

IMCSM Proceedings

ISSN 2620-0597

Volume XIV, Issue (2) (2018)

**XIV INTERNATIONAL MAY CONFERENCE ON
STRATEGIC MANAGEMENT**



**XIV STUDENTS SYMPOSIUM ON STRATEGIC
MANAGEMENT**

BOOK OF PROCEEDINGS

**An international publication for theory and practice of
Management Science**

Editor-in-Chief: Prof. dr Živan Živković

**Published by University of Belgrade, Technical Faculty in Bor,
Department of Engineering Management**

**Hotel "Jezero" – Bor
Bor, May 25 – 27, 2018**



Министарство просвете,
науке и технолошког развоја

**Conference is financially supported by
the Ministry of Education, Science and
Technological Development of the
Republic of Serbia**

**Конференција је финансијски
подржана од стране Министарства
просвете, науке и технолошког
развоја Републике Србије**

Conference partner / Partner konferencije



**Program institucionalnog jačanja ekoloških
organizacija civilnog društva CSCconnect**



Scientific Board (SB) of the Conference:

Prof. dr Živan Živković, University of Belgrade, Technical Faculty in Bor, **president of the SB.**

Prof. dr Ivan Mihajlović, University of Belgrade, Technical Faculty in Bor, **vice-president of the SB.**

Members of SB:

Dr inż. Renata Stasiak-Betlejewska, Institute of Production Engineering, Faculty of Management, The Czestochowa University of Technology Poland

Prof. dr Vesna Spasojević Brkić, University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia

Prof. dr Peter Schulte, Institute for European Affairs, Germany

Prof. dr L-S. Beh, Faculty of Economics and Administration, University of Malaya, Kuala Lumpur, Malaysia

Prof. dr Ladislav Mura, University of Ss. Cyril and Methodius, Trnava, Slovakia

Prof. dr Michael Graef, University of Applied Sciences Worms, Germany

Prof. dr Pal Michelberger, Obuda University, Budapest, Hungary

Dr. Slobodan Radosavljević, RB Kolubara, Lazarevac, Serbia

Prof. dr Jaka Vadnjal, GEA College Ljubljana, Slovenia

Prof. dr Geert Duysters, ECIS (Eindhoven Centre for Innovation Studies), Eindhoven University of Technology, Eindhoven, The Netherlands

Prof. dr Michael. D. Mumford, The University of Oklahoma, USA

Prof. dr John. A. Parnell, School of Business, University of North Carolina-Pembroke, Pembroke, USA

Prof. dr Antonio Strati, Dipartimento di Sociologia e Ricerca Sociale, Universities of Trento and Siena, Italy

Prof. dr Rajesh Piplani, Center for Supply Chain Management, Nanyang Technological University, Singapore

Prof. dr Musin Halis, University of Sakarya, Business and Administration Faculty, Serdivan, Turkey

Prof. dr Rekha Prasad, Faculty of Management Studies, Banaras Hindu University, India

Prof. dr Ofer Zwikael, School of Management, Marketing and International Business ANU College of Business and Economics The Australian National University, Australia

Prof. dr Simon Gao, Edinburg Napier University, United Kingdom

Prof. dr Jadip Gupte, Goa Institute of Management, India

Prof. dr Jan Kalina, Institute of Computer Science, Academy of Sciences, Czech Republic

Prof. dr Jifang Pang, School of Computer and Information Technology, Shanxi University, China

Prof.dr David Tuček, Tomas Bata University in Zlin, Czech Republic

Prof. dr Jyrki Kangas, University of Eastern Finland, School of Forest Sciences, Joensuu Campus

Prof. dr Natalya Safranova, Russian Presidential Academy of National Economy and Public Administration (RANEPA), Russia

Organizational Board of the Conference:

Assoc. prof. dr Predrag Đorđević, president of the Organizational Board

Doc. dr Nenad Milijić, vice-president of the Organizational Board

Prof. dr Dejan Bogdanović, member of the Organizational Board

Assoc. prof. dr Ivan Jovanović, member of the Organizational Board

Assoc. prof. dr Đorđe Nikolić, member of the Organizational Board

Doc. dr Marija Panić, member of the Organizational Board

Doc. dr Aleksandra Fedajev, member of the Organizational Board

Milena Jevtić, MSc, member of the Organizational Board

Anđelka Stojanović, MSc, member of the Organizational Board

Branislav Ivanov, MSc, member of the Organizational Board

Organizational Board of the student's symposium:

MSc Ivica Nikolić, PhD student, president of the Students Symposium Organizational Board.

MSc Sanela Arsić, PhD student, vice-president of the Students Symposium Organizational Board.

Published by Technical Faculty in Bor

CIP - Katalogizacija u publikaciji - Narodna biblioteka Srbije, Beograd

005(082)(0.034.2)

004:007(082)(0.034.2)

502.131.1(082)(0.034.2)

658(082)(0.034.2)

INTERNATIONAL May Conference on Strategic Management (14 ; 2018 ; Bor)

Book of Proceedings [Elektronski izvor] / XIV International May Conference on Strategic Management [and] XIV Students Symposium on Strategic Management [section], Bor, May 25 - 27, 2018 ; [editor in chief Živan Živković]. - Bor : Technical Faculty in Bor, Management Department, 2018 (Bor : Tehnički fakultet). - 1 elektronski optički disk (CD-ROM) : tekst, slika ; 12 cm. - (Edition IMCSM Proceedings ; vol. 14, issue (2) (2018), ISSN 2620-0597)

Sistemske zahteve: Nisu navedeni. - Tiraž 150. - Nasl. sa naslovnog ekrana. - Napomene i bibliografske reference uz tekst. - Bibliografija uz svaki rad. - Abstracts

ISBN 978-86-6305-082-2

1. Students Symposium on Strategic Management (14 ; 2018 ; Bor)

a) Менаџмент - Зборници b) Информациона технологија - Зборници c)

Одрживи развој - Зборници d) Предузећа - Пословање - Зборници

COBISS.SR-ID 266066444

Bor – July 2018

EDITORIAL

International May Conference on Strategic Management has been held continuously for 14 years, always in the last week of May (the first conference was held in 2005, while the fourteenth was held in 2018). The quality of the presented and published papers has been continuously growing as well as the number of authors from a large number of countries all over the world (during the fourteenth conference 120 papers were submitted from 223 authors, coming from 24 countries). The visibility of published papers has been constantly growing as well as the number of times they were cited, especially after the conference Book of Proceedings started to be submitted to EBSCO Host database.

The May Conference on Strategic Management become recognizable in the world due to its quality, especially in Central and Southeast Europe. Special interest from the researchers has been expressed for publishing papers in the Book of Proceedings of the conference, as evidenced by the growing number of submitted papers through the years. Due to these facts, the organizers of the conference decided that papers will be published in a periodical publication under the volume 14, with its Editorial Board, Editor-in Chief, Technical Editors and ISSN numeration assigned to periodicals. In each volume there will be a number of publications depending on the content of the available papers. In this way presented and published papers will be made accessible to the widest scientific public interested in the research in the field of Management Science.

In order to increase the quality of papers published in this periodical publication, which will be published annually after the conference, the Editorial Board will carry out another review of the papers after the conference using the external reviewers, and the accepted full papers will be published in one of the issues of these publications. The publisher's desire is to make this publication available to the general public by increasing the quality of published papers and periodicity of the publication in order to increase its accessibility, as well as to increase its contribution to the exchange of scientific experiences and research results, along with providing a contribution to the development of Management Science in the world.

Editor-in-Chief
Prof. dr Živan Živković

**INTERNATIONAL MAY CONFERENCE ON
STRATEGIC MANAGEMENT**

Plenary papers:



Volume XIV, Issue (2) (2018) 1-12

International May Conference
on Strategic Management

EVALUATION OF THE MINING PROJECTS UNDER ECONOMIC UNCERTAINTIES USING REAL OPTION VALUATION

Hesam Dehghani

Mining engineering, Hamedan University of Technology, Hamedan, Iran

Abstract: Nowadays, economic uncertainties have an indispensable role in mining evaluation projects, so the evaluation of a mining project without considering if the available uncertainties are incorrect and unreliable. Therefore, it is necessary that the mining uncertainties be recognized at the initial stage and then the evaluation process be carried out. Obviously, the economic uncertainties are the most important parameters, which can affect the evaluation process. Selecting the most reliable method for evaluating a mining project is another knot.

The results of conventional mining project evaluation methods such as Discounted Cash Flow (DCF) are conservative and these methods cannot represent the real value of mining projects. To solve this problem, it is necessary to use more accurate techniques such as Real Option Valuation (ROV). This research uses the DCF and ROV methods to compute the Net Present Value (NPV) of the Shahrak iron mine under uncertainties of operating costs and metal price. It is concluded that the NPV, which is calculated by ROV, is about 19.2% greater than DCF.

Keywords: Economic uncertainty, Binomial tree, Real option, Net present value

1. INTRODUCTION

Mining projects are complex tasks that demand a constant assessment of risk. This is because the value of a mine project is influenced by many underlying physical and economic uncertainties, which are mainly due to the volatile nature of commodity prices and uncertainty around geological conditions encountered in ore bodies. Therefore, evaluating a mine project without mentioning the risk for future losses (or opportunities) will lead to invalid results. Consequently, managers and stockholders of a mine company make an indiscreet decision based on invalid information.

Uncertainties can arise from three different sources including: geological uncertainties, design uncertainties and economic uncertainties. Geological uncertainties will occur in the duration of resource evaluation stages such as grade uncertainty, reserve modeling, deposit classification, reporting and so forth. Geological uncertainty has been investigated by many researchers. Ramazan and Dimitrakopoulos (2004) develop a stochastic based mixed integer programming (MIP) model for multiple elements that uses several simulated orebodies in order to minimize the grade uncertainty in the life of the mine schedule. The model also takes into account risk quantification, equipment access and

mobility and other operational requirement such as blending, mill capacity and mine production capacity. Godoy and Dimitrakopolus (2004) develop a new set of way to generate a mine production schedule under geological uncertainty. The first stage of the method generates a stable solution domain which shows the possible ore and waste extraction rates for a given open pit. The second stage generates optimum ore production and waste removal under uncertainty. The third stage generates a series of physical schedules which obey slope constraints, maximize the equipment utilization and meet mill requirements while matching the mining rates previously derived by the optimization. The last stage generates a single mining sequence from alternative sequences produced in the third stage by using a new algorithm based on the simulated annealing method. Leite and Dimitrakopoulos (2007) develop a stochastic based optimization model for open pit mines and apply it to a copper deposit for risk analysis. The study shows the stochastic approach generates 26% higher NPV than the conventional schedule. Also, the study suggests that life of mine schedules which incorporate geological uncertainty lead to more informed investment decisions and improved mining practice.

Design uncertainties include bench heights determination, equipment reliability, minimum stoping widths, choice of stoping method, dilution factors, geotechnical and hydrological parameters, mining recovery factors and metallurgical recovery. This type of uncertainty will affect the ultimate pit (stope) limit and scheduling period. Some researchers tried to determine the effect of this uncertainty on the project value. Groeneveld et al. (2018) presented a MIP model for determining the optimal open pit design in an iron ore mine under geological and design uncertainties. Morshedlou et al. (2014) determined the role of the equipment reliability uncertainty in the coal production in an underground mine.

Economic uncertainty is another important source of uncertainty, which has a critical impact on mine project evaluation. From the economic point of view, future metal prices and operating costs are the most important factors of uncertainty. The metal price is the real cash-settlement that represents the equilibrium or non-equilibrium of the metal market. Since this market is based on demand, supply and other factors such as speculation, news events and dividend payouts (Fanning and Parekh, 2004). Numerous research works have been carried out for price uncertainty. Dehghani and Ataee-pour (2012) evaluate a mine project under price uncertainty using binomial tree. Dehghani et al. (2014) estimated the price and operating cost in a copper mine using multidimensional binomial tree. Dehghani and Bogdanovic (2018) have proposed a new model based on the time series functions and bat algorithm for forecasting the copper price volatilities.

The mining industry will be more sustainable if projects are developed in a manner that increases flexibility to respond to uncertainties the business cycle. One of the most effective methods for managing economic uncertainty in natural resources projects is real option method. Many authors such as Costa Lima and Suslick (2006), Dimitrakopoulos and Abdel Sabour (2007), Shockly (2007) and Akbari et al. (2009) noted that ROV is far more useful method than the classical NPV method for evaluation of mining projects under the condition of price uncertainty. The sense of option appears when the information obtained during the time can be effective on the investment decision, especially when decision-making in the presence of high degree of uncertainty, some managerial flexibilities and unawareness of all the facts.

In this paper, the NPV of a real mining project was computed and compared under three scenarios: first, assuming the certain metal price; second, assuming uncertain metal price without any managerial options; third, assuming uncertain metal price with managerial options. For this propose the binomial tree method was used for investigating the operating cost and price uncertainties.

2. BINOMIAL TREE

The binomial model is a well-known alternative discrete time, which is developed by Cox et al. (1979). The method of binomial pricing tree is a flexible, powerful, and quite superb method. A binomial pricing tree is a structure that maps all possible trajectories of metal price through time as are allowed by the model. This structure consists of nodes and branches. Each node in a given layer, and therefore corresponds to a potential metal price at a particular point in time. Nodes are identified with traversal probabilities, as well as with metal prices. Nodes and the data items with which they are associated are easily indexed as elements in matrices. A convenient indexing scheme has the layer or time step represented by j (a number between 1 and n , the number of layers or time steps) and the nodes within each layer (the potential metal prices) by i (a number between 1 and m , the number of nodes in the layer). Depending on whether or not the tree is recombining, the node count m for any given layer may range from j to twice the number of nodes in the previous layer. Each branch or path in a binomial pricing tree represents a possible transition from one node to another node later in the tree and has a probability and a ratio associated with it. Branches to higher nodes reflect up probabilities (p_r) and multipliers (u), while branches to lower nodes implement the down probabilities ($1 - p_r$) and multipliers (d). A schematic binomial tree on the metal price at time zero (P_0) with three steps are shown in Figure 1. The up (u) and down (d) factors and the probability of occurrence were determined using the following formula:

$$u = e^{\sigma\sqrt{\delta t}} \quad (1)$$

$$d = e^{-\sigma\sqrt{\delta t}} = \frac{1}{u} \quad (2)$$

$$p_r = \frac{(1 + rf) - d}{(u - d)} \quad (3)$$

The basic inputs are the volatility of the metal price (σ), the risk-free rate (rf), stepping time (δt).



Figure 1. Three time step binomial tree

3. METHODOLOGY

In this section endeavor that the amount of significance and efficiency of the uncertainty of the economic parameters such as metal price and operating cost on the mining project valuation was studied using three different scenarios which is introduced bellow:

Scenario 1: NPV computation under certain metal price

Scenario 2: NPV computation under uncertain metal price without options

Scenario 3: NPV computation under uncertain metal price with options

3.1 SCENARIO 1: NPV COMPUTATION UNDER CERTAIN METAL PRICE

In this scenario, the project NPV was calculated using the traditional discounted cash flow (DCF) technique. For this purpose, in the first step, the taxable income (V) and cash flow (CF) were determined using Equations 4 and 5.

$$V_n = (P_n - r_n) \times Q_{r_n} - C_n \times Q_{m_n} - F_n - D_n \quad (4)$$

$$\begin{cases} CF_n = V_n (1 - T_n) + D_n & \text{if } V_n > 0 \\ CF_n = V_n + D_n & \text{if } V_n \leq 0 \end{cases} \quad (5)$$

Where V_n : taxable income at time n, P_n : metal price at time n, r_n : refining and treatment costs C_n : variable cost at time n, Q_m : tonnage of metal production at time n, Q_{mm} : tonnage of crushed ore at time n, F_n : fixed cost at time n, D_n : the depreciation at time n, CF_n : cash flow to the firm at time n and T_n : tax rate at time n.

There are many methods for estimating the future metal price and operating cost such as using the average of the previous metal price and operating cost data and regression analysis. After calculating the CF, the NPV will be determined using Equation 6.

$$NPV = -I + \sum_{n=1}^N \frac{CF_n}{(1+i)^n} \quad (6)$$

where I: the capital investment and i: the discount rate for the mining project.

3.2 SCENARIO 2: NPV COMPUTATION UNDER UNCERTAIN METAL PRICE WITHOUT OPTIONS

In this scenario, the metal price is considered uncertain. A binomial tree which is constructed using the historical data is utilized for estimating the future metal price changes. The future operating cost data is estimated using the regression analysis. Therefore, a new FCF binomial tree is constructed using the metal price binomial tree, annual estimated operating cost and equations (4) and (5). Finally, after constructing the CF binomial tree, the DCF will be calculated using the equation (7).

$$DCF_{n,k} = CF_{n,k} + \frac{p_r \cdot DCF_{n+1,k} + (1-p_r) \cdot DCF_{n+1,k+1}}{(1+rf)} \quad (7)$$

Where k is the node number at time n .

3.3 SCENARIO 3: NPV COMPUTATION UNDER UNCERTAIN METAL PRICE WITH OPTIONS

In this scenario, the metal price is uncertain but unlike the previous scenario the options were considered. The uncertainty of metal price will be modeled using the binomial tree method. Then, the CF binomial tree will be constructed using Equations (4) and (5). Finally, the ROV will be computed using Equation (8). The advantage of this model is comparing mine value with reinvesting cost, closing cost and reopening cost in each period. Three options were added to Equation (8): reinvesting cost, temporary closing cost and reopening cost of the mine. These three functions should be estimated for the entire mine life. This means the option comprehensively is comparing value of mine with all other opportunities in each time.

$$ROV_{n,k} = MAX \left\{ -D_1 O_1, CF_{n,k} + \frac{pr \cdot DCF_{n+1,k} + (1-pr) \cdot DCF_{n+1,k+1}}{(1+rf)} - D_2 O_2 \right\} \quad (8)$$

where: $ROV_{n,k}$ is real option valuation in time n and node k , $CF_{n,k}$ is free cash flow in time n and node k , $D_1 = 1$ if the mine is going to close temporary in time n , otherwise $D_1 = 0$, $D_2 = 1$ if the mine is going to reinvesting in time n , otherwise $D_2 = 0$, O_1 is temporary closing cost of mine, O_2 is cost of reinvesting.

4. NUMERICAL ANALYSIS

4.1 SHAHRAK IRON MINE

Shahrak mine is one of the most important iron mines in west of Iran. This mine is located 100km northeast of Bijar City in Kurdistan province, and is situated on the Sanandaj-Sirjan metamorphic zone, which has been played a large part in the history of the tectonics of Iran plate margin. Open pit mining is utilized at this mine. The main mineral in this deposit is magnetite. The average grade of magnetite is 50%. The effective tax is 30%. The average annual depreciation at this mine is equal to 0.8M\$. The risk free rate is 7%. It is assumed that the operating and fixed costs are adjusted by the risk free rate for the entire life-of-mine.

Until 2008, Shahrak mine only produced and sold 500 thousand tones crushed iron ore per year with the grade of 55 to 58 percent. Managers had three options, i.e. (1) continuing the current situation, (2) temporary closing and reopening the mine based on the price changes and (3) developing a concentrate factory for producing and selling the iron ore concentrate. The NPV criterion was selected for comparing and choosing the best option. In order to calculate the NPV, crushed iron ore and iron concentrate price fluctuations from 2003 to 2008 were gathered as shown in Fig. 2.

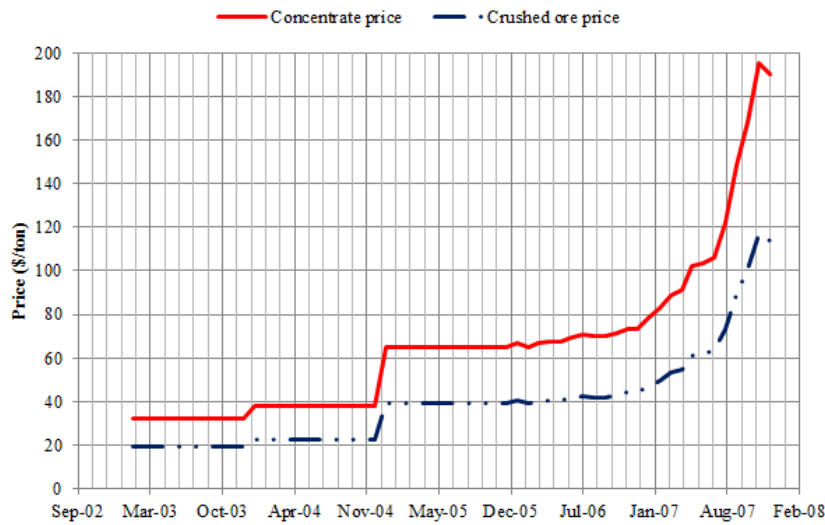


Figure 2. Iron ore price fluctuation

For finding the best option, Shahrak mine project were evaluated under the above mentioned scenarios. The fundamental information is presented in table 1.

Table 1. Input data parameters (In 2008)

Input data	Amount	Unit
Crushed iron ore price	73.2	(\$/ton)
Operating cost	6.5	(\$/ton)
Crushed iron ore production	0.5	(Mton)
Fixed cost	6.3	(M\$)
Deprecation	0.8	(M\$)
Tax	30	%
Discount rate	15	%
Stripping ratio	2:1	-

4.2 SCENARIO 1: NPV COMPUTATION UNDER CERTAIN METAL PRICE

In this scenario, it is assumed managers reluctant to change the current conditions. Therefore, there is no option to deal with the future uncertainties. The metal price, operating cost and fixed cost are adjusted by the risk free rate for the entire life-of-mine. Table 2 shows the project discounted cash flow for next ten years. The Shahrak mine project NPV is obtained as 106.17 M\$ using Eq. 6.

Table 2. Discounted cash flow

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Price (\$/ton)	73.20	78.32	83.81	89.67	95.95	102.67	109.85	117.54	125.77	134.58
Operating cost (\$/ton)	6.50	6.96	7.44	7.96	8.52	9.12	9.75	10.44	11.17	11.95
Production (M ton)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Fixed cost (M\$)	6.30	6.74	7.21	7.72	8.26	8.84	9.45	10.12	10.82	11.58
Deprecation (M\$)	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Cash flow (M\$)	16.59	17.73	18.95	20.26	21.66	23.16	24.77	26.49	28.32	30.29
Discounted cash flow (M\$)	14.42	13.41	12.46	11.59	10.77	10.01	9.31	8.66	8.05	7.49

4.3 SCENARIO 2: NPV COMPUTATION UNDER UNCERTAIN METAL PRICE WITHOUT OPTIONS

In this scenario, the crushed iron ore price fluctuations are modeled using the binomial tree method. For this purpose, the volatility of the iron price data was calculated using the historical data. Table 3 shows the fundamental information for constructing the iron price binomial tree. Upside, downside and probability is calculated using equations 1 to 3, respectively. In Figure 3, the binomial tree of iron prices is illustrated for 10 years.

Table 3. Fundamental data for copper price binomial tree

Input data	Volatility (σ)	Up (u)	Down (d)	Risk free rate (rf)	Probability (p_r)
Crushed iron price	8.23%	1.33	0.75	0.07	0.55

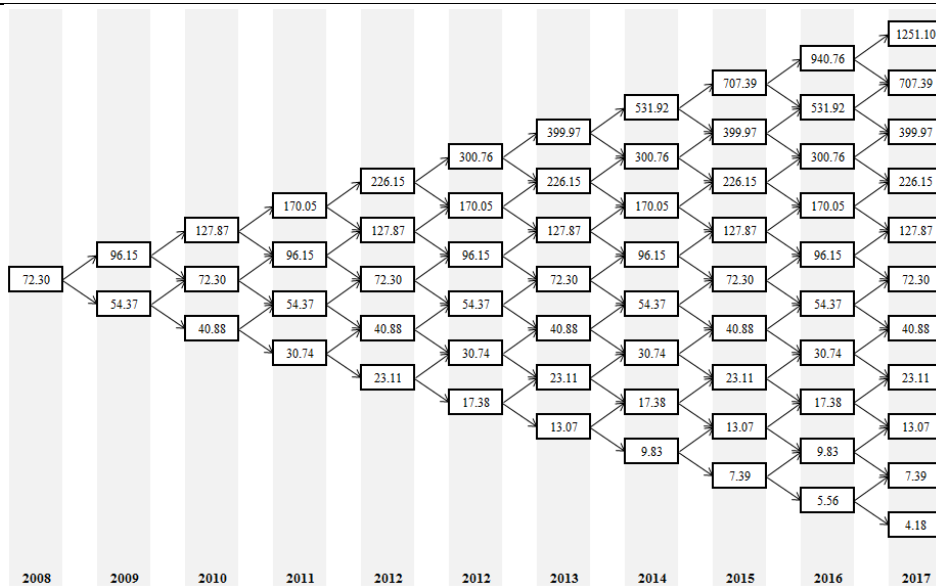


Figure 3. Binomial tree of iron price from 2008 to 2017 (\$/ton)

The operating cost and the rest of the data is the same of the scenario 1. Therefore, the CF binomial tree is calculated using Equations 4 and 5. Figure 5 shows the CF binomial tree.

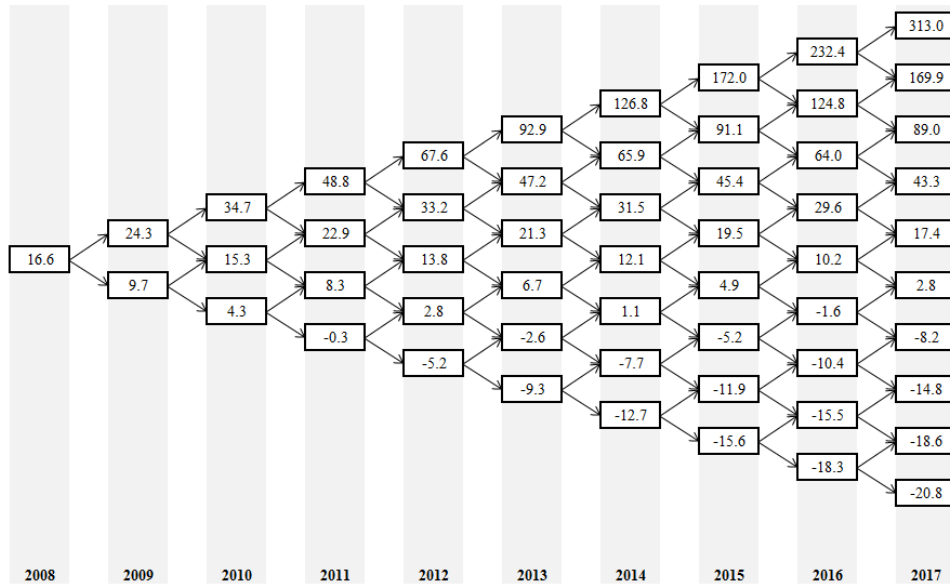


Figure 4. Binomial tree of FCF (M\$)

In this scenario, the project discounted cash flow binomial tree is calculated from project cash flow binomial tree. The last column in Fig. 5 is the same as the last column in Fig. 4. Eq. 7 is used to calculate the project DCF for the remaining years. According to this approach and from Figure 5 the NPV is obtained 121.4 M\$.

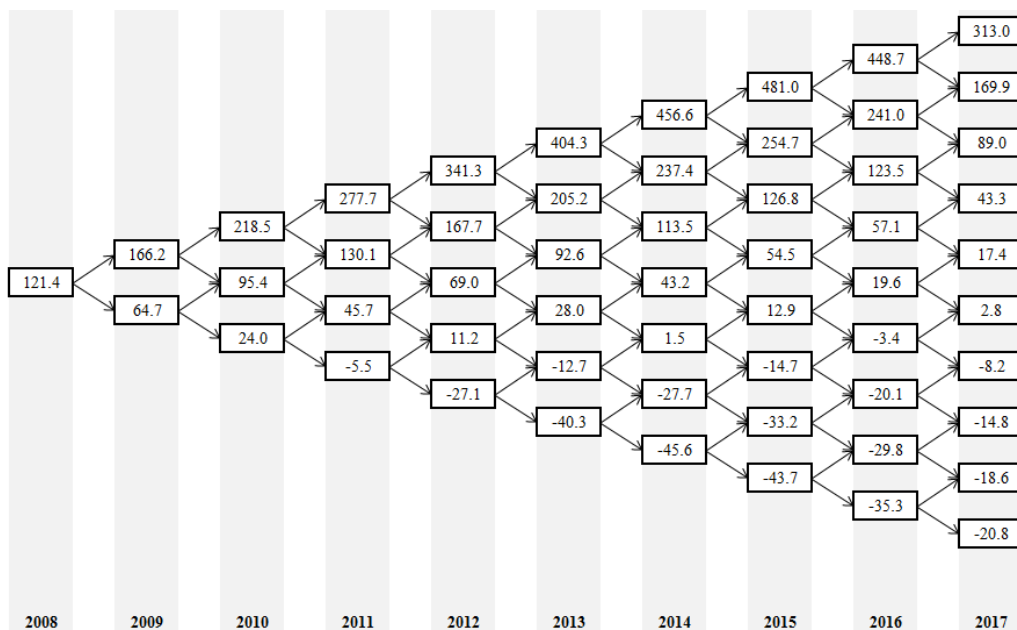


Figure 5. Binomial tree of DCF (M\$)

4.4 SCENARIO 3: NPV COMPUTATION UNDER UNCERTAIN METAL PRICE WITH OPTIONS

In this scenario, for dealing with the risks and uncertainties the managers may use the options. Temporary closing the mine (Temporary closing option) and investing for building an iron ore concentrate plant (Investing option) are the main options in Shahrak mine. For utilizing the options the American call option method was used. Therefore, the value of each option should be calculated at the end of the period. Moreover, unlike the investing option, which can be used only one time, mine may open and close many times during the plant construction period. Figure 6 shows the real option valuation of cash flows for the next 10 years.

The reopening costs and temporary closure costs for the Shahrak mine have been assumed \$10 million in 2008. The cost estimations are adjusted by the risk free rate for the entire life-of-mine, as can be seen in Table 4.

Table 4. Closing, reopening costs and value of expansion

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Temporary and reopening cost (M\$)	10.00	10.70	11.45	12.25	13.11	14.03	15.01	16.06	17.18	18.38

The capital investment for building the iron concentrate plant with the capacity of one Mton per year is about 80 M\$. The capacity of the first phase of the concentrate plant is about 325 thousand tons per year. The construction period is 3 years. Also the concentrate project is tax free for 10 years. The rest of the information is presented in Table 5.

Table 5. Iron concentrates economic parameters (In 2008)

Input data	Amount	Unit
Concentrate price	122	(\$/ton)
Processing operating cost	10	(\$/ton)
Concentrate production	0.325	(Mton)
Fixed cost	7.2	(M\$)
Deprecation	1.8	(M\$)

The volatility of the iron concentrate price is like the crushed iron ore. Based on Figure 5, as the value of the first and second nodes in 2009 is more than plant construction capital investment, this year is suitable for constructing the concentrate factory. The CF binomial tree of this scenario is shown in Figure 6.

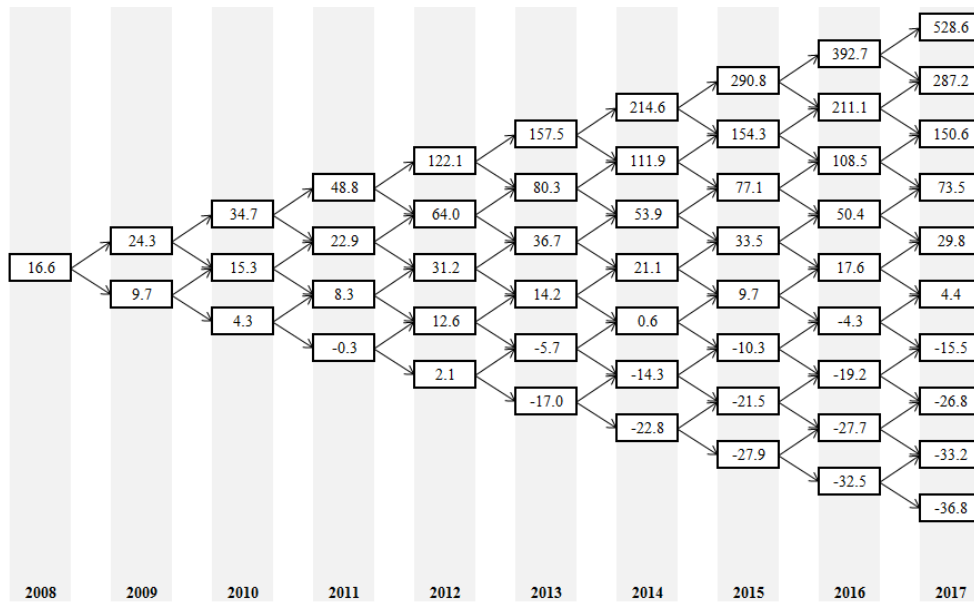


Figure 6. CF binomial tree for ROV

Using Equation 8 the real option binomial tree will be constructed as bellow. Using this method, the NPV of the project is obtained 131.5 M\$.

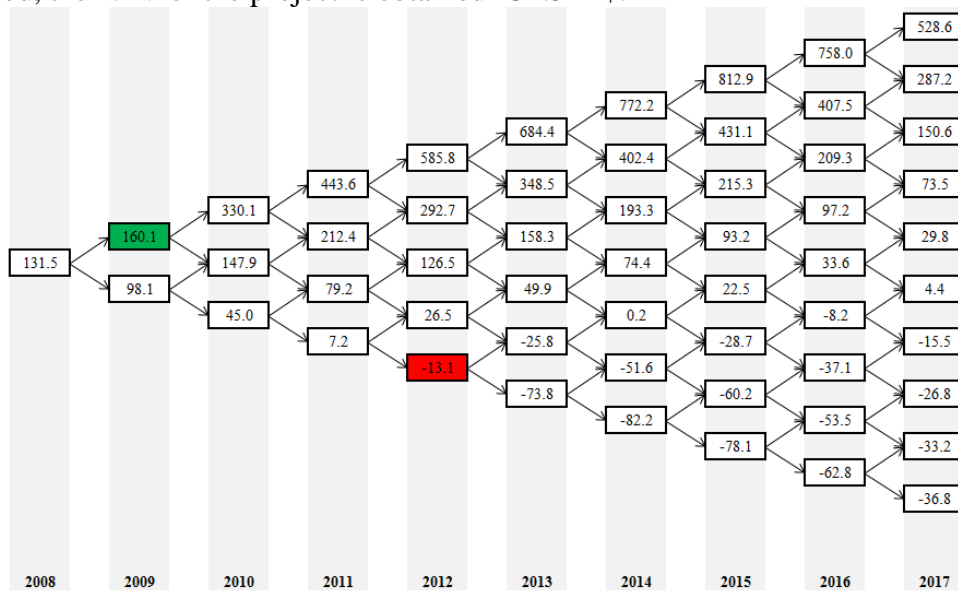


Figure 7. Binomial tree of DCF (M\$) in real option valuation method

In Fig. 7 the investing option has been represented by green and temporary closing by red.

5. DISCUSSION

The changes of the NPV in various scenarios are presented in Fig. 8. As it is shown, in comparison with classic evaluation, options can increase the NPV about 43 percent. Therefore, the managers convinced that if the price of the crushed iron ore price increase

more than 55 \$/ton, called the investing option and if the crushed iron ore price decrease less than 30 \$/ton, called the temporary closing option. Since the average crushed iron ore price in 2009 reached to 80 \$/ton, the construction period was began. After 3 years the concentrate plant started to produce 0.325 MTON iron concentrate per year. Figure 9 shows the concentrate plant. Also, the real NPV for this project was obtained 119.68 M\$.

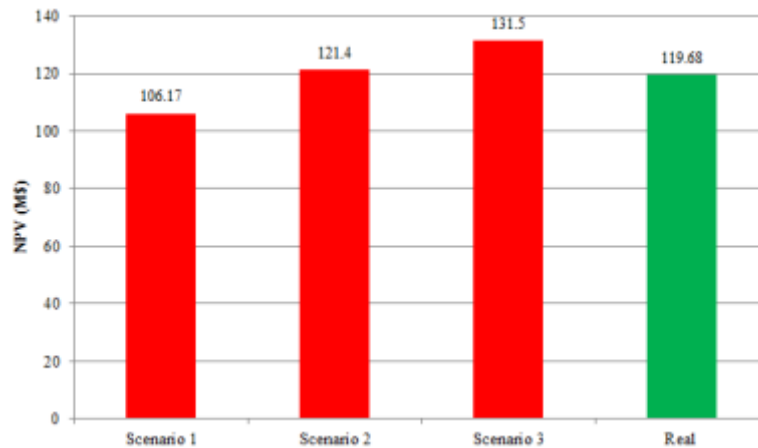


Figure 8. NPV changes based on the various scenarios



Figure 9. Shahrak iron ore concentrate Plant

6. CONCLUSION

The NPV of the Shahrak iron mine project was determined under three scenarios, i.e. using: certain metal price, uncertain metal price without any options and uncertain metal price with options. The following results were concluded:

- The binomial tree method is a suitable and applicable technique for forecasting the economic uncertainties in mining projects.
- The conventional approach (Scenario1) provided 106.17 M\$ for the NPV, while the NPV in uncertain metal price without any options was obtained for 121.4 M\$. The NPV in uncertain metal price with options was obtained for 131.5 M\$.

- Based on the foregoing facts, it can be confirmed that the suggested methodology can successfully be applied for evaluating the mine projects.
- This methodology has only been applied for a mine project, but it is obviously that the proposed model can be used for solving a large scale of evaluation problems in various fields, such as mining, management, economy, production, etc.
- Fluctuation of the iron price and not using the temporary closing option are the main reasons that the real NPV is less than ROV.

REFERENCES

- Akbari AD, Osanloo M, Shirazi MA, 2009. *Reserve estimation of an open pit mine under price uncertainty by real option approach*, Mining Science and Technology, Vol. 19, pp.0709–0717.
- Costa Lima GA, Suslick SB, 2001. *Estimating the volatility of mining projects considering price and operating cost uncertainties*, Resources Policy, Vol. 31, No. 2, pp.86–94.
- Cox JC, Ross SA, Rubinstein M, 1979. *Option pricing: a simplified approach*, Journal of Financial Economics, Vol. 7, pp.229–263.
- Dehghani H, Ataee-pour M, 2012. *Determination of the effect of operating cost uncertainty on mining project evaluation*. Recour. Policy 37, 109–117.
- Dehghani H, Ataee-pour M, Esfahanipour A, 2014. *Evaluation of the mining projects under economic uncertainties using multidimensional binomial tree*. Resour. Policy. 39, 124–133.
- Dehghani H, Bogdanovic D, 2018. *Copper price estimation using bat algorithm*. Resources Policy. 55, 55-61.
- Dimitrakopoulos R, Abdel Sabour SA, 2007. *Evaluating mine plans under uncertainty: Can the real options make a difference?* Resources Policy, Vol. 32, No. 3, pp.116–125.
- Fanning, S, Parekh, J, 2004. *Stochastic processes and their applications to mathematical finance*. The Maryland Mathematics Department (working), 31.
- Godoy M, Dimitrakopoulos R, 2004. *Managing risk and waste mining in long-term production scheduling*. SME Trans. 316:43–50.
- Groeneveld B, Topal E, Leenders B, 2018. *A New Methodology for Flexible Mine Design*. The Australasian Institute of Mining and Metallurgy, https://doi.org/10.1007/978-3-319-69320-0_14, 191-216.
- Leite A, Dimitrakopoulos R, 2007. *A stochastic optimization model for open pit mine planning: application and risk analysis at a copper deposit*. Min Technol Trans Inst Mater Miner Min. 116(3):109-118.
- Morshedlou A, Dehghani H, Hoseinie SH, 2014. *Reliability-based maintenance scheduling of powered supports in Tabas mechanized coal mine*, Journal of Mining & Environment. 5(2):113-120.
- Ramazan S, Dimitrakopoulos R, 2004. *Traditional and new MIP models for production scheduling with in-situ grade variability*. International Journal of Mining, Reclamation and Environment. 18(2):85-98.
- Shockly R, 2007. *Applied Course in Real Options Valuation*, Thomson Learning, London.



MANAGEMENT OF AGRICULTURAL AND RURAL DEVELOPMENT IN THE REPUBLIC OF SERBIA

Lela Ristić

University of Kragujevac, Faculty of Economics, Serbia

Abstract: Agriculture and rural areas are of the exceptional socio-economic importance for the Republic of Serbia, therefore, their management, although a very complex task, is an imperative. Responsible governance is essential at all levels, starting with the most important and irreplaceable role of the state, i.e., relevant authorities and institutions at the macro level, to local self-governments, the private sector and farmers. At the global level, management of agriculture and rural economy significantly determines the national institutional structure, directions of development and models of rural development and agriculture. In the light of the EU integration of the Republic of Serbia, as well as the effects of many global interrelated factors that inevitably affect each and every country, the mentioned facts should be thoroughly considered. With this in mind, the aim of this paper is to identify the opportunities for improving the management of agriculture and rural development in the Republic of Serbia, in terms of better strategic management, i.e., creating and implementing adequate development policy tailored to the real needs of local farmers and non-agricultural economic entities in rural areas, as well as the modernization of the lower levels of management, including the smart use of external support. The research focuses on the following: key characteristics of agriculture and rural areas in the Republic of Serbia that are considered important in terms of management; management models currently applied; developing more efficient management practices in line with the contemporary internal and external challenges.

Keywords: agriculture, rural development, management, Republic of Serbia

1. INTRODUCTION

The basic function of agriculture and rural areas is food production. Their role in production of raw materials for the food industry, exports, and balance of payments, extraordinary circumstances, environmental protection, and natural resources is of great importance as well. Therefore, agrarian and rural development management is one of the important issues of socio-economic stability, prosperity, and preservation of the ecological capacity of each country. Macro-level management defines models of agrarian and rural management at the micro level, i.e. it determines the position and performance of agricultural producers and agribusiness enterprises, as well as the satisfaction of food consumers and other relevant socio-economic entities.

Agrarian and rural development management is of strategic importance for the Republic of Serbia, especially because of abundant natural resources in agriculture and rural areas, which need to be used in a sustainable manner. Adequate management in this field is

also important due to the large share of agriculture in GDP, employment, exports, and similar indicators. Due to a large number of factors restricting the development of other economic sectors, agriculture and rural areas are, due to favorable natural conditions and agricultural tradition, becoming more and more important as the development potential of the Republic of Serbia, as confirmed in a number of strategic documents related to this field. Nevertheless, there are no ambitious activities in practice, as indicated by unsatisfactory business results in agribusiness, unfavorable situation in agriculture and rural areas, and especially low development level of small agricultural holdings and cooperatives. The above confirms the need for better management of agrarian and rural development at all levels.

The research subject in this paper is the management of agrarian and rural development in the Republic of Serbia. The aim of this paper is to identify the opportunities for improving the management of agriculture and rural development in the Republic of Serbia, in terms of better strategic management, i.e., creating and implementing adequate development policy tailored to the real needs of local farmers and non-agricultural economic entities in rural areas, as well as the modernization of the lower levels of management, including the smart use of external support.

The starting hypothesis in the paper is: if the models of agrarian and rural development management are created and applied, adapted to agriculture and rural areas specifics of the Republic of Serbia, better results can be expected in this field, both at macro and micro levels.

The paper is based on the results of previous research, official statistical and available empirical indicators on issue under consideration, relevant strategic documents, and legal regulations underlying agricultural and rural development management. The purpose of using the historical method in the paper is to identify the good and bad sides of different management methods in the past and today. The description method is used for detailed description of the development potentials and limitations managers face on the road to more successful agriculture, i.e. rural economy. The comparison method is used to compare the key development indicators, and the SWOT analysis gives strengths, weaknesses, opportunities, and threats from the environment, relevant to the research area.

2. LITERATURE REVIEW

Specifics of production and consumption of agro-food products determine agrarian management specifics. Agricultural production does not only involve work processes, but also biological processes, which require special attention of agrarian managers. Resource management is far more complex than in many other fields. The complexity is also related to the specifics of certain production factors, such as land or genetic and human resources. Agrarian business also requires environmental protection, since a large part of agricultural production is carried out in the open space. Cost imbalance and longer working capital entrapment in agriculture stem from the seasonal production character, the impact of natural factors, and the like. Agricultural products cannot be stored and kept in stock indefinitely, so their storage requires additional investment. Agriculture is in organizational, economic, and technological terms linked with other sectors of the economy, which additionally complicates the business in this area and the demands imposed on agrarian managers. The specifics of small farm management are particularly emphasized, as well as the great influence of the socio-economic environment (Figure 1), while the adjustment of agrarian and rural development to the changed market demands does not generally take place rapidly [19].

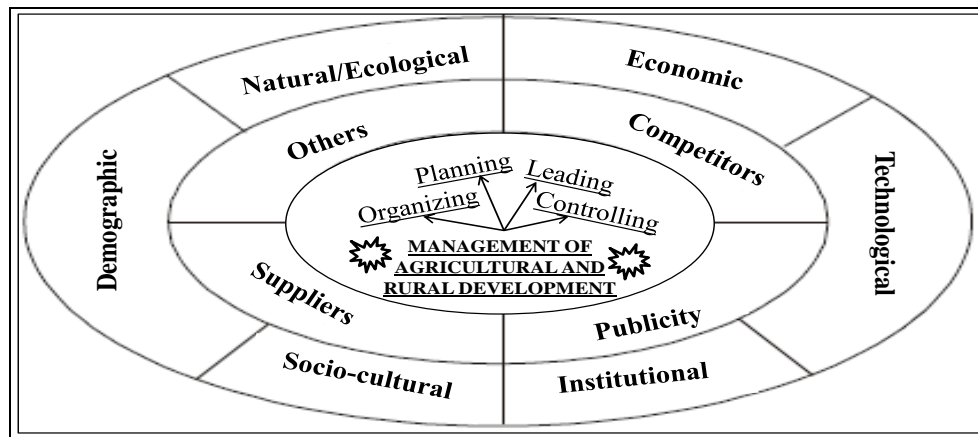


Figure 1. Environment facing management of agricultural and rural development [19]

Agrarian management (Figure 2) takes place both at the macro level (national level) and at the micro level (level of agricultural enterprises, agricultural cooperatives, and family farms). At the macro level, state management decisions relate to [15]: structure of agricultural production in the country; price stability and parity; market; import, export, and balance of payments; system of agricultural financing; organization of professional services; quality system, and the like. Rural development management is a broader concept, and, in addition to agrarian management in rural areas, implies also the management of other important sectors.

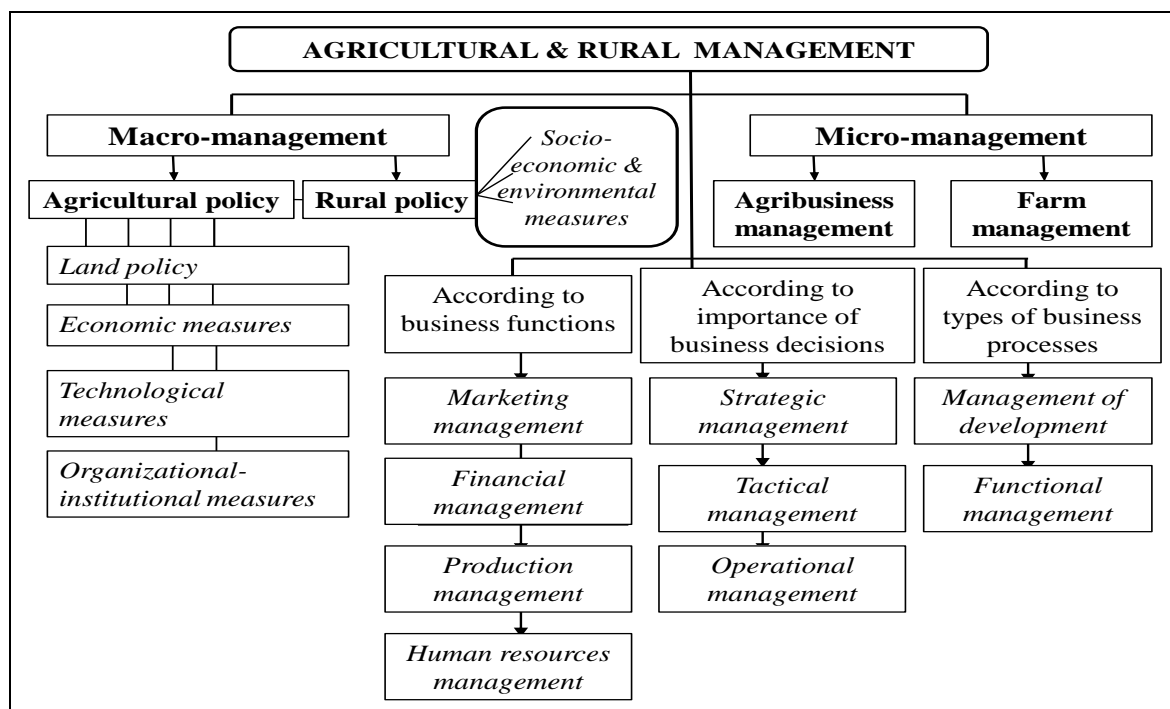


Figure 2. Types of management in agriculture and rural development [20]

Some of the most important points that make up the essence of agriculture and rural development planning at macro level are: importance, place, and role of agriculture and rural economy in economic development; establishing the institutional framework for agrarian and rural development; defining clear development directions; determining the available resources

and the model of their allocation; anticipating problems and choosing alternatives. Within the organization process, the following are of particular importance: new technology; sustainable use of natural resources; organizing the market for agricultural products; developing modern organizational forms and information system in agrarian and rural areas [4]. Some of the most complicated issues that managers face are: managing innovation, information, risk, human, and financial resources. Control activities are closely related to other stages of the management process, permeate them, and contribute to their improvement. Control must be very broad and include [5]: inputs, business operations, outputs, other phases of the management process, and the environment (macro-environment, competitors, etc.).

Agribusiness management is concerned with decision making within the different organizations that comprise the food system [7]. The agribusiness management is fundamentally a multi-disciplinary endeavor because it operates at various levels of analysis that requires different disciplinary approaches. As a result, dialogue between the fields of management, sociology, economics and other related fields serves to not only highlight the unique approaches to examining various levels of analysis in agribusiness management research but as a consequence serves to advance the pluralistic nature of this field [12].

A generalized schematic representation of the farm system is shown in Figure 3. The central role of management subsystems clearly emphasized.

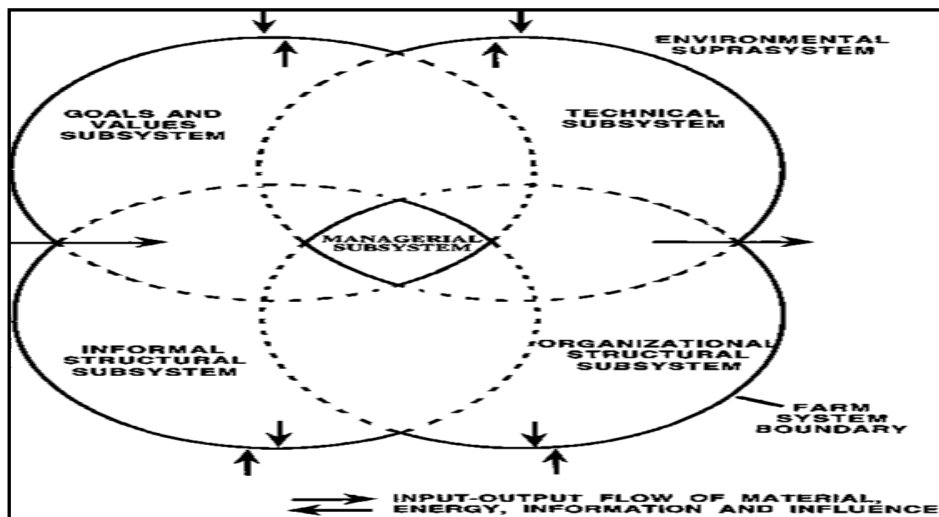


Figure 3. Generalized schematic representation of the farm system [6]

The different concepts and principles are important for managers [2]. The main problems of management of rural development are shown in Figure 4.

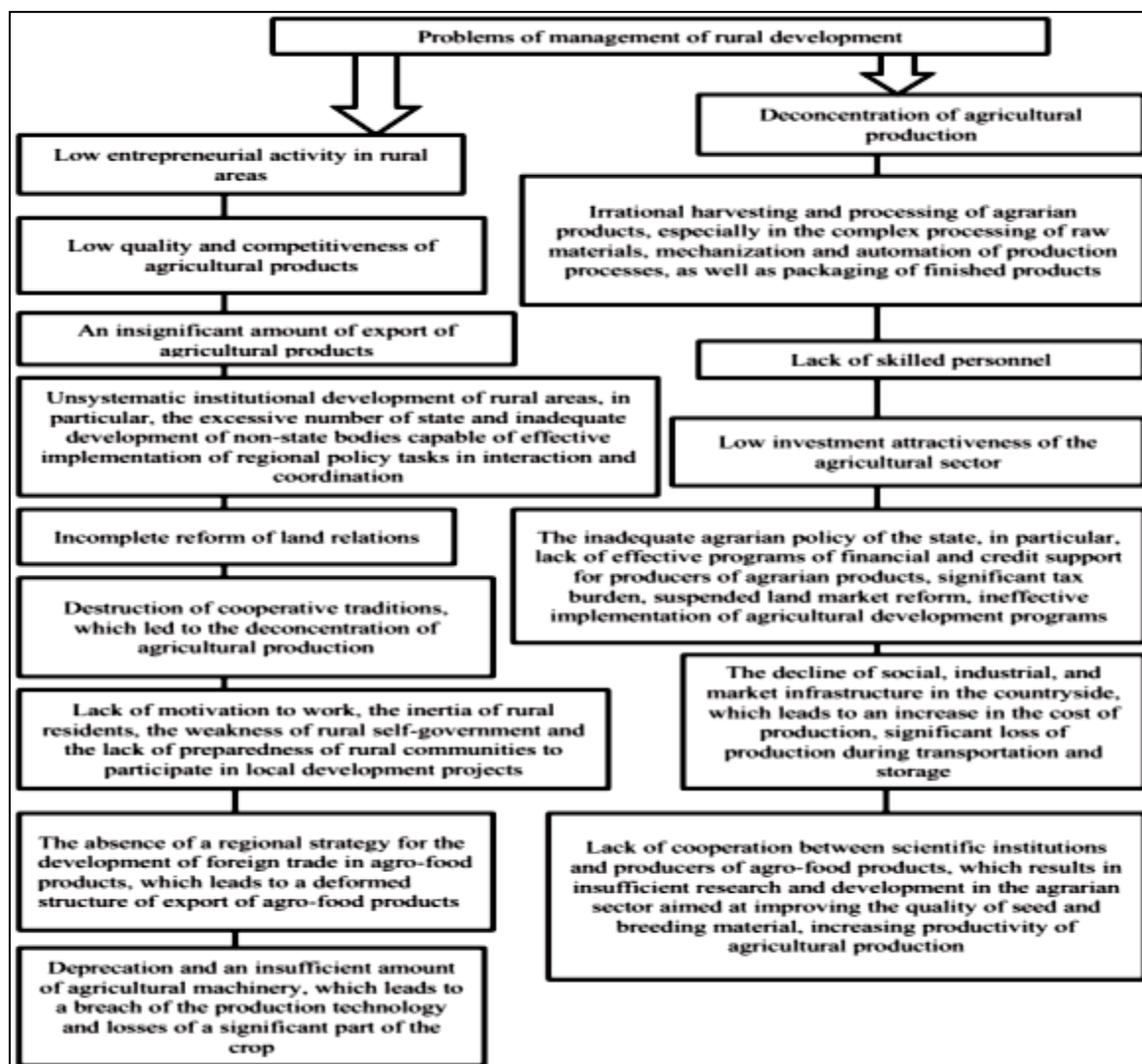


Figure 4. The most common problems of management of rural development [18]

Makeham (1968) wrote that there were two major challenges facing farmers [8]: how to incorporate new technology and how to be sufficiently flexible. What farm management economists today require from the agricultural systems modellers are the technical coefficients for potential changes. The tools for analysing changes are already available, and are very powerful, but still they must be in competent hands to be useful [9]. There are many contemporary management tools: satellite farm monitoring systems; farm management softwares that help farmers in data-driven decision making for improving productivity and profitability; agricultural accounting packages; platforms designed to track field data, etc. Thereby, the contemporary management has an important role to increase entrepreneurial and employment opportunities of rural inhabitants [1].

3. SPECIFIC FEATURES OF AGRICULTURE AND RURAL AREAS OF THE REPUBLIC OF SERBIA IMPORTANT FOR MANAGEMENT AT MACRO AND MICRO LEVELS

The analysis of the situation in the agrarian sector and rural areas as well as the detection of external and internal challenges (Table 1) significantly define development vision, goals, and priority areas of managers at all levels.

Table 1. SWOT analysis of agrarian economy and rural areas of the Republic of Serbia [16]

STRENGTHS	WEAKNESSES
Resources	
Favorable climatic conditions for agricultural production; Abundant land resources and biodiversity; Animal feed; Cost of labor	Undeveloped infrastructure; Property fragmentation; Outdated equipment and machinery; Plantation depreciation; Small number of livestock; Demographic structure
Food production	
Tradition of agriculture; Competitiveness of certain agrarian products on some foreign markets; Recovery of some branches of agriculture; Growing organic production sector	Insufficient use of modern technology; Unattractive product range; Inefficient food quality control system; Undeveloped system of financing and insurance in agrarian sector
Production chain	
Relatively well-supplied input market; Storage capacities; Improved technology in some subsectors; Availability of various raw materials from domestic agriculture; Associations, organizations, and other types of cooperation are formed	Outdated technology or a low degree of utilization of processing capacities; Low degree of horizontal and vertical connection; Presence of monopoly; Insufficiently developed modern market institutions and infrastructure; Insufficient logistical support
Technological development and environment	
Scientific and educational institutions; Interest in accepting new technology; Unpolluted environment in many rural areas; Existence of HNVP (High Nature Value Farmland)	Low financial capacity and technical conditions for research; Insufficient knowledge transfer; Degradation of many habitats and biodiversity
Rural development	
Diversity and attractiveness of the rural environment; Cultural heritage; Preserved tradition in many parts; Rural tourism	Non-diversified rural economy; Undeveloped rural infrastructure; Lack of financial resources; Adverse demographic trends
OPPORTUNITIES	THREATS
Resources	
Raising new plantations; Revitalization of animal husbandry; Improvement of the natural resource management system and their increased use in organic production, rural tourism, etc.	Lack of system solutions and increased financial support; Inefficiency of the natural resource management system; Climate changes; Neglecting marginal areas
Food production	
Growth of investors' interest in investment in the agrarian sector and the rural economy; Improving the quality system; Export growth	Growing competition; Lack of financial capital; Political or/and economic instability; Unpreparedness for the liberalization process
Production chain	
Investing in quality, distribution, and storage systems	Non-functionality of inspections; Gray economy, Monopoly
Technological development and environment	
Developing capacities for creating and transferring knowledge, with the cooperation of researchers and professionals in the country and abroad; Production of energy crops and use of renewable energy sources	High costs of creating and transferring knowledge; Non-innovative scientific-research staff; Non-motivation of manufacturers to accept new technology; Absence of system support
Rural development	
Creating new products and services within the rural economy; Use of EU funds (IPARD etc.)	Insufficient budget support; Poor investor interest; Rising rural poverty and regional differences

The agricultural sector and rural areas of the Republic of Serbia have significant development resources, especially natural conditions. On the other hand, there are many weaknesses and threats to development. Nevertheless, there are many opportunities for the development of the domestic agrarian and rural economy. More serious efforts are needed at all levels, ranging from institutional improvement to significant changes in business models of agribusiness entities themselves.

4. MANAGING AGRARIAN AND RURAL DEVELOPMENT IN THE REPUBLIC OF SERBIA

Agrarian and rural development management in the Republic of Serbia has in recent decades been under the influence of very complex and heterogeneous factors, both in the country and in the international environment. Basically, the main feature of this period was the neglect of agriculture. The first transition years brought some changes in relation to previously applied policies. In 2004, a new shift in strategic choices and implementation mechanisms occurred. The Agricultural Development Strategy of Serbia was adopted in 2005, then the National Program for Agriculture of the Republic of Serbia from 2010 to 2013, and the National Rural Development Program 2011 - 2013 (Table 2).

Table 2. The strategies and programs for the agricultural and rural development of the Republic of Serbia [17; 10; 11; 14; 16; 13]

Agricultural Development Strategy of Serbia in 2005
Strategic objectives: <ul style="list-style-type: none"> • Build a viable and efficient agricultural sector that can be competitive on the world market • Provide food that meets the needs of consumers in terms of quality and safety • Provide support to the living standard of people who depend on agriculture • Provide support for the sustainable development of villages • Preserve the environment from the impact of agricultural production impact • Prepare the agriculture of the Republic of Serbia for EU integration • Prepare a policy of domestic support and trade in agriculture in line with WTO rules
National Agricultural and Rural Development Programs 2010/2011 - 2013
<ul style="list-style-type: none"> • Vision for agriculture: dynamic and competitive agriculture, commercial farms, quality products, cooperation with the processing industry, contribution to the protection of environment and natural resource etc. • Vision for food industry: meeting consumers' needs and requests, innovation, food quality, cooperation with farmers and their associations, development of SMEs, etc. • Vision for rural economy and society: rural communities characterized by balanced age structure of the population, satisfactory income and employment opportunities, access to education, fostering the cultural identity, protection and preservation of the environment, sustainable use of natural resources, reducing poverty and social exclusion, promoting local initiatives in order to improve the quality of life in rural areas, diversification of activities
Agricultural and Rural Development Strategy of the Republic of Serbia for the period 2014-2024
Vision for the development of agriculture and rural areas of the Republic of Serbia: <ul style="list-style-type: none"> • Make agriculture a sector whose development is based on knowledge, modern technology and standards, which offer innovative products to domestic and demanding foreign markets, and provide producers with stable income • Manage the natural resources, environment, and cultural heritage of rural areas in accordance with the principles of sustainable development, in order to make rural environment an attractive place for life and work
Strategic development goals: <ul style="list-style-type: none"> • Growth in production and stability of producers' income • Increasing competitiveness by adapting to market demands, technological improvement of the agrarian sector • Sustainable resource management and environmental protection • Improving the quality of life in rural areas and reducing poverty • Efficient management of public policies, improvement of the institutional framework for the development of agriculture and rural areas
National Program for Agriculture for the period 2018-2020
Objective: Supporting the development of agriculture, adapting the agrarian policy to the EU, i.e. CAP rules and principles

New phase of reform began in 2013, when the process of EU accession became more dynamic. The new Law on Incentives in Agriculture and Rural Development (2013) created an important prerequisite for establishing a more consistent agrarian and rural development framework. Instrument for Pre-Accession Assistance for Rural Development of the Republic of Serbia for the period 2014-2020 (IPARD II program) was adopted in 2015. The

Agricultural and Rural Development Strategy of the Republic of Serbia for the period 2014-2024 is an important step forward in the implementation of reforms in the agricultural sector and the rural economy. The strategy encourages the harmonization of domestic legislation with EU acquis in the field of agriculture and rural development. The National Program for Agriculture for the period 2018-2020 is based on this Strategy, and further elaborates it [13]. The preparation of the National Program for Rural Development is also foreseen.

The visions, directions, priorities and objectives for the agriculture and rural development of the Republic of Serbia contained in the agricultural and rural development strategies and programs 2005-2024, which share the similar projections, are too ambitious for our circumstances, especially in terms of financing, the scope of activities, the objectives to be achieved, etc. [14]. Although the national policy frameworks are harmonized in legal, strategic, and program terms, their implementation in practice has been inconsistent so far [3], which is particularly evident in the level of development of small agricultural holdings, the situation regarding rural infrastructure, and other numerous weaknesses in domestic agriculture and rural areas.

Today, the Ministry of Agriculture, Forestry, and Water Management is responsible for agrarian and rural development management in the Republic of Serbia, i.e. its sectors and departments. Great efforts are being made in the process of negotiations with the EU, as well as in other forms of international cooperation, so that positive developments are achieved in some sectors. At the local government level, as well as at the micro level, there are examples of good practice and interest to improve the management of agricultural and rural economy development, although many restrictions still exist, which cannot be overcome without greater state and external support, reasonably expected in the next period.

5. POSSIBLE IMPROVEMENT DIRECTIONS OF AGRARIAN AND RURAL DEVELOPMENT MANAGEMENT IN THE REPUBLIC OF SERBIA

A successful agriculture development model requires comprehensive systemic measures and state actions. In addition, farmers themselves must develop managerial skills, which are of particular importance in today's era of market globalization, modern technology, strong competition of powerful companies and brands, high production costs, limited access to favorable sources of financing, difficult product placement, etc. For domestic farmers, the following is important: greater use of state subsidies and European funds for agricultural and rural development; stronger linkage of primary agricultural production with the manufacturing sector; contracting purchase before commencement of production; customizing product range to market requirements; economic diversification of production on farms; association of agricultural producers for joint performance and protection on the market, etc. These and similar methods and models can significantly reduce the risks faced by small farms and other economic entities in rural areas.

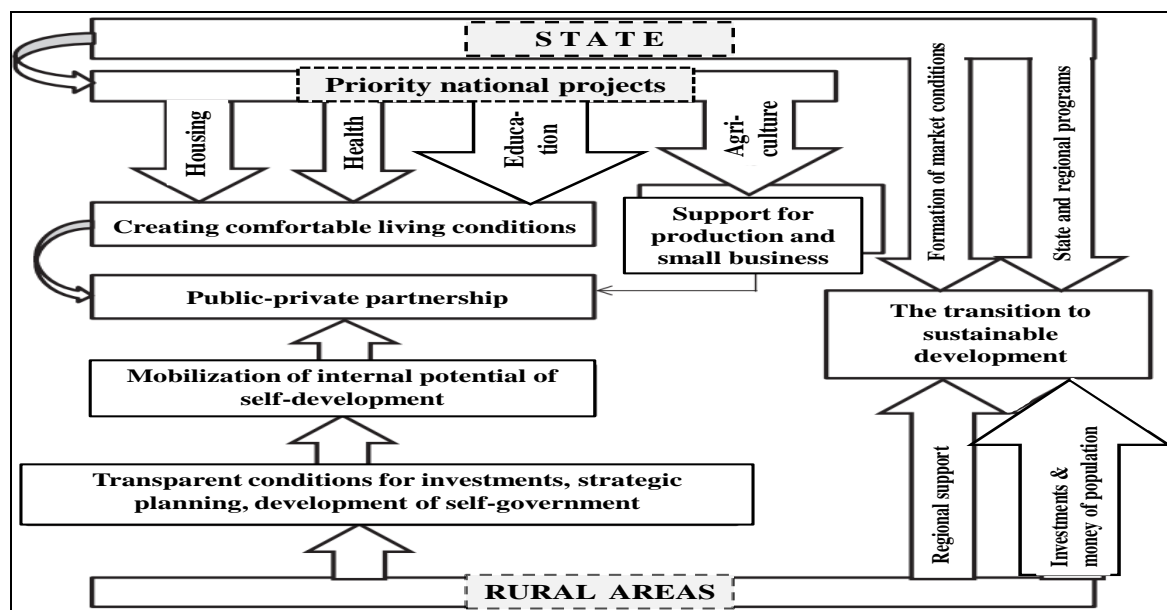


Figure 5. Scheme of development of rural areas [18]

The direct administrative influence on the development of agriculture and rural areas is carried out by local self-government and, on a national scale, state authorities (Figure 5). The prospects for the development of rural areas depend primarily on the level of economic development of the country. The further development of agriculture and rural areas should be based on agrarian and non-agrarian activities in rural areas. It requires managers capable of creating the necessary financial base for serious socio-economic transformations in the villages in order to ensure agricultural profitability and adequate living conditions of the rural population [18].

The complexity of the agricultural sector, the intensity of challenges facing food production, and the multidimensional aspects of rural development suggest that the state needs to create a more stimulating institutional environment, to motivate farmers and other rural residents for better management decisions and activities. The complexity of the food production system and the heterogeneity of the participants in the production chain require state response to their needs in the form of appropriate policies [16]. On the other hand, more pronounced entrepreneurial initiative, innovation, and creativity of economic entities in the agricultural and rural areas are necessary.

6. CONCLUSION

Although the theory and practice around the world have given different models of successful agrarian and rural development management, in the Republic of Serbia the management in this field has not yet been sufficiently improved, either at macro or micro level, as confirmed by the situation in agriculture and rural areas, especially unsatisfactory macroeconomic indicators related to this field, rural poverty, and low level of development of small agricultural holdings, as the dominant economic entities in agriculture and rural economy of the Republic of Serbia. The development management of agriculture, rural economy, and agribusiness systems in the Republic of Serbia is not sufficiently adapted to the needs of domestic farmers and other relevant economic entities in the agricultural and rural

economy, both as a result of a number of inherited problems in this field, whose solution requires much more extensive and more comprehensive efforts, and due to numerous current problems, which in modern conditions burden domestic agriculture and rural areas. Also, external challenges, i.e. global tendencies in the economy and society, such as economic signals on the international market of agrarian products and political influences of the world agrarian forces, largely determine business success in this field. Therefore, with a view to the future development of agriculture and rural areas of the Republic of Serbia, a number of improvements in the management of this field are necessary, both at macro and micro levels, where it is important, besides the inevitable state support, to provide greater external support, taking into account national interests in agriculture and the rural economy.

The starting hypothesis in this paper has been confirmed, and it can be concluded that, if more contemporary models of agrarian and rural development management are developed and applied in practice, adapted to the specifics of agriculture and rural areas of the Republic of Serbia, with the advocacy of all key stakeholders in this field, better economic results in agrarian and rural economy can be expected, both at macro and micro levels.

REFERENCES

1. Arabiun, A. G. (2014). The Importance of Management for Growing and Developing Agribusiness SMEs: Designing a Conceptual Framework. *International Review*, 1(2), 25-44.
2. Beierlein, J. G., Schneeberger, K. C., Osburn, D. D. (2014). *Principles of Agribusiness Management*. Waveland Press, USA.
3. Bogdanov, N., Stevović, M., Papić, R. (2016). Agrarna politika Srbije - izazovi i postojeća rešenja. Stanje i perspektive agroprivrede i sela u Srbiji, Univerzitet u Beogradu-Ekonomski fakultet - CID, Beograd, 19-40.
4. Castle, E. N., Becker, M. H., Nelson, A. G. (1987). *Farm business management*. Macmillan Publishing Company, New York.
5. Đekić, S. (2010). Agrarni menadžment. Ekonomski fakultet Univerziteta u Nišu, Niš.
6. FAO (2018). *Management, Farm Management and Farm Systems*, available 28 April 2018, at <http://www.fao.org/docrep/w7365e/w7365e0f.htm>
7. King, R. P., Boehlje, M., Cook, M. L., Sonka, S. T. (2010). *Agribusiness Economics and Management*. *American Journal of Agricultural Economics*, 92(2), 554-570.
8. Makeham, J. P. (1968). *Farm Management Economics*. Gill Publications, Armidale, NSW.
9. Malcolm, L. R. (2004). *Farm Management analysis: a core discipline, simple sums, sophisticated thinking*. *AFBM Journal*, 1(1), 45-56.
10. Nacionalni program ruralnog razvoja od 2011. do 2013. godine („Sl. glasnik RS”, br. 15/11)
11. Nacionalni program za poljoprivredu Republike Srbije od 2010. do 2013. godine („Sl. glasnik RS”, br. 83/10).
12. Ng, D., Siebert, J. W. (2009). Toward Better Defining the Field of Agribusiness Management. *International Food and Agribusiness Management Review*, 12(4), 123-142.
13. NPP. (2017). Nacionalni program za poljoprivredu za period 2018-2020. godine („Sl. glasnik RS”, br. 120/17).

14. Ristić, L. (2013). Strategic management of sustainable rural development in the Republic of Serbia. *Economic Horizons*, 15(3), 229-243.
15. Simonović, Z. (2014). *Upravljanje agrarom Srbije u tranziciji*. IEP, Beograd.
16. SPRR. (2014). *Strategija poljoprivrede i ruralnog razvoja Republike Srbije za period 2014-2024.godine* ("Službeni glasnik RS", br. 85/14).
17. *Strategija razvoja poljoprivrede Srbije* („Sl. glasnik RS”, br. 78/05).
18. Tomashuk, I. (2017). Problems and prospects of management of rural development. *Baltic Journal of Economic Studies*, 3(5), 214-220.
19. Vujičić, M., Malešević, Lj., Ristić, L. (2006). *Menadžment u agrobiznisu*. Ekonomski fakultet Univerziteta u Kragujevcu, Kragujevac.
20. Zakić, Z., Stojanović, Ž. (2008). *Ekonomika agrara*. Ekonomski fakultet Univerziteta u Beogradu, Beograd.



CONSENSUS MODEL IN ANALYTIC HIERARCHY PROCESS

Petra Grošelj

University of Ljubljana, Biotechnical Faculty, Slovenia

Abstract: To successfully solve the complex real world problems multi-criteria group decision-making approaches are recognized as reliable and effective. They include evaluating and selecting alternatives regarding multiple possibly conflicting criteria with participation of multiple decision makers. Satisfying decisions demand that a certain level of consensus among decision makers is reached. Consensus in the rigorous form is defined as full and unanimous agreement of all decision makers. However, unanimity is difficult to reach in real world situations with larger and heterogeneous groups of decision makers. A consensus process has a dynamic and iterative character. It consists of several consensus rounds. In each stage the level of consensus is measured and decision makers, typically following the advice of the moderator, adapt their preferences to increase the level of the consensus. In this study focus is on the analytic hierarchy process and multiplicative preference relations that are presented as pairwise comparison matrices. Consensus can be reached for all pairwise comparisons providing a group consensus comparison matrix. In this case, individual and group consistency is often taken into account. Another possibility is consensus of individual priority vectors derived from individual comparisons matrices. This study presents an overview of consensus models within the framework of analytic hierarchy process. An example is provided to illustrate the similarities and the differences between the selected consensus models.

Keywords: Multi-criteria analysis; Analytic hierarchy process; Group decision making; Building consensus; Consistency

1. INTRODUCTION

To successfully solve the complex real world problems multi-criteria group decision-making approaches are recognized as reliable and effective. They involve evaluating and selecting alternatives with regarding multiple possibly conflicting criteria with participation of multiple decision makers.

Group decision making is a process that unites individual evaluations into a joint group opinion. The complexity of the real world problems often exceeds the knowledge and experiences of a single decision maker (DM). Therefore, a group of DMs, experts, stakeholders, participants is more suitable to be included in the decision-making process. A group possesses a greater variety of opinions, knowledge and experiences comparing to the single decision maker. However, conflicts and oppositions can also be present in group decision making.

In group decision making preference relations are common approaches to model decision makers' judgments. Here we will discuss the analytic hierarchy process (AHP) and

multiplicative preference relations that are presented as pairwise comparison matrices. AHP is one of the most appropriate group multi-criteria decision making method [1]. In group AHP, there are four basic approaches to derive the group priority vector from comparison matrices of DMs [2, 3]: consensus, voting or compromise, and two aggregating methods [4]: aggregation of individual priorities (AIP) and aggregation of individual judgments (AIJ). When AIP individual priority vectors are aggregated into a group priority vector by weighted arithmetic mean or weighted geometric mean. However, when AIJ only weighted geometric mean method (WGMM) can be used to aggregate individual judgments into group judgments because geometric mean is the only merging mathematical function that preserves reciprocal property and satisfies the unanimity and homogeneity conditions [5]. WGMM has been used in many applications [6-12].

Consensus in its rigorous form is defined as full and unanimous agreement of all DMs [13-15]. In AHP consensus is defined as the situation where all DMs agree on the judgments or priorities [16]. In spite of their different initial opinions all DMs are persuaded of a consensual group decision [17]. Compromise is the state where DMs do not have the same opinion about the judgments or priorities, but because they want to cooperate, they agree to support something other than what they think to be the best [16]. According to these definitions, the aggregating methods are only special cases of consensus or compromise. It is easier to achieve a compromise than consensus. We also cannot be absolutely convinced that consensus is reached and that all DMs really agree that it is the best result. Moreover, a good decision may not satisfy any of the DMs, and a popular decision may not be good [16].

In this paper we focus on the consensus reaching process. However, unanimity is difficult to reach in real world situations with larger and heterogeneous groups of DMs and a soft consensus can be applied instead.

In group decision making, many consensus reaching models have been proposed. Chiclana et al. [18] developed a consensus model that integrates consistency reaching module. Wibowo and Deng [19] presented an interactive algorithm for consensus building for multi-criteria decision making problem. Herrera-Viedma et al. [13] prepared a review of soft consensus models in fuzzy environment.

Many methods have been proposed to improve the consensus level in group AHP. Regan et al. [20] presented an iterative consensus reaching model for AIP. It is based on the Lehrer-Wagner model [21] and the philosophy of negotiation. Srdjevic et al. [22] upgraded the Regan's model into a two-phase algorithm based on the optimal clustering of decision makers in the first phase followed by the consensus process within and between sub groups. Kou et al. [23] developed AIP consensus model based on the optimization model and optimal weights. Consensus can be reached in AIJ for all pairwise comparisons providing a group consensus comparison matrix [14, 24]. In this case, individual and group consistency is often taken into account [25-28]. Altuzzara et al. [29] based their model on the Bayesian analysis. Pedrycz and Song [30] proposed consensus models based on the information granularity.

This study presents an overview of consensus models within the framework of AHP. A case study is provided to illustrate the similarities and the differences between the selected consensus models.

The paper is structured as follows. In section 2 a short introduction in AHP is provided. In section 3 selected consensus models are presented, that are applied to the case study in section 4. In section 5 conclusions are made.

2. ANALYTIC HIERARCHY PROCESS

The AHP is a multi-criteria decision making approach with hierarchical structure of goal, criteria, subcriteria and alternatives. It is based on pairwise comparisons of objects on the same level of hierarchy regarding the objects on the higher level using 1-9 Saaty's fundamental scale, which express the relative importance of objects. The pairwise comparisons of n objects are represented in pairwise comparison matrix (PCM) $A = (a_{ij})_{n \times n}$, with $a_{ji} = 1/a_{ij}$. PCM A is consistent if

$$a_{ij} = a_{ik} a_{kj}, \quad i = 1, \dots, n, \quad j = 1, \dots, n, \quad k = 1, \dots, n. \quad (1)$$

Since consistency is hard to achieve, the level of inconsistency is measured by consistency ratio CR [31]

$$CR_A = \frac{CI_A}{RI_n} \quad (2)$$

a quotient of consistency index $CI_A = \frac{\lambda_{A, \max} - n}{n - 1}$ which depends on the principal eigenvalue

$\lambda_{A, \max}$ of PCM A , and random index RI_n [31]. In general, $CR_A < 0.1$ is considered acceptably consistent.

The priority vector $w = (w_1, w_2, \dots, w_n)^T$ can be derived from the PCM A by several methods. One of the most known besides the eigenvector method is the row geometric mean method (RGMM) [32]

$$w_i = \frac{\left(\prod_{j=1}^n a_{ij} \right)^{\frac{1}{n}}}{\sum_{i=1}^n \left(\prod_{j=1}^n a_{ij} \right)^{\frac{1}{n}}}, \quad i = 1, \dots, n. \quad (3)$$

Let assume that there are m decision makers DM_1, DM_2, \dots, DM_m with PCMs $A_k = (a_{ij}^{(k)})_{n \times n}$, $k = 1, \dots, m$ and priority vectors $w^{(k)} = (w_1^{(k)}, \dots, w_n^{(k)})^T$, $k = 1, \dots, m$. Let $\rho = (\rho_1, \rho_2, \dots, \rho_m)^T$ be the weights of importance DMs, with $\rho_k \geq 0$, $k = 1, \dots, m$ and $\sum_{k=1}^m \rho_k = 1$. In AIP the group priority vector $w^g = (w_1^g, \dots, w_n^g)^T$ can be derived by weighted arithmetic mean

$$w_i^g = \sum_{k=1}^m \rho_k w_i^{(k)}, \quad i = 1, \dots, n. \quad (4)$$

In AIJ the group PCM can be derived by WGMM as

$$G = (g_{ij})_{n \times n}, \quad \text{with } g_{ij} = \prod_{k=1}^m (a_{ij}^{(k)})^{\rho_k}. \quad (5)$$

If all individual PCMs are acceptably consistent, the group PCM is acceptably consistent [33].

3. CONSENSUS MODELS

A certain level of agreement between DMs increases the effectiveness of the decisions [19, 34]. However, consensus as unanimous agreement between DMs is hard to achieve therefore soft consensus is a more realistic goal in real decision making situations. The soft consensus process tends to bring the diverse group opinion closer until a predefined agreement is reached [19]. Consensus building is usually based on the iterative process that involves evolution of individual opinions towards the consensus opinion [13]. This can be appealing for DMS because it can improve the participation of DMs, it can help managing the conflicts in their opinions and the final result can be more acceptable for all DMs [19, 35]. A consensus process has a dynamic and iterative character. It consists of several consensus rounds and in each round the degree of consensus, which is associated with the closeness of individual opinions, is measured [25]. The closeness of group opinion can be measured by the distance between the priority vectors, compatibility index or any other consensus measure.

The consensus building process is typically managed by the moderator. Models involving moderator are more promising in practice [13]. The moderator controls the consensus process and does not participate in the evaluations. When moderator receives preferences of all DMs he calculates values of the selected consensus measure to identify the level of consensus. If it is high enough the consensus process ends. Otherwise the moderator gives advice to the DMs, how to adapt their preferences. The advice can be given to all DMs or only to one or two the most discordant DMs. Some consensus models demand from DMs to follow the advice of the moderator and to adapt their preferences to increase the level of consensus. The other models leave the decision about the adjustment of the preferences to the DMs. If the decision is left to the DMs that could create a more comfortable group decision environment [25]. However, the group can use some psychological concepts to persuade the other DMs to follow the moderator's recommendation [13].

The algorithm of the iterative soft consensus process should have integrated some stop conditions [25]. The threshold for the soft consensus should be defined according to the measurement of the consensus. Also maximal number of consensus iterations should be defined in advance. If all DMs rejected the modification of their preferences the consensus process stops.

We selected several consensus models to discuss their similarities and differences. For AIP we present Regan et al.'s [20] consensus model. The model presumes that all DMs adapt their priority vectors in each iteration round and that the adaptations are obligatory. The weights of importance of DMs cannot be assigned in advance, but are defined before the first iteration and are based on the strength of the differences between the pairs of DMs for each criterion

$$w_s^{ij} = \frac{1 - |{}^0w_s^{(i)} - {}^0w_s^{(j)}|}{\sum_{j=1}^n (1 - |{}^0w_s^{(i)} - {}^0w_s^{(j)}|)} \quad (6)$$

The weights of importance are gathered in matrices $W_s = (w_s^{ij})_{m \times m}$. Let 0P_s denote the vector of DMs' priorities of the criterion s : ${}^0P_s = ({}^0w_s^1, \dots, {}^0w_s^m)$. The updated priorities of the criterion s after the first iteration result in

$${}^1P_s = W_s {}^0P_s = ({}^1w_s^{(1)}, \dots, {}^1w_s^{(m)}), \quad s = 1, \dots, n. \quad (7)$$

The process is repeated with the same weights of importance:

$${}^r P_s = (W_s)^r {}^0 P_s, \quad s = 1, \dots, n. \quad (8)$$

As r approaches infinity, the revised priorities of criterion s converge towards the consensual priority ${}^c w_s = {}^c w_s^{(1)} = \dots = {}^c w_s^{(m)}$, which is equal for all DMs and where c is the number of iterations needed to reach convergence. The convergence is guaranteed [36].

For AIJ the goal of the consensus process is group consensus PCM. The result of aggregation of individual PCMs by WGMM is a compromise and not a consensual result and could be unsatisfactory for DMs because it does not take into account the whole range of the individual judgments. Whether the judgments are all similar to the geometric mean or they are very diverse the geometric mean could be identical. For AIJ we selected five consensus models [14, 25-28]. All models have similar consensus algorithm.

Algorithm

Input: PCMs A_1, A_2, \dots, A_m of m DMs, all acceptably consistent

$\rho = (\rho_1, \rho_2, \dots, \rho_m)^T$ the weights of importance of DMs

the threshold value of the consensus index (C) ε

the maximum number of iterations T

Output: the number of iterations t , $0 \leq t \leq T$

final PCMs $A_1^*, A_2^*, \dots, A_m^*$

group PCM G^*

Step 1: Set $t=0$ and $A_k^0 = (a_{ij}^{(k)0})_{n \times n} = (a_{ij}^{(k)})_{n \times n}$, $k=1, \dots, m$.

Step 2: Calculate the group PCM $G^t = (g_{ij}^t)_{n \times n}$, $g_{ij}^t = \prod_{k=1}^m (a_{ij}^{(k)t})^{\rho_k}$.

Step 3: Calculate the consensus indices C for all DMs. If all $C \leq \varepsilon$ or $t=T$, then go to Step 5, otherwise continue with the next step.

Step 4: Select one DM_h (or a pair of the most incompatible DMs, depending on the model) with maximal consensus index C . The moderator suggest him to update his PCMs from $A^{(h)t}$ to $A^{(h)t+1}$ by using

$$a_{ij}^{(h)t+1} = (a_{ij}^{(h)t})^{\alpha_t} (x_{ij}^t)^{1-\alpha_t} \quad (9)$$

where α_t , $0 < \alpha_t < 1$, is a parameter which determines the amount from DM's old PCM that is preserved in his new PCM and x_{ij}^t is a part that changes DM's new PCM and depends on the model. If DM accepts moderator's advice, than $A^{(k)t+1} = (a_{ij}^{(k)t+1})_{n \times n}$, $k=1, \dots, m$ with

$$a_{ij}^{(k)t+1} = \begin{cases} (a_{ij}^{(k)t})^{\alpha_t} (x_{ij}^t)^{1-\alpha_t}, & k = h \\ a_{ij}^{(k)t}, & k \neq h \end{cases} \quad (10)$$

Set $t=t+1$ and return to Step 2. If DM rejects the moderator's advice, set $A_k^{t+1} = A_k^t$, $k=1, \dots, m$, $t=t+1$ and return to Step 2.

Step 5: Let $A_k^* = A_k^t$, $k=1, \dots, m$ and $G^* = G^t$. The output solution is $A_1^*, A_2^*, \dots, A_m^*$, G^* and the number of iterations t . End the algorithm.

Dong et al. [14] proposed two consensus models based on the RGMM prioritization method. In their model, only one DM with the maximal consensus index C is advised to adapt his PCM. In the first model, they defined the geometric cardinal consensus index (GCCCI)

$$GCCCI(A_k) = \frac{2}{(n-1)(n-2)} \sum_{i < j} \left(\log(a_{ij}^{(k)}) - \log(w_i^g) + \log(w_j^g) \right)^2, \quad (11)$$

that is based on the geometric consistency index [32]. Smaller values of GCCCI indicate higher cardinal consensus. In the second model, they defined geometric ordinal consensus index (GOCI)

$$GOCI(A_k) = \frac{1}{n} \sum_{i=1}^n \left| r_i^{(k)} - r_i^g \right|, \quad (12)$$

where $r_i^{(k)}$ is rank of the i -th criterion regarding $w^{(k)}$. Smaller values of GOCI indicate higher ordinal consensus. In both models in Step 4, eq. (9) and (10), x_{ij}^t , a part that changes DM's PCM, is defined as the quotient of the group weights:

$$x_{ij}^t = \left(\frac{w_i^{gt}}{w_j^{gt}} \right), \quad (13)$$

where $w^{gt} = (w_1^{gt}, \dots, w_n^{gt})^T$ is group priority vector derived from PCM G^t by the RGMM in iteration t . The parameter α in eq. (9) and (10) is set arbitrary. The DMs in their models have to adapt their preferences.

Wu and Xu [26] proposed a consensus model that is not based on any prioritization method. In their model, DM with the maximal group consensus index (GCI) cannot decide himself but has to adjust his PCM. GCI is based on the compatibility index [37]

$$GCI(A_k) = \frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n a_{ij}^{(k)} g_{ji}. \quad (14)$$

Smaller values of GCI indicate more compatibility between DM and the group with value 1 indicating full consensus. A part that changes DM's PCM, is defined as the element from group PCM :

$$x_{ij}^t = g_{ij}^t, \quad (15)$$

The parameter α is set arbitrary.

Dong and Saaty [25] proposed a similar model as Wu and Xu [26] with the same x_{ij}^t , based on GCI. However, in their model DM can decide whether he wants to adapt his PCM or not. They proposed the threshold value of GCI to be set at $\varepsilon=1.01$ allowing 1% of deviation. The parameter α is set arbitrary and can change in each iteration. They proved that the acceptable consistency of the initial PCMs is preserved in the iteration process. They suggest that moderator is not mandatory and that the propositions to the DMs can be provided by computer.

Dong and Cooper [27] presented a peer to peer adaptive consensus model. They proposed that the pair of two most disagreeable DMs with maximal individual consensus

index (ICI) adapt their preferences. ICI is similar to GCI with smaller values indicating higher degree of consensus:

$$ICI_{kl} = \frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n a_{ij}^{(k)} a_{ji}^{(l)}. \quad (16)$$

A part that changes DM's PCM, is defined as the element from PCM of the other selected DM q :

$$x_{ij}^t = a_{ij}^{(q)t}. \quad (17)$$

Parameter α in their model depends on the sums of ICIs.

$$\alpha^{(k)t} = 1 - \frac{\sum_{j=1, j \neq k, l}^m ICI_{kj}}{2 \left(\sum_{j=1, j \neq k, l}^m ICI_{kj} + \sum_{j=1, j \neq k, l}^m ICI_{lj} \right)} \quad (18)$$

Dong et al. [28] proposed a consensus model with a twofold feedback mechanism. They defined consensus index based on logarithms:

$$LGCI_k = \sum_{i=1}^n \sum_{j=1}^n |\log a_{ij}^{(k)} - \log g_{ij}| \quad (19)$$

and set the same x_{ij}^t as Wu and Xu [26] and Dong and Saaty [25]. However, they proposed that if DM rejects to adapt his preference, his weight of importance reduces with parameter β , that is provided by moderator.

$$\rho_k^{t+1} = \begin{cases} (\beta^t + \rho_h^t(1 - \beta^t)) \rho_h^t, & k = h \\ (1 + \rho_h^t(1 - \beta^t)) \rho_k^t, & k \neq h \end{cases} \quad (20)$$

They proposed the threshold value ε of LGCI to be set at 0.01 to 0.1 allowing from 1% to 10% of deviation.

4. CASE STUDY

The selected consensus models were applied to the data from the study, which goal was to select the optimal strategy for the development of Pohorje, a mountainous area in northeastern part of Slovenia. The first part of this study was SWOT analysis of Pohorje. Twelve local stakeholders, experts from the fields of forestry, agriculture, tourism, and nature protection made pairwise comparisons of SWOT groups. Their judgments were diverse. We took their data and simulated consensus building processes. In all models we made some identical assumptions. We set the maximal number of iterations to 20. We presumed that all DMs are equally important with $\rho = (\frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12}, \frac{1}{12})^T$ at the beginning of the consensus process. The prioritization method was RGMM in all models. We set parameter α , that defines the part of the DM's PCM that is preserved from the previous iteration, at $\alpha = 0.8$. First we applied WGMM as a non-consensus approach. Then we applied all selected consensus models. The results are presented in Table 1.

Table 1. The priority vectors gained from consensus models

	WGMM	Regan et al.	Dong et al. GCCCI	Dong et al. GOCI	Wu and Xu	Dong and Saaty	Dong and Cooper	Dong et al., a twofold feedback mechanism
Strengths	0.251	0.255	0.236	0.294	0.283	0.250	0.256	0.262
Weaknesses	0.216	0.216	0.223	0.161	0.201	0.230	0.212	0.208
Opportunities	0.321	0.310	0.306	0.372	0.320	0.293	0.328	0.326
Threats	0.212	0.218	0.235	0.173	0.197	0.227	0.203	0.204

With Regan et al.'s [20] model the consensus (on four decimal places) was reached in 6 iterations. In Dong et al.'s [14] GCCCI model we set the threshold value $\varepsilon = \overline{GCCCI} = 0.35$, as was proposed in the authors example. The threshold was reached in 9 iterations. Five stakeholders have to change their judgments, from them two stakeholders two times and one stakeholder even three times (in the first, second and fifth iterations). In Dong et al.'s [14] GOCI model we set the threshold value $\varepsilon = \overline{GOCI} = 1$, while authors proposed 0. The threshold was not reached in 20 iterations. Only four stakeholders have to adapt their judgments: two DMs six times, one DM five times and one DM three times. For Wu and Xu's [26] model we set $\varepsilon = \overline{GCI} = 1.1$, which was proposed by the authors. The threshold was not reached in 20 iterations, two DMs have to made five adaptations, one DM four adaptations, one DM three, one DM two and one DM one adaptation. In Dong and Saaty's [25] model with equal terms as Wu and Xu's [26] model we presumed that every DM is willing to make one adaptation and that all DMs reject the second adaptation. The consensus process stopped after twenty iterations. All DMs made one adaptation of their judgments. For Dong and Cooper's [27] model we set $\varepsilon = \overline{ICI} = 1.1$. We assumed that all pairs of DMs would make the adjustments. The threshold was reached after seventeen iterations. All DMs have to made at least one adjustment and the same pair of DMs has to repeat the adjustment only in the 16th and in the 17th iteration. Dong et al. [28] in their twofold feedback mechanism model proposed $\varepsilon = \overline{LGCI} = 0.1$ and we took the same threshold in our study and set $\beta = 0.8$. We presumed that every DM is willing to make one adaptation and that all DMs reject the second adaptation. The consensus process stopped after 20 iterations.

The results show similar ranking of the SWOT groups by all models. However, the weights differ. The highest weight by all models was gained by opportunities and it varies from 29.3% to 37.2%. Strengths were placed the second by all models, the weight varying from 23.6% to 29.4%. Weaknesses and threats shared the third and the fourth place with similar weights, varying from 16.1% to 23.5%.

The application of the consensus models shows that some models have shortcomings. Our finding was that the consensus process should not have too many iteration rounds. Many iteration rounds can be inconvenient for DMs. They could lose the focus if they have to make many adaptations to their judgments and their initial preferences can blur. We set the number of iterations to 20, but it can also be smaller. One of the main drawbacks is that the model forces the DM to change his preferences many times, while the other DMs can preserve their preferences. In our application DMs have to adjust their judgments up to six times in twenty iterations. This could cause that the selected decision maker feels uncomfortable and that he does not support the final result. The final result in such case could be less consensual than the results of WGMM. On the basis of this discussion we do not recommend Dong et al.'s [14] GCCCI and GOCI models and Wu and Xu's [26] model. In models, when DMs can decide about the adaptation of their judgments, we presumed that each DM is willing to change his

judgments only once. We find as a deficiency that all models state that once DM rejects to adapt his opinion, he cannot change his mind in the future iterations. We think that it can be convenient to allow DMs to change his mind. For example: DM adapts his judgments in the first iteration. Then he is not willing to adapt his judgment in the next iterations. Nevertheless, when all DMs adapt their judgments, he could be prepared to adapt his judgments again.

The second problem is how to define the threshold for the consensus index to be reachable within a few iterations. The threshold depends on the initial consensus of the DMs. We took the proposals from the literature, which was suitable in majority of the models. However, the threshold for LGCI in Dong et al.'s [28] twofold feedback mechanism model was far too low. We do not recommend this model until a broader research about LGCI and its values is carried out.

Another important issue is determination of parameter α , which defines the amount from DM's old PCM that is preserved in his new PCM. In the literature, different values were proposed and applied in the examples, but the values were not substantiated enough. The only model that included the calculation of the parameter α is Dong and Cooper's [27] model. The values of parameter α ranged from 0.703 to 0.797, which stimulated us to set $\alpha=0.8$ for all the other models. $\alpha=0.8$ also preserves a great part of DM's PCM. However, how to define the suitable value of parameter α needs further analysis.

At the end of this discussion, we recommend three consensus models as suitable to be employed in applications. The first one is Regan et al.'s [20] model, which is suitable for AIP, forces all DMs to adapt their preferences and stops in a few iterations. The second and the third models are Dong and Saaty's [25] model, where one DM is advised to correct his preferences, and Dong and Cooper's [27] model, where two DMs are advised to correct their preferences, both models suitable for AIJ and both allowing DMs to decide for themselves if they want to adapt their judgments.

5. CONCLUSIONS

The paper discussed the group decision making in AHP. The most desirable result of the group decision making is consensus although it is hard to be reached in the real world problems. Therefore soft consensus, with predefined degree of consensus is looked-for. There are many consensus reaching models presented in the literature. We selected several models and applied them to the case study. The results showed that not all models can be recommended for the applications. We exposed some shortcomings and some not enough researched topics. We proposed three consensus models as suitable to be used in applications. However, more studies should be performed to confirm our selection.

ACKNOWLEDGEMENT: The author acknowledges the financial support from the Slovenian Research Agency (research core funding No. P4-0059).

REFERENCES

1. K. Peniwati, Criteria for evaluating group decision-making methods, *Mathematical and Computer Modelling*, 46 (2007) 935-947.
2. R.F. Dyer, E.H. Forman, Group decision support with the Analytic Hierarchy Process, *Decision Support Systems*, 8 (1992) 99-124.

3. V.S. Lai, B.K. Wong, W. Cheung, Group decision making in a multiple criteria environment: A case using the AHP in software selection, *European Journal of Operational Research*, 137 (2002) 134-144.
4. E. Forman, K. Peniwati, Aggregating individual judgments and priorities with the analytic hierarchy process, *European Journal of Operational Research*, 108 (1998) 165–169.
5. J. Aczél, T.L. Saaty, Procedures for synthesizing ratio judgements, *Journal of Mathematical Psychology*, 27 (1983) 93-102.
6. J. Ananda, G. Herath, Multi-attribute preference modelling and regional land-use planning, *Ecological Economics*, 65 (2008) 325–335.
7. J.M. Duke, R. Aull-Hyde, Identifying public preferences for land preservation using the analytic hierarchy process, *Ecological Economics*, 42 (2002) 131–145.
8. Y.-M. Wang, K.-S. Chin, A new data envelopment analysis method for priority determination and group decision making in the analytic hierarchy process, *European Journal of Operational Research*, 195 (2009) 239–250.
9. J. Sun, H. Li, Financial distress early warning based on group decision making, *Computers & Operations Research*, 36 (2009) 885–906.
10. F.A. Cortés-Aldana, M. García-Melón, I. Fernández-de-Lucio, P. Aragonés-Beltrán, R. Poveda-Bautista, University objectives and socioeconomic results: A multicriteria measuring of alignment, *European Journal of Operational Research*, 199 (2009) 811–822.
11. A.H.I. Lee, H.-J. Chang, C.-Y. Lin, An evaluation model of buyer-supplier relationships in high-tech industry - The case of an electronic components manufacturer in Taiwan, *Computers & Industrial Engineering*, 57 (2009) 1417–1430.
12. O.U. Akaa, A. Abu, M. Spearpoint, S. Giovinazzi, A group-AHP decision analysis for the selection of applied fire protection to steel structures, *Fire Safety Journal*, 86 (2016) 95-105.
13. E. Herrera-Viedma, F.J. Cabrerizo, J. Kacprzyk, W. Pedrycz, A review of soft consensus models in a fuzzy environment, *Information Fusion*, 17 (2014) 4-13.
14. Y. Dong, G. Zhang, W.-C. Hong, Y. Xu, Consensus models for AHP group decision making under row geometric mean prioritization method, *Decision Support Systems*, 49 (2010) 281-289.
15. J.C. Bezdek, B. Spillman, R. Spillman, A fuzzy relation space for group decision theory, *Fuzzy Sets and Systems*, 1 (1978) 255-268.
16. K. Steele, H.M. Regan, M. Colyvan, M.A. Burgman, Right Decisions or Happy Decision-makers?, *Social Epistemology: A Journal of Knowledge, Culture and Policy*, 21 (2007) 349 - 368.
17. S. Hartmann, C. Martini, J. Sprenger, Consensual Decision-Making among Epistemic Peers, *Episteme*, 6 (2009) 110-129.
18. F. Chiclana, F. Mata, L. Martínez, E. Herrera-Viedma, S. Alonso, Integration of a consistency control module within a consensus model, *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems*, 16 (2008) 35-53.

19. S. Wibowo, H. Deng, Consensus-based decision support for multicriteria group decision making, *Computers & Industrial Engineering*, 66 (2013) 625-633.
20. H.M. Regan, M. Colyvan, L. Markovchick-Nicholls, A formal model for consensus and negotiation in environmental management, *Journal of Environmental Management*, 80 (2006) 167–176.
21. K. Lehrer, C. Wagner, *Rational Consensus in Science and Society*, Reidel, Dordrecht, 1981.
22. B. Srdjevic, Z. Srdjevic, B. Blagojevic, K. Suvocarev, A two-phase algorithm for consensus building in AHP-group decision making, *Applied Mathematical Modelling*, 37 (2013) 6670-6682.
23. G. Kou, X. Chao, Y. Peng, L. Xu, Y. Chen, Intelligent Collaborative Support System for AHP-Group Decision Making, *Studies in Informatics and Control*, 26 (2017) 131-142.
24. J.-M. Yeh, B. Kreng, C. Lin, A consensus approach for synthesizing the elements of comparison matrix in the Analytic Hierarchy Process, *International Journal of Systems Science*, 32 (2001) 1353-1363.
25. Q. Dong, T.L. Saaty, An analytic hierarchy process model of group consensus, *J. Syst. Sci. Syst. Eng.*, 23 (2014) 362-374.
26. Z. Wu, J. Xu, A consistency and consensus based decision support model for group decision making with multiplicative preference relations, *Decision Support Systems*, 52 (2012) 757-767.
27. Q. Dong, O. Cooper, A peer-to-peer dynamic adaptive consensus reaching model for the group AHP decision making, *European Journal of Operational Research*, 250 (2016) 521-530.
28. Q. Dong, K. Zhü, O. Cooper, Gaining consensus in a moderated group: A model with a twofold feedback mechanism, *Expert Systems with Applications*, 71 (2017) 87-97.
29. A. Altuzarra, J.M. Moreno-Jiménez, M. Salvador, A Bayesian prioritization procedure for AHP-group decision making, *European Journal of Operational Research*, 182 (2007) 367–382.
30. W. Pedrycz, M. Song, Analytic hierarchy process (AHP) in group decision making and its optimization with an allocation of information granularity, *IEEE Transactions on Fuzzy Systems*, 19 (2011) 527-539.
31. T.L. Saaty, *Fundamentals of decision making and priority theory with the analytic hierarchy process*, RWS Publications, Pittsburgh, 2006.
32. G. Crawford, C. Williams, A note on the analysis of subjective judgment matrices, *Journal of Mathematical Psychology*, 29 (1985) 387–405.
33. P. Grošelj, L. Zadnik Stirn, Acceptable consistency of aggregated comparison matrices in analytic hierarchy process, *European Journal of Operational Research*, 223 (2012) 417-420.
34. E. Herrera-Viedma, L. Martínez, F. Mata, F. Chiclana, A consensus support system model for group decision-making problems with multigranular linguistic preference relations, *IEEE Transactions on Fuzzy Systems*, 13 (2005) 644-658.

35. C. Kahraman, O. Engin, Ö. Kabak, İ. Kaya, Information systems outsourcing decisions using a group decision-making approach, *Engineering Applications of Artificial Intelligence*, 22 (2009) 832-841.
36. K. Lehrer, C. Wagner, *Rational Consensus in Science and Society*, Reidel, Dordrecht, 1981.
37. T.L. Saaty, A ratio scale metric and the compatibility of ratio scales: The possibility of arrow's impossibility theorem, *Applied Mathematics Letters*, 7 (1994) 51-57.



COMPARATIVE ANALYSIS OF BUSINESS ENVIRONMENT IN CEE AND SEE COUNTRIES USING THE PROMETHEE METHOD

Aleksandra Fedajev

University in Belgrade, Technical Faculty in Bor, Serbia

Abstract: Enterprises do not operate in a vacuum, but their functioning is influenced by numerous internal and external factors. In contrast to internal factors that are under their control, external factors are those that enterprises cannot control and they only can adjust their operations according to them, if they want to do business successfully. In this context, it can be concluded that there is necessity for analysis of the environment in which enterprises perform their activities, so the policy makers in any country can identify its impact on the performance of enterprises (micro level), but also, broadly, on the performance of the national economy as a whole (macro level). On the basis of such analysis, appropriate strategic reform program should be formulated and efficiently implemented in order to create the incentive environment that will support the growth of existing enterprises and encourage starting of new businesses.

This is particularly important for CEE and SEE transition economies, having in mind that most of them are facing with numerous disruptions and imbalances inherited from the central planning period as well as the growing challenges posed by the global market. Recent global economic crisis caused the deepest recession they have experienced since the start of transition to market-oriented economies. The economies that accumulated relatively more substantial internal and external imbalances before the crisis suffered more severe contractions in output and most of them face a more sluggish economic recovery. Economic progress, transformation of their economic system and their greater involvement in global economy is unimaginable without the implementation of intensive and efficient business environment reforms. In that sense, the aim of this paper is to analyze the business environment characteristics in these countries and to perform the comparative analysis of their business environment using the PROMETHEE method in combination with entropy method. The results have shown that CEE economies have more incentive business environment and they were more resilient to the crisis than SEE non-EU countries. In front of these economies there is a long way of business environment reform, where first-ranked economies can be benchmark partners of good practice. According to that, some recommendations and guidelines for improvement of business environment in the future period has been defined.

Keywords: business environment, CEE and SEE countries, transition, reforms, economic development, PROMETHEE method, entropy method

1. INTRODUCTION

The beginning of the transition of former command economies to the market economies was accompanied by a number of negative effects, first of all, a decline in production and employment. The depth and length of the transitional recession was almost the

same as the one that affected the developed countries during the Great World Economic Crisis. While the crisis has been relatively quickly overcome in the CEE countries, this initial crisis has been only further deepened in most of SEE countries. Today, nearly three decades after the start of transition, the reduction in the development gap among mentioned economies has not yet been occurred.

In order to reduce the development gap, CEE and SEE economies need to create an incentive business environment for the development of the private sector. The business environment is a multidimensional concept and can be defined as a set of economic, political, legal, institutional and regulatory conditions that affect the business operations in one country. Otherwise, the business environment is most often considered in the context of the investment policies of transition countries, having in mind that FDI played a key role in the recovery of these economies [1]. The arrival of foreign investors was not only significant as a source of capital and new technologies, but also as an expression of confidence in the transition to the market economy. Therefore, governments in transition economies were trying to liberalize their national investment regimes, by effective implementation of reform processes, in order to eliminate barriers for foreign investors' entry. In addition, it should be born in mind that there has been a significant decline in the volume of investments in recent years, due to the effects of the global economic crisis in 2008, which intensified the competitive struggle for attracting foreign investors among the transition economies [2].

In this sense, the main goal of this paper is to evaluate the business environment determinants in the observed countries and their synthesis, by using the multi-criteria analysis, into a single indicator - the level of preference, as an indicator of the business environment' quality that enables the ranking of observed transition economies according to the quality of the business environment. On the basis of the obtained results, the strategy for business environment improvement in the following period is defined.

2. DETERMINANTS OF THE BUSINESS ENVIRONMENT

Given that there are many different definitions of the business environment, there is no unique set of determinants that compose it yet. Each author defines the appropriate set of determinants starting from his own understanding or definition of a business environment. However, there are also certain determinants that are common, since they often appear in scientific papers, studies and reports of international institutions, such as: macroeconomic environment, efficiency of the goods market, infrastructure development, government quality, administrative procedures and tax system. This set of determinants business environment was taken into consideration in this paper.

2.1. MACROECONOMIC ENVIRONMENT

Macroeconomic stability is a key driver and a fundamental precondition for economic growth and the development in transition countries. The most important indicators of macroeconomic stability for domestic and foreign investors are those that directly influence their financial statements and the possibility to expand of operations, which are primarily related to the level of price and currency stability, the level of indebtedness and economic relations of a particular economy with foreign countries.

The necessity of maintaining the price stability arises, of course, from the effects that inflation/ deflation has on the business operations and the growth and development of the economy as a whole. Based on the price level trend in some country, a fairly real picture of

the business conditions, the government quality and progress in the implementation of structural reforms can be obtained. However, since it reflects primarily the internal balance of a particular economy, foreign investors usually complement this first, coarse picture with indicators about fiscal discipline and the external position of the country, in order to gain a wider insight into the possibilities and cost-effectiveness of investments in that economy.

When it comes to fiscal discipline, it should be emphasized that it is very important for CEE and SEE countries that they do not delay service of public debt. Although they can achieve some short-term goals in this way, such behaviour of the governments in transition countries sends a bad message to investors. If they consider the country highly risky due to the accumulated public debt that threatens to cause illiquidity and instability in the economy, foreign investors require the guarantee of international economic and financial institutions, such as the European Bank for Reconstruction and Development, the World Bank, the International Development Bank, etc., before investing in certain country [3]. However, it often happens that the support of these institutions fail, which jeopardizes the inflow of FDI and leads to further debt accumulation.

In the end, it is necessary to take in consideration the external position of some country in order to obtain a complete picture of its macroeconomic environment. Given that the current account balance is the result of the imbalance of the capital balance, i.e. the category that closes the discrepancy between capital inflows and outflows, it is the most frequently used indicator of external position in macroeconomic analysis. As in the case of indebtedness, the sustainability of the current account and its financing became even more important after the emergence of the global economic crisis.

2.2. EFFICIENCY OF THE GOODS MARKET

Bearing in mind that modern markets, especially in transition countries, largely deviate from the model of perfect competition, engaging the state in the sphere of regulating market structures is becoming one of the key business environment determinants. By implementation the necessary measures in this area, it is possible to protect and strengthen competition, which through competitive struggle leads to an increase in efficiency of the economy as a whole. Although the benefits of the competition policy and anti-monopoly policy implementation are more than obvious and the transition process began nearly three decades ago, most of transition economies have still failed to leave their heritage from the central planning period [4], so one of the key segments of the transition to a market economy is the formulation of an effective competition policy and anti-monopoly policy and the establishment of the necessary institutions responsible for its implementation.

The trade policy of a certain transition economy is a key link through which the transmission of price signals from the world to the domestic market is carried out and which ensures efficient integration of that economy into the world trading system. Increasing openness and integration of these economies into global trade flows can lead to their accelerated development through the application of new technic and technology and access to the larger market. Whether these opportunities will be used or not depends to a large extent on the trade policy reform in transition economies and the development of institutions that support its implementation.

2.3. INFRASTRUCTURE DEVELOPMENT

The World Economic Forum [5] emphasize that “well-developed infrastructure reduces the effect of distance between regions, integrating the national market and connecting

it at low cost to markets in other countries and regions.” Therefore, it is a particularly important factor for multinational companies, given that the investments of these companies are mainly efficiency-seeking, aimed at meeting the needs of the global, regional and local market. In this sense, developed infrastructure reduces market entry costs, facilitates exports and can represent a comparative advantage of a given country in relation to others that have similar input costs, such as labour and land, but which have an underdeveloped infrastructure [3].

The most important segments of infrastructure are transport infrastructure, telecommunications and energy supply. Efficient transport infrastructure, which means the existence of high-quality roads, railways, ports and airports, ensures normal carrying out of economic activities, since it enables that companies distribute their goods and services on time, with the lowest cost as possible. Furthermore, the solid and extensive telecommunications network allows for a rapid and free information flow, which increases overall economic efficiency by helping to ensure that companies can communicate and economic actors can make decisions by taking into account all available relevant information [5]. In the end, there is a need to ensure companies a free and secure access to energy in sufficient quantities, so that companies can function smoothly, especially for manufacturing sector [6]. If investors have to wait months to connect their plants to the network, the profitability of their investment can be significantly reduced. On the other hand, the energy flow must be stable, because a single unscheduled interruption in the operation of the machine, especially in the case of modern and technologically advanced equipment, can expose the company to significant costs [3].

Regulatory reform is a precondition for the development of infrastructure capacities, since effective regulation leads to commercialization of this sector and attracting the necessary, primarily foreign, investments. However, it is very difficult for transition economies to establish an efficient regulatory system due to the lack of financial resources and professional staff. Therefore, there is a need to increase private sector involvement in infrastructure sector, which encourages competition struggle, cost rationalization and harmonization of prices. Apart from trying to increase business efficiency, private owners much less tolerate delays in payment, which leads to an increase in the rate of collection of receivables and greater financial discipline, not only in the infrastructure sector, but also in other sectors of the economy [7].

2. 4. GOVERNMENT QUALITY

One of the simplest, but also the most effective, things that government in a given country can do to improve the quality of the business environment is to improve its management. Bearing in mind that the political and economic development are closely linked and mutually conditioned, the importance of government quality in transition economies is reflected in finding the optimal relationship between the state and the market, while it should be born in mind that their operations are complementary.

The constant change in legislation has a negative impact on the possibility of forecasting project investment returns, especially in the case of foreign investors. They will change the destination of their investment, if the estimated risk degree significantly exceeds the return on investment rate. Even if legal regulations are favourable at the time of the decision making, the uncertainty of future business environment may discourage investors. In order to reduce the uncertainty of the business operations, some countries defined calendar of

regular changes in certain legal regulations, so that companies know in advance when the relevant changes in the regulations will occur.

Beside the way in which appropriate legislation is adopted, the legal aspect of the reforms also refers to the implementation of the adopted legislation. This aspect of the business environment is of particular important for foreign investors since they, in addition to certainty and predictability, insist on protecting their rights and property and the judiciary efficiency. Moreover, the perception of the rule of law in the country can also influence the choice of investment options. For example, in conditions of inefficient judiciary and proprietary rights protection, investors will decide to invest in the trade sector, where the return on capital period is much shorter, than in long-term innovative projects, which are associated with slower accumulation [8].

Corruption is one of the most reliable indicators of the business environment quality. The widespread prevalence of corruption increases the investment costs, due to existence of cost for ensuring the rents through the lobbying and bribery (so-called dead weight costs) [9], which, according to the Organization for Security and Cooperation in Europe (OSCE), can increase the cost of foreign investors by as much as 4% and it is enough to influence the decision about investing in a particular country [3].

It should be noted that the consequences of unfavourable political circumstances, and especially war conflicts, is very difficult to neutralize, given that it takes a lot of time to rebuild the country and even more to "restore" the confidence of foreign investors [10]. If foreign investors consider that their employees and property will not be safe in a particular country, they will not even undertake planned investment, because their realization requires additional costs related to insurance of assets and employees. On the other hand, the frequent stopping and renewal of business operations in accordance with political circumstances is too expensive, especially for industrial enterprises, because it additionally increases the costs of doing business both domestic and foreign business entities in countries characterized by significant political uncertainty.

If the effects of mentioned factors are not eliminated or, at least, minimized, any other benefits (such as low tax rates or free construction land) will not be able to attract foreign investors and motivate local businesses entities to increase their investments and scope of activities.

2.5. ADMINISTRATIVE PROCEDURES

Foreign investors and business entities in transition countries are faced with significant institutional constraints when they are starting a business. So called the guillotine of regulations in transition economies requires considerable time and significant costs, so the creation and implementation of reform measures in the area of starting a business are a long-lasting and complex processes, that include the legal, institutional and organizational aspect of the reforms [11]. As this process often involves a large number of institutions, which make starting a business more complicated and expensive, potential investor can give up of starting a business or decide to operate in the informal sector. Having in mind that the development of the informal economy has many negative effects, reducing the duration and costs of doing these procedures is one of the most effective ways for transition economies to deal with this problem.

The basic postulate of market economy functioning is the existence of private ownership. Since the most of transition economies are faced by numerous problems in implementation of property transformation, protection of property rights is the main driving force behind the acceleration of this process. Strengthening the property rights is particularly

important for the FDI flow, since foreign investors, regardless of other host country characteristics, will not invest their capital in countries where their property will not be protected from embezzlement, theft, crime and unlawful deprivation by the state. In addition, too long and expensive procedures for registering ownership postpone the start of the business, which can make foreign investors to give up on investment or to reduce planned investments, as these additional costs and delayed start of business operations endanger the market position. The registered and legally protected investor's assets make it easier for them to access financial assets (because in this way they can use assets as collateral) and encourage them to invest more.

2.6. TAX SYSTEM

Creating a stable and sustainable tax system is considered as one of the priorities of the transition to a market economy. An efficient tax system enables the fight against corruption and the shadow economy, increases FDI inflows and accelerates the completion of other reform processes. In recent years, there has been a downward trend in tax rates in transition countries, which seek accelerate growth by increase of tax competitiveness. Improving the tax competitiveness is particularly important for small and undeveloped economies, which cannot offer foreign investors any other benefits for starting a business. Practice has shown that the unfavourable situation of exogenous factors (such as market size, geographical location, resource availability, etc.) and a number of insufficiently incentive aspects of the business environment can, in many cases, be compensated by an efficient tax policy, which implies the definition of optimal tax rates and approving the appropriate tax incentives.

As the stability and efficiency of tax rate policy is considered as key factor for real sector restructuring, the development of the SME sector and the attraction of foreign investors, the transition countries were primarily concentrated on achieving this goal, while the development of the tax administration was initially neglected. After some progress has been made in the tax rate policy reform, most transition economies have aimed their reform processes in this area at minimizing the complexity and duration of procedures for paying taxes. Analysing the importance of tax administration reform and the simplification of tax procedures, Max Baucus, one of the US senators, concluded that "the complexity of tax procedures itself is a kind of tax" [11]. Bearing in mind the advantages of rapid development of information technologies, a large number, primarily developed, and later a number of transition countries also have introduced a system for electronic filling of the necessary documentation, and very often the execution of all necessary payments electronically, as the most efficient way to reduce this type of indirect tax burden. In this way, eliminating unnecessary paperwork and interaction between businessmen and tax officials are eliminated, as well as the possibilities for corruption occurrence.

3. DATA

In order to perform comparative analysis of business environment in CEE and SEE countries, the data representing the mentioned determinants should be obtained. In that sense, in the Table 1 there are indicators used for multi-criteria analysis with their sources.

Table 1. Indicators of business environment determinants

Determinants	Indicators	Source
Macroeconomic environment	Anti inflation/forex policy	Bertelsmann Stiftung's Transformation Index (BTI) https://www.bti-project.org/en/country-reports/ [12]
	General government gross debt (in %GDP)	IMF, World Economic Outlook Database, April 2018 https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/weoselgr.aspx [13]
	Current account balance (in %GDP)	IMF, World Economic Outlook Database, April 2018 https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/weoselgr.aspx [13]
Efficiency of the goods market	Market-based competition	Bertelsmann Stiftung's Transformation Index (BTI) https://www.bti-project.org/en/country-reports/ [12]
	Anti-monopoly policy	Bertelsmann Stiftung's Transformation Index (BTI) https://www.bti-project.org/en/country-reports/ [12]
	Liberalization of foreign trade	Bertelsmann Stiftung's Transformation Index (BTI) https://www.bti-project.org/en/country-reports/ [12]
Infrastructure development	Roads	EBRD, Transition Report http://www.ebrd.com/transition-report-2017-18 [14]
	Railways	EBRD, Transition Report http://www.ebrd.com/transition-report-2017-18 [14]
	Electric power	EBRD, Transition Report http://www.ebrd.com/transition-report-2017-18 [14]
	ICT	EBRD, Transition Report http://www.ebrd.com/transition-report-2017-18 [14]
Government quality	Role of Law	WB, Worldwide Governance Indicators (WGI) http://info.worldbank.org/governance/wgi/#home [15]
	Control of corruption	WB, Worldwide Governance Indicators (WGI) http://info.worldbank.org/governance/wgi/#home [15]
	Government effectiveness	WB, Worldwide Governance Indicators (WGI) http://info.worldbank.org/governance/wgi/#home [15]
	Political Stability and Absence of Violence	WB, Worldwide Governance Indicators (WGI) http://info.worldbank.org/governance/wgi/#home [15]
	Regulatory quality	WB, Worldwide Governance Indicators (WGI) http://info.worldbank.org/governance/wgi/#home [15]
Administrative procedures	Time to start business	WB, Doing Business database http://www.doingbusiness.org/data [16]
	Cost of starting business	WB, Doing Business database http://www.doingbusiness.org/data [16]
	Time to register property	WB, Doing Business database http://www.doingbusiness.org/data [16]
	Cost to register property	WB, Doing Business database http://www.doingbusiness.org/data [16]
Tax system	Time to pay taxes	WB, Doing Business database http://www.doingbusiness.org/data [16]
	Income tax	WB, Doing Business database http://www.doingbusiness.org/data [16]
	Labor tax and contributions	WB, Doing Business database http://www.doingbusiness.org/data [16]
	Other taxes	WB, Doing Business database http://www.doingbusiness.org/data [16]

As it can be seen from Table 1, there are 3-5 indicators for each determinant that represent state in certain area. Also, used data are from different sources, increasing objectivity of the research.

4. METHODOLOGY

In order to perform a comparative analysis of the business environment in CEE and SEE countries, multi-criteria analysis has been applied. The aim of multi-criteria analysis is to rank numerous alternatives from best to worst, based on a large number of usually opposing criteria. The PROMETHEE is one of the most prominent multi-criteria methods that can be effectively used to solve very complex decision making problems. Furthermore, PROMETHEE has good software support which enables additional processing and presentation of obtained results. In order to identify and evaluate advantages and disadvantages of each country, action Profiles were used in this research.

The PROMETHEE II method is an adequate method for solving problems whose aim is multi-criteria ranking of final set of alternatives (in this case CEE and SEE countries) based on a number of criteria which need to be maximized or minimized. For each observed alternative this method calculate its value expressed in level of preferences. Thereby, each alternative is evaluated based on the two preference flows. Positive preference flow $\phi + (P)$ indicate how much is given alternative better than the other (according to all criteria). Accordingly, the higher this preference flow is, the alternative is better. The negative flow of preference $\phi - (P)$ indicates how much a given alternative is worse than the rest, and therefore if this flow is lower, the alternative is better. After that, the PROMETHEE II method accounts net preference flow $\phi (P)$ as the difference between these two flows [17-18].

On the bias of such calculated net preference flow, final ranking of alternatives is performed, from the best one, with the highest net preference flow, to the worst one, with the lowest net preference flow. To calculate mentioned flows, PROMETHEE II method requires the specification of appropriate parameters for each criterion [17-18]:

1. Direction of preference, minimizing or maximizing;
2. Weight coefficients, indicating the importance of certain criteria;
3. Adequate preference function, that converts the difference between the two alternatives in the level of preference, which ranges from 0 to 1. In PROMETHEE methods following preference functions are available: Linear, Usual, U-shape, V-shape, Level and Gaussian;
4. Preference threshold (p), which represents the minimum deviation that decision maker considers important for the decision making;
5. Indifference threshold (q), which represents the maximum deviation that decision maker considered irrelevant for the decision making.

An appropriate approach to determine the weights of selected indicators is essential to solving multi-criteria decision making (MCDM) problems because it may affect the rankings of the alternatives. Generally, the weights can be classified into subjective weights and objective weights depending on the information source [19]. Subjective weights reflect the subjective judgment or intuition of the decision maker. But, when it comes to macroeconomic analysis, it is very important to obtain objective weights in order to perform the reliable comparative analysis of considered problem. Therefore, the entropy method was used for determination of weights. The smaller the entropy value is, the smaller the disorder degree of the system is and the weight coefficient of such indicator is lower.

5. RESULTS AND DISCUSSION

Application of PROMETHEE II method for the data on observed indicators in 2008 has produced the following results for the positive preference flows $\varphi^+(a)$, negative preference flows $\varphi^-(a)$ and net preference flows φ (Table 2).

Table 2. Preference flows and rankings of CEE and SEE economies in 2008

Countries	$\varphi^+(a)$	$\varphi^-(a)$	$\varphi(a)$	Rank
SVK	0,3105	0,0767	0,2338	1
POL	0,2927	0,0705	0,2222	2
HUN	0,3623	0,1432	0,219	3
SVN	0,3056	0,1208	0,1849	4
HRV	0,2635	0,0851	0,1784	5
ROU	0,2389	0,1122	0,1267	6
BGR	0,2153	0,124	0,0913	7
MKD	0,1570	0,2171	-0,0601	8
SRB	0,0824	0,3486	-0,2661	9
MNE	0,0805	0,3661	-0,2856	10
BIH	0,0866	0,4037	-0,3171	11
ALB	0,0564	0,3838	-0,3274	12

According to data from Table 2 it can be concluded that CEE countries that entered EU in 2004 had the most favourable business environment in 2008. The first ranked was Slovakia, followed by Poland, Hungary and Slovenia. Slovakia had advantage in all areas except in road infrastructure and labour taxes and contributions. This country had very favourable macroeconomic environment, having in mind that it met Maastricht criteria in order to adopt euro in 2009. It is also among the first transition countries that have implemented significant liberalization of prices and trade and strived to harmonize anti-monopoly legislation with the practice of the European Union. In general, this country improved its regulatory quality and government effectiveness in its implementation in the first few years of EU membership. Poland had more disadvantages of business environment than Slovakia, so it occupied the second position. The negative aspects of business environment in this country are price and currency stability, gross government debt, time for registering property and all aspects of tax system except other taxes. In addition, measures aimed at simplification of registration of property and paying taxes procedures and lowering tax rates was insufficient, so this country started to lagging behind other observed countries. But, despite these limitations, Poland had a favourable business environment, with numerous advantages. It have greatly improved infrastructure and the government quality after accession to EU, especially in the area of regulatory quality, control of corruption (there have been many cases in which corrupt officials have been accused for abuses before the State Court) and role of law.

It is interesting to note that Croatia, which at that moment has not joined EU, had better business environment than Bulgaria and Romania that have accessed EU in 2007. Such good ranking of Croatia is, before all, result of higher government quality (in all aspects, except role of law and control of corruption) and improved tax system. In the area of government quality, special progress has been made in the field of harmonization of national regulations with the practice of the European Union in order to accelerate accession progress. On the other hand, tax system was significantly improved in order to attract as many foreign investors as possible, which was especially important in the light of current crisis.

At the end of the rankings there are the rest of SEE countries – FRY Macedonia as the eighth ranked, followed by Serbia, Montenegro, Bosnia and Herzegovina and, at the very end, Albania. FRY Macedonia was the best ranked country in the region primarily due to better macroeconomic environment and tax system. At the end, it should be mentioned that Albania was the last ranked country due to disadvantages in almost all observed areas and the most prominent were infrastructure development, government quality and tax system. The fact that the European Union rejected the request for accession of Albania several times, clearly illustrate how much successful this country was in building market economy and democratic institutions in the last period.

In order to identify progress in improvement of business environment, the ranking results for 2016 are presented in the Table 3.

Table 3. Preference flows and rankings of CEE and SEE economies in 2016

Countries	$\varphi^+(a)$	$\varphi^-(a)$	$\varphi(a)$	Rank
SVK	0,3261	0,0507	0,2753	1
POL	0,3413	0,0777	0,2636	2
SVN	0,2889	0,0977	0,1911	3
ROU	0,1966	0,0935	0,1031	4
HRV	0,2148	0,1176	0,0972	5
HUN	0,1895	0,1209	0,0686	6
BGR	0,1735	0,1164	0,0571	7
MKD	0,1663	0,1811	-0,0148	8
MNE	0,0727	0,2950	-0,2223	9
SRB	0,0558	0,2868	-0,2311	10
ALB	0,0569	0,3454	-0,2885	11
BIH	0,0891	0,3884	-0,2994	12

Results presented in Table 3 point out that Slovakia and Poland retain their positions from 2008 rankings and, according to that the most favourable business environment. Slovakia has made significant improvements of business environment during the period 2008-2016. First of all this country significantly improved government quality by greater public participation in the adoption of legislation through the public announcement of the draft law on the internet in 2009, the introduction of so called "big protest" (which allows a meeting of a body that passes a certain law with petitioners against the adoption of a law, if 500 people sign a petition) [20]. Also, the competitive bidding has been improved and market pressures have been increased in 2011, by adoption of numerous amendments to the Law on Protection of Competition [21]. When it comes to anti-monopoly policy, it should be said that there are some difficulties in its implementation, so this country does not have advantage in this area anymore. Namely, Anti-Monopoly Office decisions has been frequently blocked and/or delayed by the courts in Slovakia, e.g., the case of cartel formed by six construction companies for making a cartel agreement on the construction of highways from 2006. Although European Commission intervened, by applying a coherent anti-monopoly policy, the procedure lasted long.

Poland also has not changed its position during the period. It retained second position by strong pace of reforms in the area of macroeconomic stability, infrastructure development, increase of government quality and simplifying and making less costly procedures of registering property. Macroeconomic environment has been improved due to efficient monetary policy of National bank of Poland (which set inflation control and the introduction of the euro as the most important goals on its priority list) and austerity measures implemented to overcome the crisis and decrease public debt. This country greatly improved

its infrastructure primarily through public-private partnerships. In order to obtain adequate regulatory environment for developments in infrastructure sector, new Law on public private partnerships (2008) and Law on concessions (2009) has been adopted. Immediately after the adoption of the necessary regulations, already in 2010, the Polish government has concluded a significant number of public-private partnerships, primarily in the area of road network improvement [22].

Hungary fell from third to sixth place, due to worsening of the macroeconomic environment, as well as decrease of efficiency of goods market, government quality and infrastructure quality. Hungarian business environment after 2010 has been characterized by increase of government role in the economy, insufficient independence of judiciary, closing the country for cooperation with international institutions, abuse of public office and corruption [23]. The political situation in the country has greatly influenced the implementation of economic policy, because the newly elected government was focused primarily on implementation of measures aimed at achieving short-term goals and solving current problems.

On the other hand, Slovenia improved its business environment and replaced Hungary at the third position. Such significant improvement is result of reforms in the area of administrative procedures for starting a business and tax system. Slovenia reduced the time and cost of procedures to start a business Romania also improved its position in comparison to 2008 rankings, moving from the sixth to the fourth position as a result of improved macroeconomic stability and administrative procedures reforms. Despite the turbulent political situation in the country, the inflation rate remained relatively stable throughout the observed period. A moderate inflation rate was achieved primarily by the managed floating exchange rate regime, which enabled better amortization of the imbalances caused by global economic crisis and increase of the central bank's independence in the conduction of monetary policy.

Croatia, Bulgaria and FRY Macedonia retained their positions, while some changes have occurred at the bottom of the rankings. Montenegro and Serbia switched their positions and Albania and Bosnia and Herzegovina, too. In the first case, the switch is result of intensified reforms of administrative procedures in Montenegro. The latter switch is result of little bit stronger pace of reforms in Albania in the areas of infrastructure development (especially in the energy supply and telecommunication sector due to privatisation of state monopolies) and government quality.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The obtained results pointed out that CEE countries gained a significant advantage over other transition economies, due to efficient implementation of business environment reforms. A significant part of the reforms was made at the very beginning of the transition. As a result of progress in implementing the reforms, the countries of this region have become members of the European Union, after which the reform processes are further intensified in order to adapt to the single market of the European Union. Slovakia and Poland retained the first two positions during the observed period, by significant progress in the previous period as well as by continued progress in reforms implementation. Other CEE countries have moved to the next five places, depending on progress in the reform process. Croatia is the only SEE country that has set aside in relation to the other SEE countries and it has got closer to the CEE countries according to business environment quality.

During the observed period, the SEE countries occupied the last five places in the rankings and the some changes in the order of the observed countries occurred, which are the result of intensive reform processes, but also a significant lag in the previous period, primarily due to the influence of political factors. At the end of the observed period, Bosnia and Herzegovina took the last position, due to the slow implementation of reforms, primarily as a result of a specific state arrangement. SEE countries should follow the example of the CEE countries in the implementation of the reform processes and the first step in this process would be definition of the reform strategy that should be consistent and coherent and harmonized with the specific conditions that exist in each of these countries.

In order to ensure appropriate macroeconomic stability, SEE countries should implement a consistent and coherent set of economic policy measures aimed at stabilizing prices, disciplining the fiscal sector and integrating the economy into international economic flows. In the monetary sphere, the primary goal is to increase the independence of the central bank, in order to implement measures aimed at the stability of prices and foreign exchange rates, depending on economic trends, rather than under to influence of the country's political situation. One of the most important measures in this direction is that the Law on the National Bank abolishes lending to the government, as Bulgaria has done.

The greatest challenge in this area during the observed period was public debt management, particularly after global economic crisis and debt crisis. SEE countries should establish a clear legislative framework defining the public sector debt limit. Certainly, it doesn't mean to completely abolish public debt, because in this way the positive effects on economic development will disappear, but to reduce public debt to certain optimal borders, which enable the achievement of stabilization goals. In determining the range in which public debt should run, it should be guided by the rule that the public debt growth rate should not exceed the rate of GDP growth.

Practice has shown (especially after global economic crisis in 2008) that there is no economy that can work only on the basis of the invisible hand of the market, but the state should regulate economic trends, to a greater or lesser extent, in order to prevent the negative effects of potential imbalances. Therefore, it can be said that in market economies state need to represent the guarantor of the free operation of market laws. Implementation of price liberalization in sectors where monopolies still exist, through increased competition from the private sector, is also one of the priorities in this area. In addition, quotas, permits and other quantitative restrictions should be abolished, which give the exclusive right to particular companies to import certain products. In order to increase the efficiency of anti-monopoly legislation implementation, it is necessary to ensure stable inflow of funds to Commission for the Protection of Competition operations and appropriate legislation to eliminate the possibility that the government will affect the its work, departing from the adopted financing plan. In the area of trade liberalization, the first step is simplification or abolishing of certain import procedures that increase the costs and price of imported products, introduce the electronic flow of customs documentation (which shorten the duration of import procedures and reduce the possibility of corruption), and abolishing the procedures that are doubled.

There is no unique model of infrastructure reforms that would be universally applicable (with minor adjustments) in all transition countries, but government should take into account the characteristics of the institutional environment during the formulating a set of reform measures, as well as the characteristics of each sector of infrastructure separately, such as the ownership structure, the opportunities for introducing competition, the technology development and its application, and the like.

Having in mind that in most SEE countries infrastructure enterprises include several organizational units that carry out a certain part of activities in the production of goods and the provision of services of public interest, appropriate statutory changes should be carried out. In some cases, it is necessary to merge several organizational units to ensure greater efficiency in business (primarily in the area of investment projects implementation), but also to reduce costs and rationalize the number of employees. On the other hand, in certain sectors, organizational units should be separated and form several new companies. Namely, it is necessary to distinguish the organizational units in the areas: production of goods and the provision of services, distribution and maintenance of infrastructure capacities. This would facilitate the privatization of new enterprises in the first two groups of companies, while the maintenance of infrastructure capacities should be improved through concessions or public-private partnership projects. The most commonly used form of public-private partnership is concession arrangement, so-called B.O.T. (build-operate-transfer). It imply permission granted by the state in a given country to foreign investors which enable them to build a new or replace an existing infrastructure capacities and use them for a certain period of time, with the obligation to transfer ownership of the property to the state after the expiration of the contract. The earnings of investors in such projects consist of charging for the services provided and / or the depreciated value of the investment over the duration of the concession arrangement. In addition, in order to ensure continuous progress in the development of infrastructure, it is necessary to strengthen the capacities and independence of the relevant regulatory bodies in this area. The mentioned reforms would enable strengthening of competition, reduction of prices and increase of quality of services provided.

Improving the government quality is one of the key challenges in improving the business environment in SEE countries. The problem of inefficient fight against corruption is particularly pronounced, so the state in these countries should primarily define the appropriate strategy for combating this negative social phenomenon. In order to define an effective strategy, government in these countries should formulate the appropriate dynamics, order and combination of instruments, depending on the nature and causes of corruption in the specific economy. In addition, the institutions responsible for the fight against corruption should therefore be provided with adequate authorities and resources for effective and coordinated action, which ensure their independence in work. At the same time, penalties for corruption, conflict of interest and the failure to inform state officials about the property situation should be increased.

In the area of regulatory quality, transparency in the regulatory process should be increased and the public should be more involved in its definition. One of the most effective measures is adopting and applying appropriate legal acts for debating and adopting the law, as done in Hungary (this country has the Law on the enactment of the law and the Law on public participation in preparation of law). In addition, transparency of law-making should be ensured, as it has been done in Slovakia, by greater involvement of NGOs, economic entities and general public. The public debates should be organized and the draft of the law should be published on the Internet, so that all interested parties can take part in the law-making process. It is necessary to introduce the Slovakian so-called "big protest", in order to avoid the unwanted effects of law enforcement and practical problems in their implementation.

It can be said that reforms in the area of administrative procedures are one of the key preconditions for the faster economic and social development of the SEE countries. The most important factor for the improvement of this business environment aspect is the introduction of electronic registration. By linking enterprises, tax authorities, social security and other involved institutions, the created application leads to the formation of an appropriate

"ecosystem of users" and it facilitates the flow of information between them. Bearing in mind the mentality of people in most transition countries, one can say that the most important precondition for successful automation is ensuring the support of wider public and employees in the public services responsible for registration, because even the most advanced technology will not make any improvements (in terms of reducing the costs and time necessary for registration), if the actors on both sides of the ICT platform do not have the will and interest to use it.

In the field of registering property, it is necessary to define the deadline for performing the procedures in the real estate cadastre and to define sanctions for non-compliance with this deadline (consideration should be given to the possibility of introducing a discount on payment of the fee for performing this procedure, which can be funded from the salary of employee responsible for its performing). In defining the deadline, the time necessary for registering business entities in the Business Registers Agency can serve as a starting point.

The first step in reforming the tax administration is certainly its reorganization. Namely, in most transition economies tax organizational units are formed by type of tax or taxpayer, which causes their inefficiency and high costs of performing the necessary procedures, as there are numerous overlaps in the performance of certain activities. In order to improve the work of these services, a functional organization should be introduced, which includes the grouping of tax administration tasks according to the functions like education of taxpayers, registration, accounting, tax collection, legal services and consideration of complaints and so on. In this way, the increase in the productivity and efficiency of these organizational units, as well as the creation of more favourable conditions for control and audit. However, it should be kept in mind that such a reorganization of tax administration requires a lot of time (at least two years), since it requires gradual implementation and large investments. Once this reorganization has been carried out, other reforms involve only a legal and institutional upgrade.

In order to increase the predictability of changes in tax burden, government can determine that tax rates will change once or twice a year over a precisely determined period of time, creating a certain predictability of the environment in which companies operate. Bearing in mind the far-reaching effects of tax policy on economic growth and development, most authors agree that it is best for transition countries to reform the tax system so that it is based on several types of tax, a limited number of different rates for each type of tax, a small number of tax relief and broad tax base. On the one hand, it facilitates the work of the state administration in the collection of taxes, which results in ensuring sufficient tax revenue for the state functions and, on the other hand, it provides a favourable and non-discriminatory business environment that fosters investment and development.

In front SEE countries, which were very poorly ranked, there are numerous challenges of reform. They can be overcome by consistent and efficient implementation of the necessary reform processes, which will create an incentive business environment for domestic enterprises and foreign investors, ensuring their sustainable growth and development in the future.

REFERENCES

1. Simionescu M., The relation between economic growth and foreign direct investment during the economic crisis in the European Union. *Zbornik radova ekonomskog fakulteta u Rijeci*, 34 (1), (2016), 187-213.

2. Hlavacek P., Bal-Domanska B. Impact of Foreign Direct Investment on Economic Growth in Central and Eastern European Countries. *Engineering Economics*, 27 (3), (2016), 294–303.
3. Kolodkin B., Moreva O., Sullivan S. N., Best-Practice Guide for a Positive Business and Investment Climate. The Organization for Security and Co-operation in Europe (OSCE), Vienne, 2006.
4. Havrylyshyn O., Meng X., Tupy M.L., 25 Years of Reforms in Ex-Communist Countries - Fast and Extensive Reforms Led to Higher Growth and More Political Freedom. *Policy Analysis*, 759, (2016), 1-26.
5. Schwab, K., The Global Competitiveness Report 2011-2012. World Economic Reform, Geneva, Switzerland, 2011.
6. Martí J., Alguacil M., Orts V., Location Choice Of Spanish Multinational Firms In Developing And Transition Economies. *Journal of Business Economics and Management*, 18(2), (2017), 319–339.
7. Vagliasindi M., The role of investment and regulatory reforms in the development of infrastructure across transition economies. *Utilities Policy*, 12 (4), (2004). 303-314.
8. Leković V., The importance of public management quality for the success of the transition process. Institutional changes as a determinant of the economic development of Serbia, Faculty of Economics in Kragujevac, Kragujevac, 2010.
9. Janković I., Functioning of market economy and rent-seeking - Why is necessary to diminish the role of the state in economic affairs? *International problems*, 56 (2-3), (2004), 1-26.
10. Petracco C., Schweiger H., The Impact of Armed Conflict on Firms' Performance and Perceptions. European Bank for Reconstruction and Development Working Paper 152, 2012.
11. OECD, Progress in Policy Reforms to Improve the Investment Climate in South East Europe: Investment Reform Index 2006. OECD Publishing, Paris, 2006.
12. Bertelsmann Stiftung's Transformation Index (BTI), <https://www.bti-project.org/en/country-reports/>
13. IMF, World Economic Outlook Database, April 2018, <https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/weoselgr.aspx>
14. EBRD, Transition Report, <http://www.ebrd.com/transition-report-2017-18>
15. WB, Worldwide Governance Indicators (WGI), <http://info.worldbank.org/governance/wgi/#home>
16. WB, Doing Business database, <http://www.doingbusiness.org/data>
17. Brans, J.P. Mareschal, B. Vincke, Ph., PROMETHEE: A new family of outranking methods in multi-criteria analysis, in (Brans, J.P.), *Operational Research '84*, North-Holland, Amsterdam, 1984, 447–490.
18. Brans J. P., Vincke Ph., A preference ranking organization method: The PROMETHEE method for MCDM. *Management Science*, 3 (6), (1985), 647-656.

19. Hwang, C. L.; Lin, M. J. Group Decision Making Under Multiple Criteria: Methods and Applications. Springer-Verlag, Berlin, 1987.
20. http://www.seio.gov.rs/upload/documents/publikacije/Brosure%20nove/studija_zak_proces_srp.pdf
21. <http://www.bti-project.org/fileadmin/Inhalte/reports/2014/pdf/BTI%202014%20Slovakia.pdf>
22. Stanek R., Toft D., Public-private partnership in Poland: Overcoming psychological barriers and rigid regulations. in (Damjanovic D., Pavlovic, Krizanic T., Peteri G.) Public and Private Sector Partnership: Good and Bad Experiences in Selected Countries in Transition, PALGO center, Belgrade, 2010, 89-111.
23. <http://www.bti-project.org/fileadmin/Inhalte/reports/2014/pdf/BTI%202014%20Hungary.pdf>

Conference papers:



Volume XIV, Issue (2) (2018) 52-59

International May Conference
on Strategic Management

TOP MANAGEMENT TEAMS DIVERSITY IMPACT ON COMPANY PERFORMANCE: EVIDENCE FROM THE AUTOMOTIVE CZECH SMALL AND MEDIUM-SIZED ENTERPRISES

Emil Velinov¹, Vasko Vassilev²

¹Skoda Auto University, Czech Republic (representing Riga International School of Economics and Business Administration (RISEBA), Latvia); ²University of Transport-Kableshkov, Bulgaria

Abstract:

Purpose: The paper tries to explain the relationship between diversity dimensions in the senior management of the automotive SMEs in the Czech Republic and SMEs performance. The paper suggests that diversity dimensions as gender, international experience, functional background of the TMT members are critical for the success of the SMEs. The study aims at broadening knowledge at TMT literature in the context of SMEs business domain.

Design/methodology/approach: The study represents quantitative analysis on TMTs diversity based on the ground theory of upper echelons. The collected data in the paper are primary and secondary and it has been collected mainly from LinkedIn, Xing portals and from 30 surveys sent to the Automotive cluster managers in the Czech Republic. Additional data have been gathered from the Automotive SMEs' annual reports as well.

Findings: The paper empirical data findings for the period 2010-2015 show that social networks among the top managers in the Automotive SMEs business domain are positively related to SMEs performance. Along with that the study suggests that SMEs with diversified TMTs tend to perform business with similar counterparts.

Research/practical implications: Paper implications shed a light on further research on diversity dimensions in the SMEs management structures and it draws the need of deeper studies on how social networks and diversity affect SMEs performance

Originality/value: The paper investigates diversity in Czech Automotive SMEs, which is under-researched topic in the literature

Keywords: Top Management Teams, Diversity, Company performance, Automotive SMEs

1. INTRODUCTION

Diversity management is considered today as a very important factor influencing substantially managerial efficiency and performance. It stems from the fact that the higher the

diversity is, the higher efficiency and performance of the particular managerial team, because diversity of individuals brings into the team different ideas, new opinions, fruitful exchange of experiences and brainstorming atmosphere. Diversity means that composition of different managerial teams, in our case top managers, boards of directors, managerial board and supervisory boards is not homogenous in different factors as well as in the level of these factors. Research on multicultural teams, however, suggests that national diversity has positive effects for team effectiveness and performance. Diversity in national origin is associated with diversity in values, cognitions and experiences that generate broader knowledge bases and different perspectives within the team (Lambert, Cox, Lobel & McLeod, 1991; McLeod & Lobel, 1992; Watson, Kumar & Michaelsen, 1993). One of the most important factors which can substantially increase the efficiency of decision-making of top management teams (TMT) is the characteristics where we measure efficient composition and diversity of TMT. Business World tries to find this efficiency by incremental (ongoing) improvement of TMT. Moreover, diversity in SMEs is under-researched area, which brings the attention of scholars and business in recent years (Pavlinek, 2017).

Top Management Team Diversity

TMT is considered as those who are in the upper echelons in an organization (Hambrick & Mason, 1984). The potential members of TMT are CEO or chief executive, president of the commissioner, director of finance, director of the operational, and so on. These individuals are the major executives in an organization, and each of them provides instructions and directives on making important decisions. Hambrick, et al. 1996) also add that TMT is every executive at the level of directors. Amason (1996) states that TMT is upper executives involved in the decision-making process for the company. In this case they are the CEO. This definition is supported by West and Anderson (1996), West and Schwenk (1996), and Amason and Sapienza (1997).

One of the most frequently discussed factors is gender diversity. The others are age, nationality, race, professional background as well as interlocking directorate, independence and others. Gender diversity means usually the percentage of women in the analysed managerial team or the ratio between men and women in the team (Marinova et al, 2010). Age diversity represents the number of team members in different age categories (Van der Walt et al, 2006). Nationality and race diversity examines the ratio between the number of local (domestic) and foreign members of managerial teams. Diversity in races brings different cultural heritage and life experiences (Richard et al, 2000; Gundelach, 2014). Diversity in professional background enriches the team discussion in exchange of the arguments from versatile specialisations – engineering, law, business and others (Patrick and Kumar, 2012).

Independence means that the team member is not connected with the company by business activities, family relationships, legal and other activities, threatening the independent decision making of the team member (Chrobot-Mason and Aramovich, 2013).

To choose meaningful factors for analysis of managerial diversity is one task, the other is to specify the optimal level of these factors for securing the maximal level of efficiency and performance of the managerial team. It means that we have to find the ways how to quantify the level of different above-mentioned factors as well as to try to specify the optimal level of each factor. Analysis of literature sources showed that there are surprisingly almost no references in this topic of quantification.

2. METHODOLOGY

For the purpose of the study data collection from around 30 SMEs from the Automotive sector in the Czech Republic has been gathered for the period of 2010-2015. The top managerial profiles have been gathered from social networks such as LinkedIn, Xing databases and the business portal Czech Trade. The list of SMEs is attached in attachment below. The paper quantifies selected TMT characteristics based on theory of upper echelons.

Optimal and Operational Level of Diversity

The task to quantify the level of the managerial diversity of the factor and to assess the optimal level of each factor is in some factors logical and relatively easy, in others very difficult because of the lack of logical arguments, enabling to do it. Moreover the “optimal level” is theoretical figure, which may not be acceptable in managerial practice for different reasons.

In this situation managers use more realistic figures based on their practical or expert experiences. We can call this figure “operational level”. The construction of the optimal and operational level in each diversity factor follows as our original contribution to the theory of managerial diversity topic.

Gender diversity

Gender diversity (GD) is one of the only few factors, where the optimal level can be set theoretically or logically easy. The optimal level is when the ratio of male and female in the managerial team is 1 to 1, the same number of males and females. Mathematically we can express it so that the level or value changes from 0 (zero) to 1 (one) in interval $<0; 1>$. Zero value is the case when there are only male or female members in the managerial team, one value is when the male and female are equal. The other values of gender diversity are changing in the interval $<0; 1>$ according to the real ratio of males and females.

In literature sources we can find the practical proposals of the operational level of GD. The directives of EU suggest the value of 40 per cent of females in boards.

Age diversity

Age diversity (AD) is a little more complicated for construction of the optimal level of the AD factor. Psychologically, people at the age of 40-45 have a couple of mitigations in regard to experience and self-control. They tend to be more mature and though in the way of perceiving the surrounding world. Therefore, people at this age sit in the board of the directors. Their mature ways of thinking and their wisdom help them significantly in the process of decision making. At first, it is necessary to specify the borders for different age groups. Our proposal is to specify the borders in harmony with the duration of one human generation i.e. about 25 years. The borders for manager’s production age are 20-45 and 46-70 years. Then the theoretically optimal level of age diversity is in case the team members are divided into two border groups equally. In this case mathematically the AD level is 1 (one). In case all team members belong only to the first or second border group, the AD level is 0 (zero). The other values of the age diversity are moving within the interval $<0; 1>$ according to the real ratio of members in both border groups.

According to our experiences, based on the interviews, discussion and statistical data, we would suggest the operational level of AD 60 per cent of team members in 20-45 age group and 40 per cent in 46-70 group.

Nationality diversity

Nationality diversity (ND) from formal theoretical point of view and according to our hypothesis above, the highest national diversity possible would be the optimal solution. It means every team member is from different country. In this case the VD level is 1 (one) and if all members are of the same nationality, the ND level is 0 (zero). The other values are changing in the interval $<0; 1>$ according to the real ratio of the members of different nationalities in the team. For example, if boards consists of 8 members and 2 members are from country A, 2 from country B, 2 from C and 2 from D, the ND level in this case is 0,5.

Practical experiences show that for the specification of the operational level of ND is more useful to calculate with the team, divided into two halves and as operational level to count with one half of local members and one half of foreign members as optimal division.

For the calculation of the race diversity we can use the same methodology as for ND.

Professional Background Diversity

Professional Background Diversity (PBD) counts with different professional background of the team members. They are collaborating together, discussing the proposals from different perspectives according to the background of the team members. We distinguish the following backgrounds: engineering, law, finance, business.

If the team members are divided according to different backgrounds equally, then the PBD reaches the optimal level of 1 (one). If all team members have the same background, the PBD level is 0 (zero). The interval is again $<0; 1>$ and the PBD value is changing in the interval according to the division of the background of the team members.

The operational level of PBD in this case is in fact in harmony with the theoretical value, but in some cases prefers the professional background which fits to the sector of industry the company is operating in.

Level of Education

Dahlin et al. (2005) suggests that the diversity in education on TMT affect positively the range and the depth of the information used. However, this might have an impact on the information combination negatively. Nevertheless, the ratio of “cognitive bias” (Herrmann & Datta, 2005; Hambrick & Mason, 1984) explains that it may become the supplement as well. Bray et al. (1997) argues that education in a university should support the students’ career, taking into account that higher education is prone to higher chance in getting job. The level of education also reflects the cognitive ability of the people and their skill. Moreover, higher education is related to the higher capacity for processing the information and to the ability to distinguish various situations (Schroder et al. 1967). Bantel and Jackson (1989) find that top management team influences the knowledge of manage the firm and make a good decision. Although educational background in business is not obligatory for those people who enter the business world, it is better if the team members have educational background in business and economy. Having that background, the members of the team have at least better ability to manage the business and to make any decision related to the business compared to those who do not have educational background in business. As a result, this ability gives better value for the company.

Having the quantitative value of individual factors, we can calculate the total level of diversity by summing up all the factors:

$$\text{TMDL1} = \text{GD} + \text{AD} + \text{ND} + \text{PBD} + \text{LE} + \text{IDD} + \text{IMD} \quad (1)$$

where:

TMDL1 – Total Management Diversity Level in case of the same factors

GD – Gender Diversity

AD – Age Diversity

ND – Nationality Diversity

PBD – Professional Background Diversity

LE- Level of Education

IMD – Independent Member Diversity

The equation [1] is flexible, we can add additional factors or decrease its number on the other side. The optimal maximal value of [1] is equal to the number of factors and changes in interval $<0; n>$, where n is the number of factors.

3. DISSCUSION

Different view on the optimal value is presented in the business world, where the managers prefer operational value (similar to IDD) 0,5. It means that at least one half of the team members are managers connected somehow with the company and at maximum one half are independent members. In some countries certain percentage of dependent members (representatives of employees etc.) is set by law. e.g. in Germany one third or one half of total number of supervisory board, depending on the total number of employees.

The paper demonstrates that Level of Education is questionable TMT Characteristics, because according to TMT theories higher level of diversity brings higher company performance. Thus, the companies should try to hire TMT members with PhD diplomas, but this is not the case in the reality. Therefore, our study shows that there is a need of further study on this TMT characteristic.

Table 1. Descriptive Statistics

	Mean	Std. Deviation	N
Age	52,94	7,286	30
Gender	,87	,341	30
Nationality	,00	,000	30
Level of Education	7,17	7,026	30
Professional Background	21,91	12,797	30
Independent Member	32,28	6,867	30
Company Performance	2,41	1,224	30

Notes: Means and standard deviations are reported for the unweighted sample

Source: Author

We can state based on the tables 1 and 2 that quite many TMT members of the selected SMEs from the Automotive sector in the Czech Republic possess Master Degree thanks to the fact that in the Czech Republic is highly appreciate it e.g. MBA degree in regard to the TMT characteristics. On other side, in the same SMEs we observe not so diversified TMTs in respect to age, nationality, gender and career length diversity. Statistically, the ratio

of female TMT members and foreigner to the total number of TMT is much lower than in neighbouring countries from the region such as Poland and Slovakia referring to the automotive industry (Gwosdz et. al., 2017).

Table 2. Characteristics of Top Management Teams

	Gender	Age	Nationality	Professional Background	Level of Education	Independent
Gender	1.000					
Age	0,2614	1.000				
Nationality	0.2233	0.0981	1.000			
Professional Background	0.0267	0.0194	0,0147	1.000		
LE- Level of Education	-0.0152	-0.0247	0.0126	0.0169	1.000	
Independent Member Diversity	-0.0158	-0.0163	-0.0279	-0.0212	0.0117	1.000

Source: Authors

Furthermore, statistical results show positive relationship between TMT Diversity and Company Performance expressed in Table 2, which is related to the fact that highly diversified TMTs increase level of creativity, innovations, internationalization and firm performance among the SMEs in the Automotive sector in the Czech Republic.

4. CONCLUSION

In conclusion we point out that our original theoretical access to the quantification can be used in comparative analysis of the managerial diversity level of different companies. The statistical findings of this study demonstrated that TMT diversity has an important influence on firm performance. These results propose some conceptual and practical implications about the relationship between TMT diversity and company performance. According to the results presented here the disadvantages related to a large TMT outweigh the benefits in terms of fostering management tool diversity. Structural inertia increased cognitive and emotional conflict among TMT members, longer decision-making time, and decreased opportunities for interaction among members may contribute to this decline. Thus, to promote firm performance, the size of the TMT should be carefully considered. Such firms must develop mechanisms to increase interaction among TMT members and compositional diversity in

order to reduce the risks of high organizational inertia and thus increase performance. The results of our research indicate that higher average age of a TMT has negative effects on company performance. This effect may be attributable to organizational structure rigidity, risk aversion, adherence to the status quo, and pursuit of financial and career security among older TMT members. Therefore, a firm must include younger executives on the TMT in order to increase organizational performance. In addition to TMT size and average age, TMT diversity had a significant effect on firm performance. In conclusion, the findings of this study suggested that TMT diversity must be considered for firms that desire to foster firm performance. In this paper, the relationship between TMT characteristics and firm performance was elucidated. Many previous studies have shown that TMT characteristics have critical effects on organizational outcomes and contextual factors such as firm culture, climate, and knowledge base. In addition, many scholars have studied the social and contextual factors that influence company performance. However, few studies have examined the direct relationship between TMT diversity and organizational performance, as most of existing studies are concerned with a group impact on firm performance. A few papers that examined the relationship between TMT diversity and organizational performance did not successfully address top managers' various characteristics other than their business-related abilities or backgrounds.

REFERENCES

1. Carpenter, M. A., The implications of strategy and socio context for the relationship between top management team diversity and firm performance. *Strategic Management Journal*, 2002, vol. 23.
2. Hambrick, D. C.. TMTs theory: An update. *Academy of Management Review*, 2007, vol. 32.
3. Gwosdz, Krzysztof, Robert Guzik, and Boleslaw Domahski. "The New International Division of Labour and the Changing Role of the Periphery: The Case of the Polish Automotive Industry." *Globalising Worlds and New Economic Configurations*. Routledge, 2017. 101-116.
4. Lambert, Jason. "Cultural diversity as a mechanism for innovation: Workplace diversity and the absorptive capacity framework." *Journal of Organizational Culture, Communications and Conflict* 20, no. 1 2016: 68.
5. Pavlinek, Petr. "The role of foreign direct investment in the privatisation and restructuring of the Czech motor industry." *Post-communist economies* 14.3 (2002): 359-379.
6. Pavlínek, Petr. "Foreign Direct Investment and the Development of the Automotive Industry." *Dependent Growth: Foreign Investment and the Development of the Automotive Industry in East-Central Europe*. Springer, Cham, 2017. 1-46.
7. Tanikawa, T., Tanikawa, T., Kim, S., Kim, S., Jung, Y. and Jung, Y.,. Top management team diversity and firm performance: exploring a function of age. *Team Performance Management: An International Journal*, 2017, 23(3/4), 156-170.
8. Tulung, Joy Elly, and Dendi Ramdani. *The influence of Top Management Team Characteristics on BPD Performance*. 2016

9. Velinov, Emil, and Milan Malý. "Top Management Team Diversity and Company Performance: The moderating effect of Organization Life Cycle." *Journal of Eastern European and Central Asian Research (JEECAR)* 3, no. 2, 2016: 11.
10. Jovanovic I., Arsic M., Nikolic D. Entrepreneurial personality traits and SMEs profitability in transition economy. *Serbian Journal of Management*, 2018 ,5 (2), 261–269.

Attachment: List of the Czech SMEs in Automotive sector [2]

Company Name
Koito Czech
Steering Systems
Koyo Seiko
TRW
Delphi
Lucas Varity
TI Group
Kovovyroba Hoffmann
Klein&Blažek
Almet
Strojirny Poldi
PBS Turbo
Hella Autotechnik
Faurecia Exhaust Systems
Karsit
Vyfuky Tyll
Bosal
Ronal
Barum
Plakor Czech
Rieter CZ



NEW GENERATION APS SYSTEMS FOR DEMANDING PLANNING ENVIRONMENTS

Konvicka Dalibor¹, Solodovnikov Vitaly Vitalievich²

¹*LOGIS Research and Development Laboratory (Frenstat pod Radgostem), Czech Republic;*

²*National Research University Higher School of Economics, Faculty of Business and Management, Supply Chain Management Department, Moscow, Russia*

Abstract: The paper examines strategically important management tool - Advanced Planning and Scheduling systems (APS systems) and their efficiency in Demanding Planning Environment. The key characteristics of Demanding Planning Environments are systematized: the uniqueness of the technological processes; high complexity and scope; limited ability to describe and low predictability; high volatility and change sensitivity. The new generation of APS systems is defined. The comparative analysis of the planning systems of several generations (MRP II, APS I, APS II) is provided. Finally, examples of implementations of the new generation APS systems at Trinicke Zelezarny, Czech Republic; TimkenSteel, USA; VSMPO-AVISMA Corporation, Russia are provided.

Keywords: New Generation APS system, Demanding Planning Environment

1. INTRODUCTION

Advanced planning and Scheduling (APS) systems are well known among professionals worldwide [6,8,13,15-17,23]. There are many examples of successful implementations of this type of systems in different industries the result of which was a high business value for the given enterprise [3,13]. At the same time there are also not only few project examples where conventional APS technologies brought less than expected or even fail [7,9,10,13]. The authors of the article introduce an explanation according to which many of these failures are related to objective properties/insufficiencies of the conventional APS systems, which are not able to solve certain problems.

Recent authors' survey introduces specific characteristics of enterprise environments whose presence limits the possibility of efficient deployment of conventional APS systems in specific cases. The more significantly the given enterprise environment is affected by the specified characteristics; the more limited the possibilities for utilization of conventional APS systems for efficient planning. For environments significantly affected by such characteristics, the authors propose using of the term Demanding Planning Environments.

In this article authors analyze conventional APS technologies (let's call them first generation APS) and their deficiency in terms of usability in demanding planning environments. New Generation APS features are analyzed and APS differentiator definition update is proposed. Comparison analysis of planning technologies is provided. In the conclusion practical examples of New Generation APS implementation are overviewed.

2. FIRST GENERATION APS

There are many different definitions of APS systems.

APS is a set of technologies, business processes and performance metrics that enable manufacturing companies to compete more effectively in the global market place. The technologies involved are computer software and hardware that enable organization to change the way they plan, schedule, forecast, distribute, and communicate with customer and suppliers [12].

An APS is a system that suits like an umbrella over the entire chain, thus enabling it to extract real-time information from the chain, with which to calculate a feasible schedule, resulting in a fast, reliable response to the customer [14].

According to APICS Dictionary [2] APS system is defined as: Techniques that deal with analysis and planning of logistics and manufacturing during short, intermediate and long-term time periods. APS system describes any computer program that uses advanced mathematical algorithms and/or logic to perform optimization or simulation on finite capacity scheduling, sourcing, capital planning, resource planning, forecasting, demand management, and others. These techniques simultaneously consider a range of constraints and business rules to provide real-time planning and scheduling, decision support, available-to-promise, and capable-to-promise capabilities. APS often generates and evaluates multiple scenarios.

According to Ivert [11]: “Other terms are also used to describe the same thing creating confusion regarding the concept, e.g. advanced planning and optimization (APO), supply chain planning (SCP) and advanced supply chain collaboration. Besides, many concepts are overlapping each other, and it is difficult to obtain a clear picture about the functionalities and roles of each entity. For instance, the modules of an APS system are often bundled together with the modules of an ERP system and it is not easy to determine which modules that belong to which system. Another explanation for the ambiguousness concerning the definition of APS systems is that software vendors call their solution APS but the functionality of the solution differs between different vendors. The big ERP vendors have successfully achieved an adequate level of functional breadth, which has helped these vendors achieve market-leading positions. A few supply chain specialists have managed to keep pace with the ERP vendors and offer similar functional footprints”.

All of these lead to the fact that it is not always easy to grasp the innovative and real aspects of APS systems compared to the previous systems using these definitions. That is why one of the common ways to describe APS systems is to view them in the light of known deficiencies of their predecessors. One of the key differentiator of APS compared to the previous systems looks like:

Unlike previous systems (authors' comment: ERP/MRP II), APS simultaneously plans and schedules production based on available materials, labor and plant capacity [1,4].

This description has a good grasp on the characteristics of APS systems as they are known. It is important to highlight though that it is possible to see labor force as a capacity as well – so it could be said, that it's planning while simultaneously considering available materials and capacities. Let's also note, that in the sentence above, the word “simultaneously” is mainly related to considering material and capacity and not so much to planning and scheduling.

The abovementioned definition doesn't cover environments where it is not enough to consider only available material and capacity. For example, how about environments, where a

significant role is also played by other specific constraints, whether they might be technological or of another nature. The first generation APS technologies are simply blind to them and the more significant the given constraint is, the less valuable the created plan will be (meaning the feasibility and the related benefits will suffer) without taking such constraint into account.

Example: Special steel producers work with hundreds of various steel grades [5,18,19,21], which differ by their chemical composition. The chemical composition of steel is consequently a major constraint for them, with major impact on the planning of the entire material flow, which is significantly affected by the heat plan. If such a company would only consider availability of the material and capacity, the plan would be insufficiently usable as a management material without further finalizing.

Working with specific constraints is not the only weakness of first generation APS systems. Let's now call *demanding planning environments* such environments, where the first generation APS systems did not achieve very convincing results. Leaving the „subjective” aspect of the given case aside (given especially by the readiness of the relevant company for process changes, the quality of a specific APS product, and the abilities of implementation teams of the investor and the supplier), these will be manufacturing environments with the following characteristics:

High uniqueness

Environments, where besides the material availability and/or capacities, a major role is also played by other constraints. These are environments where the requirements on the calculations carried out by an APS system are so unique, that it cannot be reasonably assumed that it would be possible to solve them by parameterizing the planning algorithms the APS system is equipped with and therefore it must be possible to modify the planning algorithms or even create new ones. We thusly identified the first need related to demanding planning environments, which is the need for ability to carry out significant modifications of the planning algorithms and/or to create new, specific algorithms.

Another complication occurs if the nature of the specific constraints requires more than one solver.

High Complexity and Scope

As a consequence of high complexity and scope of the environment, a need may arise to involve more than one planner (and thus for multiuser planning to be supported), especially when it could be hardly assumed that one planner would be able to orchestrate the full complexity and/or scope. This also applies if the planner brings a significant portion of specific information, abilities and know-how into the planning process (which could not be taken into account without this planner).

Limited Ability to describe and Low predictability

The consequence of a limited ability to describe and of low predictability is necessarily increased amount of manual planning. The ability to achieve high automation level is thus limited and the planner's role increases, as does the number of the planning actions he/she performs. A need thus increases for an efficient support of the planner's activities with the emphasis on the customizability, dynamics and the efficiency of the planner's working environment.

High Volatility and Change sensitivity

The result of high volatility and sensitivity to changes will be especially the need for fast replanning. However, fast replanning is conditioned by achieving a fairly high level of detail of the planning model (the ability to include specific constraints of the environment in the model is needed here – see no. 1 above) and a high level of integration of the planning activities. In cases where besides this, a need exists for involving multiple planners, an ability to efficiently manage such team is needed as well.

It seems the more characteristics of demanding planning environments (1 – 4) are bound to the given planning environment, the more limited results can be achieved in the given environment by deploying first generation APS.

The table 1 (2nd column) presents short comments on how the above-stated needs are addressed by conventional APS systems in demanding planning environments.

Table 1. Requirements of demanding planning environments

Need in a demanding planning environment	How the need is satisfied by conventional APS
Possibility to perform fairly significant modifications of planning algorithms and / or creation of new specific algorithms	Modification of the algorithms or the development of custom algorithms is usually not possible
Involvement of more than one planning solver in the calculation of a plan / schedule	Such a possibility is not common, usually an APS has one solver that is suitable only for solving certain types of problems (e.g. planning of material and capacity according to their availability)
Effective involvement of multiple planners in planning	If an APS allows multi-user mode, it usually leads to hidden conflicts in planning and thereby reducing the value of the plan
Need for highly customizable and efficient working environment of a planner	Individualization (either for a particular installation, or for a specific planner) is usually limited by parameterization. A substantial modification of tools or even incorporation of additional individual instruments is not usually possible.
Possibility to achieve high level of automation and integration of the planning process	In challenging environments where you can not do with a single planning product, the commonly used one is the concept of construction of planning system of more specialized products for planning and / or scheduling; this concept however greatly limits the achievable level of automation and integration.
Need for highly efficient management of team of planners	Conventional APS simply did not address the support for the management of the team of planners

3. NEW GENERATION APS AND APS DIFFERENTIATOR DEFINITION UPDATE

Let's assume that the world of APS will keep evolving and that APS will remain to be the term used for planning technologies which are now distinguished by their efficiency. However, in order for the term „APS“ to continue to be used for the most powerful planning systems, it won't do without offering more than its first generation predecessors. This has to be manifested in the fact that new generation APS should be able to provide really efficient planning technologies even for demanding planning environments. They should be able to provide technologies that satisfy all the needs (see above Table 1) of demanding planning environments.

Besides that, it seems that the time comes for the generational changes to be reflected in the definition of APS differentiator as well. The following description is proposed:

Unlike first generation of APS, New Generation APS are supporting efficient planning and scheduling of demand fulfillment process, taking into account significant constraints.

The changes comparing with the original description are as follows:

A) **Significant constraints** instead of **available materials and capacity**

Let's start from the end. The original phrase „**plans ... available materials, labor and plant capacity**“ is replaced by „**taking into account significant constraints**“. Although it could be said that material and capacities are constraints present in most manufacturing processes, many enterprises are also burdened by a number of other constraints, while some of them may be so significant, that unless they are taken into account during planning, they can render the resulting plan infeasible.

„Significance“ is in fact a relative term. One cannot define objectively what is significant and what is not. However it is true, that the more perfect the planning result should be, the more complete set of existing constraints has to be considered, from the major to the minor.

B) **Efficient** instead of **simultaneously**

The word **simultaneously** really is a major characteristic of first generation APS. Still, it illustrates more of the technical side of planning than the value. It assumes, that planning in a way that considers the constraints simultaneously is a guarantee of the best achievable result. Still, the goal is to efficiently create the most valuable plan. And other factors may help besides the way constraints are handled. Ways to more valuable results may, for example, lay in more efficient utilization of information resources, or in stronger what-if support, and so forth. But even if we'd look for an opportunity to improve in the way how constraints are considered, strict adherence to the principle of simultaneous considering of constraints doesn't always have to lead to the best possible result – for example in environments with heterogeneous problems (problems that cannot be solved with simple applying of some of the known modelled methods), better results would be achieved by a solution based on several cooperating solvers and iterations, which also means suppressing the simultaneous constraint considering.

C) **Demand Fulfillment Process** instead of **production**

Although production often dominates the process of satisfying the demand, it is rarely the only factor included. In many enterprises, material needs to be purchased in the interest of fulfilling the order, as do semi-finished products and various components. It is certainly clear that managing purchasing is different from production management, although both of these are closely related. In other companies, a significant role in demand fulfillment may be played by different area. Specifics like these may have a very important role affecting how efficiently the company can satisfy demand.

4. **PLANNING TECHNOLOGIES AND THEIR SUFFICIENCY FOR EFFICIENT MANAGEMENT**

As mentioned above, deploying first generation APS in some environments resulted in good or even excellent results; in other, however, the results were not so convincing. In this sense, it is very important of how demanding is the given planning environment.

Let's try to make a simple comparison of the value of planning technologies depending on the demands of the given planning environment.

As it was stated above, **demanding planning environments** are characterized by the following attributes: uniqueness, complexity, scope, volatility, change sensitivity, predictability, and ability to describe. Let's also assume, that for the purposes of this article, the 0 coordinate on the planning environment demands axis will be related to an environment, where only capacity and material availability is sufficient to consider to achieve a very realistic planning model (note: the degree of how realistic the model is represents a limitation of the achievable quality of the plan for the given planning system).

Let's now take a look at what we will consider to be a value for management purposes when comparing planning technologies. For our purposes, we propose the value for management purposes to be comprised of the following aspects:

- **Feasibility** of the plan that we can acquire using the given technology
If the plan can be realized in all its details (regardless how advantageous it is) without any objective facts standing in the way, it is fully feasible. The more details of the plan cannot be realized due to objective reasons (e.g. due to too large capacity overload in some moment in time), the less feasible it is.
- **Advantage** resulting from using the plan
The degree of how advantageous the plan is relates to how the plan makes use of the objective facts in the given situation in order to meet the goals of the company in the most efficient way (in the given case, the best possible customer service and the best possible operational efficiency).
- **Sufficiency** of the given technology for creating the plan
Sufficiency increases with the ability to manage with the results acquired using the planning systems without the need to further finalize them outside the system (e.g. manually, using Excel or other additional tools, ...).

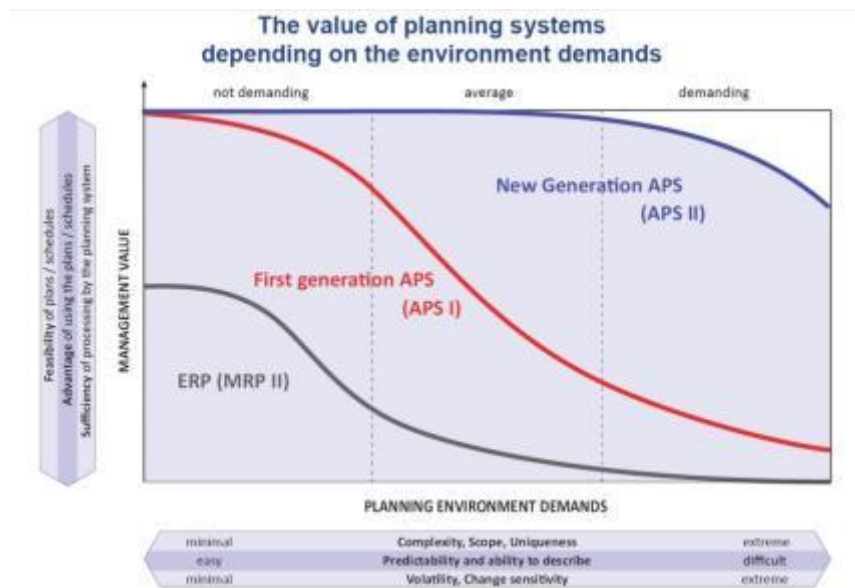


Figure 1. The value of planning systems depending on environment demand

Let's start with the **MRP II** concept (Manufacturing Resource Planning) used practically in every today's ERP system. The value of MRP II is limited by often very low feasibility or by limited advantage resulting from the plan. Consequently, MRP II is sufficient only for an enterprise with a very undemanding planning environment (see Figure 1), which is, in addition, under no noticeable competitive pressure. As soon as the environment complicates even by the simplest thing, the value of MRP II for the purposes of planning decreases rapidly; plans have to be finalized laboriously, in most cases using table calculator tools. Already in planning environments with average complexity, the value of MRP II is very little and speaking of a value of MRP II in really demanding planning environments practically loses any sense.

First generation APS (further also APS I) deals incomparably better with undemanding planning environments. Thanks to its characteristics, in 0 on the planning environment demands axis, it can reach the full management value. As the environment demands increase, meaning as demanding attributes come into effect (uniqueness, and so forth), APS I starts to lose value. This is caused by the fact that APS I is not able to deal with demanding problems – it uses to be blind to unique constraints, insufficient in environments with high complexity and scope and so on (see comparison table, column „How the need uses to be addressed by conventional APS“). The value of APS I thus declines rapidly as we get closer and closer to the really demanding environments – such environments, where the demanding attributes apply strongly or even extremely.

The value of new generation APS (further also APS II) will be very high. Because of the fact that **APS II** is able to consider almost all attributes of demanding planning environment uniqueness, complexity, ...), it will provide the higher value the more other technologies lose in the given environment. Naturally, this will result in only small differences in undemanding environments, but as the environment demands increase, the difference between other technologies, including APS I, will increase significantly. APS II will thus be the only technology able to provide outputs of high value even in demanding planning environments.

Note: Let's note, that the only attribute APS II doesn't satisfy is the insufficient ability to describe. Understandably, that cannot be considered to be a drawback of the given technology. Describing constraints in any environment is something a human must do. And so even practical experience shows that people are not always able to sufficiently describe the rules present in the given environment. It may be difficult to get the needed information in the given enterprise (more people would have to meet that have the needed knowledge but may not even know about each other) or such information simply does not exist yet in the company (the knowledge is insufficient, the given matter is a black box).

But since we are speaking about manufacturing enterprises, we're assuming that the unknown is limited, even in extremely demanding environments – that is also the reason why the blue curve in the diagram does not decline to zero in extremely demanding environments.

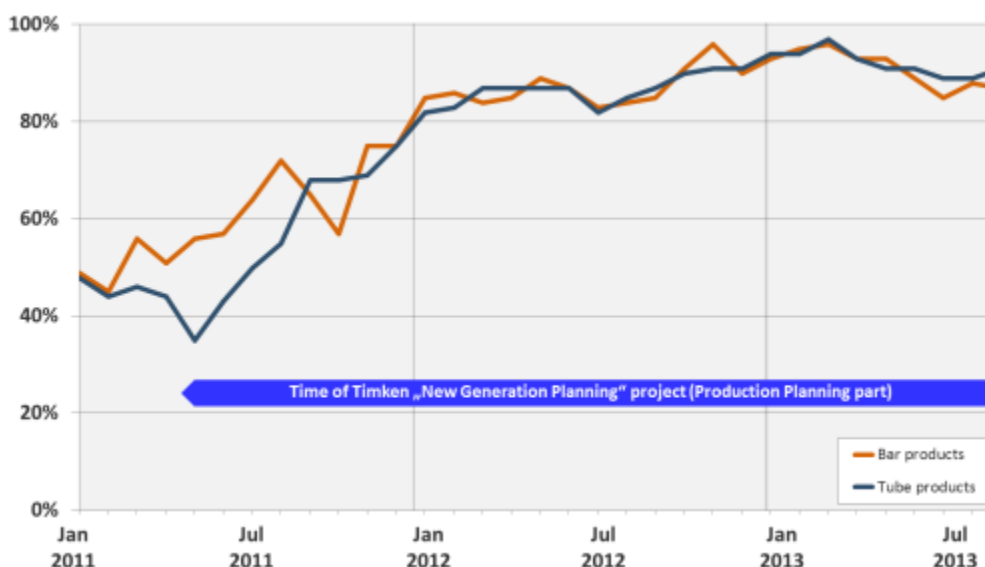
Take into account that this diagram is based on no exact values and is only approximate based on the above described abilities of planning technologies, illustrating the sufficiency of their usage for management purposes. The variables (value for management, planning environment demands) are not exactly measurable and can only be used to compare the lower/higher, more demanding/simpler levels and so on. Let's also note that the specific planning products can provide different value in their categories (MRP II, APS I, APS II).

5. NEW GENERATION APS IN PRACTICE

In recent years, there were number of successful projects of new generation APS implementation in demanding planning environments. There are some of them.

The implementation of elements of New Generation APS at Trinecke Zelezarny [22]. Trinecke Zelezarny is a Czech special steel maker and is one of the leading steel producers in Europe.

The largest deployment of New Generation APS at TimkenSteel [20]. TimkenSteel is an American special steel producer – and undoubtedly operates in a demanding planning environment. In the past, TimkenSteel used to run an A-grade first generation APS. There was a very good opportunity for comparing the two generations of APS technologies (which was even more special thanks to the fact that Timken's team in the project comprised of the same people that used to work with the preceding system). The results are very convincing. The following diagram demonstrates the development of Due Date Delivery Performance after deploying APS II technology.



In 2015 Russian company VSMPO-AVISMA Corporation started a project for New Generation APS[24]. VSMPO-AVISMA Corporation is a is the world's largest titanium producer, having a full production cycle, from raw material processing to finished products with a high degree of machining. The corporation supplies its products to the markets of 50 countries, it is deeply integrated into the global aerospace industry and it is a strategic supplier for many companies.

6. CONCLUSION

It could be supposed that soon new generation APS systems, which cover requirements of demanding planning environments, will take significant share of the SCM market. The main reason for that is that supply chains of contemporary companies keep evolving and becoming more complicated day after day at the same time competition among them is becoming tougher.

REFERENCES

1. Advanced planning and scheduling
http://en.wikipedia.org/wiki/Advanced_planning_and_scheduling (14.5.2018)
2. APICS Dictionary. In: JR, J.H.B. (ed.) APICS Dictionary. 13th ed. Chicago. APCIS The Association of Operations Management, 2011
3. Bermudez J., Advanced Planning and Scheduling Systems: Just a fad or a breakthrough in manufacturing and supply chain management, The report on manufacturing, Advanced Manufacturing Research, Inc. 1996.
4. Bubenik P., Advanced Planning System in Small Business, Applied Computer Science Volume 7, Number 2, 2011
5. Degner M., Steel Manual, Dusseldorf:Steel Institute VDEh, 2008, 185 p.

6. Dickersbach J.T., Production Planning and Control with SAP ERP 2nd Edition, SAP Press, 2010, 525 p.
7. Fontanella, J., The Overselling of Supply Chain Planning Suites, 60 Manufacturers Speak Up, AMR Research Report, 2001
8. Günther H.-O., van Beek P., Advanced Planning and Scheduling Solutions in Process Industry, GOR Publications, 2003
9. Hamilton S., Maximizing your ERP system a practical guide for managers, The McGraw Hill Companies, Inc, New York, 2003
10. Hvolby H.A., Steger-Jensen S.J. Technical and industrial issues of Advanced Planning and Scheduling (APS) systems, Computers in Industry, Vol. 61, No. 9, 2010, 845-851 p.
11. Ivert L.K., Use of Advanced Planning and Scheduling (APS) systems to support manufacturing planning and control processes, Thesis for PhD, Göteborg, Sweden, 2012
12. Naden J., Have a successful APS implementation, IIE Solutions, Vol. 32, No. 10, 2000, 10 p.
13. Stadtler H., Kilger Ch., Supply Chain Management and Advanced Planning. Third Edition, Berlin:Springer, 2004, 512 p.
14. van Eck M., Is logistics everything, a research on the use(fullness) of advanced planning and scheduling systems, BMI paper, University of Amsterdam, Amsterdam, 2003
15. Vollman T., Berry W., Whybark D.C., Jacobs F.R. Manufacturing planning and control systems for Supply Chain Management: The Definitive Guide for Professionals. 5th edition, McGraw-Hill Education, 2004, 598 p.
16. Zagidullin R., Managing discrete production with the use of MES, APS, ERP. Monography. 2015, 372 p. (In Russian)
17. Karminsky S., Business informational support: concepts, technologies, systems. M.:F&S, 2006. 624 p. (In Russian)
18. Konvicka D., Solodovnikov V., Customer service and operational efficiency improvement at special steel maker through improvement of order fulfilment planning, Logistics and Supply Chain Management, №4(63), 2014 (In Russian)
19. Konvicka D., Solodovnikov V., Strengthening competitive advantages of steelmaker through quality improvement of melt shop and caster scheduling, Logistics and Supply Chain Management, №6 (65), 2014 (In Russian)
20. New generation planning at TimkenSteel
<http://www.logis.cz/pdf/ru/LOGISNews2014.pdf> (14.05.2018) (In Russian)
21. Oeks G., Steel production, M.: Metallurgy, 1974. 440 p. (In Russian)
22. Advanced planning at Trinicke Zelezarny
<http://www.logis.cz/pdf/ru/LOGISNews2009.pdf> (14.05.2018) (In Russian)
23. Sergeev V., Supply Chain Management. Tutorial, M.:Uright, 2015, 480 p. (In Russian)
24. Titan giant “VSMPO-AVISMA Corporation” improves customer service
<http://www.metalinfo.ru/ru/news/80734> (14.05.2018) (In Russian)



THE FIVE STAGES OF BUSINESS PROCESS MANAGEMENT MATURITY MODEL

Ernad Kahrović¹, Nada Vignjević-Đorđević²

¹State University of Novi Pazar; ²State University of Novi Pazar, Serbia

Abstract: Business Process Management (BPM), in diverse forms, has been around for the last 30 years. During this time BPM has progressed to a holistic management approach that has an distinctive level of complexity resulting in part from the infinite of implementation options available. The popularity and significance of BPM leads to the question of how advanced different organizations are in their BPM development. The notion of maturity has been proposed for a number of management approaches as a way to evaluate the fullness or perfection of growth or development. This paper describes business process management as a new paradigm for competitive advantage. Also, paper presents the five stages of business process management maturity model that has been developed for the evaluation and advancement of BPM effectiveness across organizations.

Keywords: business process management, process maturity, maturity stages

1. INTRODUCTION

New technology, a constantly changing marketplace, intense global competition, and the expanded aspirations of workers who are demanding increased participation and greater responsibility are forcing companies to become more efficient each day. There is a very small numbers of companies which can afford themselves to function in a vacuum; others should optimize their business activities. Very useful way of reducing non-value added activities is a business process management (BPM) or business process orientation (BPO). It has been recognized by academicians, consultants, and practitioners as a management philosophy which can assure improved business practice. Although process management has many concepts and ideas, one of the strongest initiatives is a process maturity model. Therefore, a business process management maturity model is a tool that can assist organizations in becoming more successful with BPM, resulting in the achieving of greater operational and business performance benefits. More than 150 maturity models have been developed to measure, among others, the maturity of strategic alignment, innovation management, program management, IT service capability, enterprise architecture and knowledge management.

2. BUSINESS PROCESS MANAGEMENT

Developing new models of the organization requires a new form of thinking, which will result in radical improvements of business performance. This new way has been typically described as business process management. Business process management was recommended thirty years ago by Michael Porter (1985). This author introduced the concept of

interoperability across the value chain and horizontal organization as a significant topic within firms. Davenport and Short (1990) also depicted a process management orientation within a company as a crucial component for success in "New Industrial Engineering: Information Technology and Business Process Redesign." They defined a process management as a horizontal design of business that cuts across the organization with product inputs at the beginning and outputs and customers at the end. They suggested that five major steps in process redesign are: developing the business vision and process objectives, identifying the processes to be redesigned, understanding and measuring the performance of existing processes, identifying IT levers, designing and prototype process.

Furthermore, Hammer and Champy (1993) presented the BPM concept as a vital element of a successful reengineering effort in the most influential business management book "Reengineering the Corporation: A Manifesto for Business Revolution." They offered reengineering as a strategy to overcome the problematic cross-functional activities that present major performance issues to firms. The apparent conflict between a functional focus ("whom I report to") vs. a horizontal focus ("whom I provide value to") is offered by them as being brought back in balance by adding a BPM to the organization. Along with Hammer and Champy, Bryne (1993) among the first popularized the term "horizontal organization" and provided a prescriptive definition of a business process-oriented model. Also, numerous authors have researched the idea of organizing around business processes in a certain manner. A process oriented organization is likewise regularly referred to as a "process centred organization" "horizontal organization" , "process enterprise" , "process focused organization", "process managed organization" .

3. PROCESS MANAGEMENT MATURITY MODELS: LITERATURE REVIEW

Process maturity recently appeared as a mainstream topic in the business process management literature. The concept is offered as a path to business improvement and success. Its basic notion is that there are different level of process management orientation, and that companies should strive to reach higher process maturity level. Recently, a number of models to measure the maturity of Business Process Management have been proposed. The basis for the majority of these maturity models has been the Capability Maturity Model developed by the Software Engineering Institute at Carnegie Mellon University. This model was originally developed to assess the maturity of software development processes and is based on the concept of immature and mature software organisations. The basis for applying the model is confirmed by where it is indicated that improved maturity results "in an increase in the process capability of the organisation".

Smith and Fingar (2004) argue that a CMM-based maturity model which postulates well-organised and repeatable processes cannot capture the need for business process innovation. A shortcoming of these BPM models has been the simplifying focus on only one dimension for measuring BPM maturity and the lack of actual applications of these models. In a similar way, Fisher (2004) combines five "levers of change" with five states of maturity. Pritchard and Armistead (1999) provide an attempt to divide organisations in groups depending on their grade and progression of BPM implementation. Among others, Harmon (2004) developed a BPM maturity model based on the Capability Maturity Model (see also Harmon 2003). Maull et al. (2003), whilst trying to define maturity of BPR programs, encountered problems that they could not use objective measures. They tried to define BPM using two dimensions, an objective measure (time, team size, etc.) and a "weighting for readiness to change" , but this approach turned out to be too complex to measure. Therefore,

they chose a phenomenological approach assessing the organisation’s perception of their maturity, using objective measures as a guideline. The Rummler-Brache Group [20] commissioned a study, which used 10 success factors gauging how well an organisation manages its key business processes. The results have been consolidated in a Process Performance Index. Another example of how to define maturity (or in their case "process condition") is provided by DeToro and McCabe (1997), who used two dimensions (effectiveness and efficiency) to rate a process’ condition.

3.1. THE FIVE STAGES OF PROCESS MANAGEMENT MATURITY MODEL

The comparison of low and high maturity in Figure 1 helps to clarify the comprehensiveness and range of BPMM. The idea of comparing low and high maturity derives from Paulk et al. (1993), who presented such a comparison to facilitate the understanding of the concept of process maturity. The proposed BPMM model adopts the five maturity stages in an attempt to differentiate various levels of sophistication of a BPM initiative.

An organization with a BPMM at Stage 1 will have made either no or very uncoordinated and unstructured attempts towards BPM. Typically, such an organization may display some combination of the following characteristics: ad hoc approaches, limited scope of BPM initiatives, various and non-consolidated approaches to methodology, tools and techniques, individual efforts (IT or business), minimal employee involvement, low reliance on external BPM expertise and high level of manual interventions and work around.

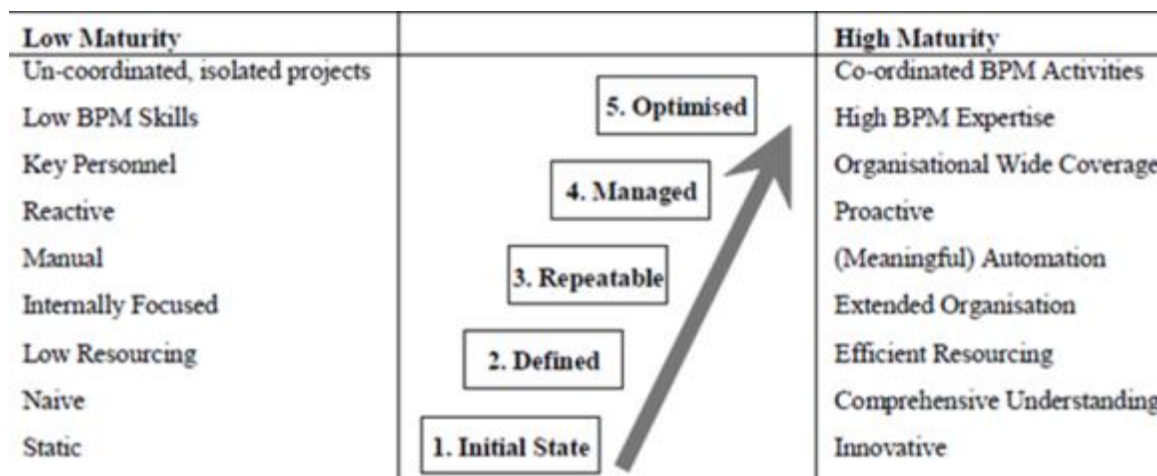


Figure 1. Comparison of low and high maturity and the five maturity stages

An organization with a BPMM at Stage 2 will have progressed past making first BPM experiences and will be starting to build up BPM capability and increasing the number of people who look at the organization from a process perspective. Typically, such an organization may display some combination of the following characteristics: first documented process, recognition of the importance of BPM, increased involvement of executives and top management, one main purposes for exploring BPM, extensive use of simple process modeling with simple repositories, first attempts with a structured methodology, common standards and increased reliance on external BPM expertise.

An organization with a BPMM at Stage 3 will experience increased momentum in its quest to develop BPM capability and expand the number of people looking at the organization from a process perspective. Typically, such an organization may display some combination of the following characteristics: focus on the management of the early phases of the process lifecycle, use of elaborate tools (e.g. dynamic modeling, server-based applications, multiple and distributed users), a combination of different process management methods and tools (e.g. process redesign, workflow management and process-based risk management), more extensive use of technology for delivery and communication of BPM, comprehensive and formal BPM training sessions and less reliance on external expertise.

An organization with a BPMM at Stage 4 will enjoy the benefits of having BPM firmly entrenched in the strategic make-up of the organization. Typically, such an organization may display some combination of the following characteristics: an established Process Management Center of Excellence that maintains standards, exploration of business process controlling methods and technologies, merging IT and business perspectives on process management, formal, designated process management positions, widely accepted methods and technologies, integrated process management purposes, process orientation as a mandatory project component, continuous extension and consolidation of process management initiatives and minimal reliance on external expertise.

An organization with a BPMM at Stage 5 will enjoy the benefits of having BPM firmly entrenched as a core part of both strategic and operational management within the organization. Typically, such an organization may display some combination of the following characteristics: process management is a part of managers' activities, accountabilities and performance measurements, wide acceptance and use of standard methods and technologies, one-organization-wide approach to BPM that incorporate customers, suppliers, distributors and other stakeholders, establishes business process lifecycle management and Business Process Management Center of Excellence reduces size as process management become simply the way business is done.

4. CONCLUSION

This paper has provided a brief and selective overview of the structure and components included in a holistic and contemporary model that facilitates the assessment of business process management maturity model. The actual BPMM assessment derived by applying this model can occur on various level. In future, it is necessary to conduct a number of case studies with European, American and Australian organizations, in order to develop a deeper understanding of the requirements related to a BPMM assessment and to get further feedback on the appropriateness of proposed model.

REFERENCES

1. Bryne, J. A. (1993, December 13). The Horizontal Corporation. *Business Week*, pp. 76-81.
2. Davenport, T. H., Short, J. (1990). The New Industrial Engineering: Information Technology and Business Process Redesign. *Sloan Management Review*, 31(4), 11-27.
3. DeToro, I., McCabe, T. (1997). How to Stay Flexible and Elude Fads. *Quality Progress*, 30(3), 55 - 60.

4. Fisher, D. M. (2004). The Business Process Maturity Model. A Practical Approach for Identifying Opportunities for Optimization. *Business Process Trends*. September 2004.
5. Gardner, R. (2004). *The Process - Focused Organization*. Milwaukee, WI: Quality Press.
6. Hammer, M. (1996). *Beyond Reengineering: How the Process - Centred Organization Is Changing Our Work and Our Lives*. New York, NY: Harper Collins Publishers.
7. Hammer, M. H., & Champy, J. (1993). *Reengineering the Corporation: A Manifesto for Business Revolution*. New York, NY: Harper Business.
8. Hammer, M., Stanton, S. (1999). How Process Enterprises Really Work. *Harvard Business Review*, 77(6), 108-118.
9. Harmon, P. (2003). *Business Process Change: A Manager's Guide to Improving, Redesigning, and Automating Processes*. Morgan Kaufmann Publishers.
10. Harmon, P. (2004). Evaluating an Organization's Business Process Maturity. *Business Process Trends*. March 2004.
11. Jeston, J., & Nelis, J. (2009). *Business process management: Practical Guidelines to Successful Implementation*. Elsevier.
12. Kahrović, E., Krstić, B. (2015). The effects of business process management on improvement of firm performances, *Industrija*, 43(4), 67-87.
13. Krstić, B., Jovanović, S., & Kahrović, E. (2012) process-oriented enterprise management as a determinant of organizational behaviour in contemporary business terms, *Actual Problems of Economics*, 11(137), 369-380.
14. Maull, R. S., Tranfield, D. R., & Maull, W. (2003). Factors characterising the maturity of BPR programmes. *International Journal of Operations & Production Management*, 23(6), 596 - 624.
15. Ostroff, F. (1999). *The Horizontal Organization*. New York, NY: Oxford University Press.
16. Paulk, M. C., Curtis, B., Chrissis, M. B., & Weber, C. V. (1993). *The Capability Maturity Model for Software, Version 1.1*. (No. CMU/SEI-93-TR-24): Software Engineering Institute.
17. Porter, M. E. (1985). *Competitive Advantage: Creating & Sustaining Superior Performance*. New York, NY: The Free Press.
18. Pritchard, J. P., Armistead, C. (1999). Business process management - lessons from European business. *Business Process Management Journal*, 5(1), 10 - 32.
19. Rummler-Brache Group (2004). *Business Process Management in U.S. Firms Today*. A study commissioned by Rummler-Brache Group. March 2004.
20. Smith, H., Fingar, P. (2004). Process Management Maturity Models. *Business Process Trends*. July 2004.



INFLUENCE OF COST MANAGEMENT TOOLS ON THE EFFICIENCY OF ACTIVITY OF ENTERPRISE STRUCTURES

Alexander Miller

Department of Economics and Financial Policy, Dostoevsky Omsk State University, Russia

Abstract: The purpose of the research is to solve the problem of the influence of entrepreneurial management of costs on the performance results of business structures.

The basic methods of the study include the key provisions of the theory of management, organization theory and modern theories of entrepreneurship. System, instrumental, process, resource and project approaches form its methodological basis. In the process of research we applied abstraction techniques, morphological analysis and synthesis of systems, structural-functional method as well as system, comparative and situational analyses.

The development of conceptual provisions of the system of tools for entrepreneurial cost management and their impact on the efficiency of industrial and entrepreneurial structures represent theoretical results of the research.

As part of the study we revealed the dependence between tools of costs management and efficiency of activity of industrial and entrepreneurial structures. We gave reason for the algorithm of formation of the system of tools for entrepreneurial cost management that is aimed at increasing the efficiency of the activity of industrial and entrepreneurial structures and ensuring their sustainable development.

As part of the study we revealed the dependence between tools of cost management and efficiency of activity of industrial and entrepreneurial structures. We gave reason for the algorithm of formation of the system of tools for entrepreneurial cost management that is aimed at increasing the efficiency of the activity of industrial and entrepreneurial structures and ensuring their sustainable development.

Keywords: entrepreneurial management, cost management tools, production and entrepreneurial activity, profitability

1. INTRODUCTION

There are a large number of different cost management tools. When choosing certain instruments, industrial-entrepreneurial structures, we should take into account various factors as well as the degree of influence of various instruments on the effectiveness of our activities. Effective cost management, in turn, is a factor of the competitiveness of the production and business structure. It means that the use of the system of cost management tools should increase the economic efficiency and, as a result, create the competitiveness of the production and business structure. At the same time, the tool system is not the only factor determining efficiency and competitiveness.

The allocated feature of the use of the system of tools, namely, its obligatory connection with economic efficiency and competitiveness, is consistent with such a parameter of entrepreneurial cost management as a criterion of orientation towards achieving entrepreneurial effectiveness.

The concept of “competitiveness” is one of the basic in the market economy. In their theoretical and applied researches economists and practitioners give numerous definitions of competitiveness. As a rule these notions are similar in essence, but they differ in specific formulations. In this study we are to consider the concept of competitiveness applied to the following objects:

Firstly, the concept of competitiveness can describe the product produced or the service provided. The competitiveness of the latter should be understood as the aggregate of consumer properties of a particular product (service) that distinguishes it from a similar product (service) of a competitor in accordance with the degree how specific public needs are met. When analyzing the factors that affect competitiveness, we take into account the costs of producing goods (services), its price, etc.

Secondly, the concept of competitiveness is used when characterizing economic entities of various organizational and legal forms. In this case, competitiveness can be defined as the possibility of such an entity to be present on the market of goods (services), deriving an economic benefit from this presence. The costs, their size and structure are an important component of such a complex concept as the competitiveness of the production and business structure.

In other words, costs are the factor of the competitiveness of the product/ service and the indicator that characterizes the work of the industrial-entrepreneurial structure. Under other equal conditions, high costs reduce the possibility of maneuvering the entrepreneurial structure (reduce the variety of possible strategic moves) in price competition, as costs determine the cost of production, and hence the minimum price that an industrial and entrepreneurial structure can afford.

2. THEORETICAL RESEARCH

Effective cost management, of course, enhances the market reputation of the industrial and entrepreneurial structure. Market reputation, in turn, entails the commitment of customers, and in this case we should take into account that it is easier (a lot cheaper) to retain customers than to acquire new ones. Indirectly, a good market reputation facilitates the access of the productive and entrepreneurial structure to loan funds and access to other resources. Effective cost management forms the basis for increasing the value of the company.

The existence of an entrepreneurial structure on the market is economically justified insofar as the costs connected with the organization of a particular type of activity or the business process, are lower than the organization of this type of activity by the market, i.e. there are fewer transaction costs (Krutik, 2008).

So, the costs increase the competitiveness of the production and business structure to the extent in which they lead to an improvement in the financial performance of its activities and provide an opportunity to improve its market reputation. One of the complex indicators of the activity of the production and business structure, which is influenced by the system of cost management tools among other factors, is efficiency. In this regard, we will consider approaches to the concept of efficiency and apply them to assess the impact of the system of cost management tools on the efficiency of the production and business structure.

Many Russian and foreign scientists, such as V. Berne, Ya.V. Dmitriev, D.N. Zavlin, V.G. Karpov, I.A. Limitovsky, E.V. Mishustin, D.N. Skhiladze, L.M. Chistov, P.N. Khavranek, M. Disent and others paid attention to the common questions concerning performance evaluation. The questions concerning effectiveness of entrepreneurial activity are also discussed in scientific works on entrepreneurship issues (Gorfinkel, 2007; Meyer, 2004). But their common feature is that, as a rule, their authors transfer the general theory of efficiency and special questions of financial and economic analysis of the results of commercial activity to the ground of entrepreneurial structures. At the same time, they do not give any specific features of determining the effectiveness of entrepreneurial activity.

In the general representation, efficiency characterizes the development of various systems, processes and phenomena. It is an indicator of the development. At the same time, efficiency is the most important stimulus for the development. In an effort to increase the effectiveness of activities, we have to determine the measures that contribute to the development process, and cut off those of them that lead to regression. In this sense, efficiency is always connected with practice. It becomes the target of management activity and makes such activity reasonable, necessary, justified and sufficient.

As generalizing indicators of the effectiveness of economic systems, scientists point out such indicators as the effectiveness of the system, the intensity of its functioning, the degree of achievement of the goal, the level of organization, etc. On the one hand, this proves the complexity of the category of effectiveness, and on the other hand it underlines the complexity of its representation in figures and measuring instruments.

In the general case, the effectiveness of different systems is determined by the relationship between the result and costs. The goal orientation of such a relationship is the desire for maximization. In this case, the task is to maximize the result per unit of costs.

Since the subject of the research is entrepreneurial cost management and the tools used, the effectiveness of management attracts the most attention. It implies the idea of effective leadership and characterizes it as a leader's ability to motivate subordinates to act with high efficiency and work hard. This definition of efficiency is qualitative and applicable to the management of participants in order to achieve results.

Efficiency is the effect attributable to the unit of expenditure of resources expended in order to obtain the achieved result. If we identify the management effect with its quality and efficiency and costs with management costs, then the logical form of management effectiveness is the ratio of the results of management and its costs. The application of this qualitative dependence for quantitative evaluation, that is, the determination of the numerical level of effectiveness of managerial decisions, is extremely difficult due to certain details associated with the concept of "efficiency". To use the management effectiveness formula for calculations, it is necessary to determine the quantitative values of the quantities in the numerator and denominator of the formula.

Assuming that the effectiveness (quality) of management is the level of satisfaction of the needs of the owner of the resource that is achieved as a result of interaction with the firm, then to measure the effect we will resort to a typical reception for economic science when we adopt various meters of the effect in cost indicators in money equivalent.

As each participant, when making a deal with the firm, plans to reach his aim, then it is hardly relevant to measure the result by management costs, calculating how many financial resources are spent on it.

Management as a resource also has a demand for its services. Each participant who has concluded a deal with the firm, finds it inappropriate to relate the expected effect only to the one who manages the firm. B.A. Raizberg and R.A. Fatkhutdinov believe that "it is wrong

to compare the economic result of management only with the costs of management” and suggest that “the cost of implementing all economic activities, not just management, be put in the denominator of the logical efficiency formula” (Raizberg and Fatkhutdinov, 1999).

The effectiveness of management, according to these considerations, is measured by the ratio of the effect (result) to the total costs that led to its receipt. The effectiveness of managing the business structure should be judged by the indicators of the economic efficiency of the managed objects and processes, based on the results and costs, to obtain this result. This approach to the evaluation of effectiveness is called process approach. Other approaches are used to determine the effectiveness of management processes as well as the ways to improve it as well.

It is known that management effectiveness is characterized by qualitative and quantitative criteria. Qualitative criteria reveal the internal links between the concepts of “management object”, “management costs” and “management results”. The criteria of the second type express the quantitative relationship of these concepts. At the same time, qualitative criteria for evaluating the effectiveness of management can be determined by quantitative indicators. As for quantitative ones, they are supplemented with qualitative ones. Methodically, the definition of management effectiveness is reduced to assessing the role of management in improving production efficiency using appropriate criteria. The general criterion is the economic performance of the managed system as a whole. As a general criterion, we can take the degree of achieving the maximum level of implementation of the plan, output or volume of profit.

3. METHODOLOGY

The main quantitative goal of any industrial-entrepreneurial structure is profit. The profitability indicators show how profitable the activity of the production and business structure is. Profitability indicators characterize the financial results and efficiency of the production and business structure. They measure profitability analyzing various positions and are grouped according to the interests of participants involved in the economic process and market exchange. Profitability indicators are important characteristics of the factor environment for profit formation of industrial and entrepreneurial structures. Therefore, they are mandatory when conducting a comparative analysis and assessment of the financial state of the industrial and entrepreneurial structure.

There are a rather large number of profitability indicators that reflect the efficiency of the activities of industrial and entrepreneurial structures in different “layers”, but within the framework of this study we confine ourselves to the following:

1. The coefficient of profitability of sales. It demonstrates the share of net profit in the sales volume of the business structure. It is the main and most frequently mentioned indicator of profitability.
2. Coefficient of profitability of assets. It allows us to determine the efficiency of the use of assets of the industrial and entrepreneurial structure. It shows how many monetary units of net profit each unit of assets earned.
3. Coefficient of profitability of current assets. It demonstrates the capabilities of the industrial and entrepreneurial structure in ensuring a sufficient amount of profit in relation to the circulating assets of the firm. The higher the value of this coefficient is, the more efficient and quickly working capital is used. In different industries the desired profitability

ratio is different. Thus, in industries with large capital investments and a long production cycle, the profitability of current assets will, as a rule, be lower than in industries with lower capital expenditures and a quick production cycle.

4. Coefficient of profitability of non-current assets. It demonstrates the ability of the production and business structure to provide a sufficient amount of profit in relation to the fixed assets of the firm. The higher the value of this coefficient is, the more efficiently the fixed assets are used and, consequently, the faster the new investments in fixed assets will be paid off.

Thus, the analysis of the viewpoints of foreign researchers (Schumpeter, 2008; Groth, J. C. and Kinney, M.R. 2014), as well as Russian economists (Gavrilov, 2008; Golokteev and Matveev, 2008; Dyukov, 2008) allows us to draw a conclusion that the range of points of view on the effectiveness of management systems is very wide. In most cases, it is considered necessary to carry out an assessment of management activities analyzing the final results of production. In addition to the profitability indicators stated above, in practice, the economic efficiency of management is assessed by a variety of indicators. Let us mention the most common:

- increase in output;
- increase in labor productivity;
- establishment of the optimal level of stocks of material resources and the amount of work in process;
- improving the quality of products, reducing the quantity of defective goods;
- other factors of production and economic activity that cannot be quantified (improving the efficiency and organization of the management apparatus, improving the skills of management personnel, improving the organization of work, etc.).

We can apply a resource approach to assess management effectiveness. As part of this approach, it is considered that management, influencing results and costs, is the sphere of application of social labor, which includes requirements for the effective use of resources. As V.V. Tomilov says “it’s right to suppose that more efficient production management leads to an increase in production efficiency ... But this conformity may not be seen, because the efficiency of production can depend on many factors that are beyond the influence of the management system” (Tomilov, 2000). In this regard, the scientific literature actively discusses the need to divide the costs into managed and unmanaged. “Managed costs are regulated, variable, programmable costs, the amount of which can be changed at the discretion of the head of the responsibility center” (Vrublevsky, 2014).

At the same time it is recognized that not all costs lead to desirable changes in production. Production and management experience allows us to state that this happens when, in the exchange between resource owners, the costs incurred by some of them are not the result for the others, those with whom this exchange is carried out. “... Due to the weak sensitivity of the aggregative aggregates of social production to specific changes in the management system, these indicators are difficult to use to solve the problem of measuring the effectiveness of management systems” (Belous, 2010). Researchers also admit that management is generally characterized by the uncertainty of the cause-effect relationship between the solution and its implementation.

4. RESULTS AND DISCUSSION

The considered approaches and points of view concerning efficiency formed the basis of our study, in particular, the assessment of the influence of cost management and the system of relevant instruments on the efficiency of the production and business structure. The need for such an assessment is due to the following reasons:

- through the analysis of efficiency, we can conclude that there is a positive development of entrepreneurial cost management, the conformity of the applied tools to management objectives;
- the analysis of performance factors allows us to identify weak and strong points in the process of managing costs, thereby making efforts to improve it;
- the analysis of effectiveness allows us to make an opinion on the validity, justification and sufficiency of the applied cost management tools, as well as taking managerial decisions concerning updating and the most optimal combination of different tools from the viewpoint of the effectiveness criterion.

The arguments stated above became the basis for carrying out an applied research in order to reveal the relations between the tools of cost management and the efficiency of the activities of industrial and entrepreneurial structures.

Within the framework of this research, the following issues became topical:

- evaluation of the effectiveness of the process of cost management on the basis of performance indicators of the business structure;
- determination of methods of collecting the necessary data to evaluate the effectiveness of cost management;
- selection of indicators for assessing the effectiveness of cost management.

Previously, when identifying modern approaches to the effectiveness assessment in science, there was a widespread view that any process of a firm should contribute to the effectiveness of its activities or final results, and the costs that defined these results are better to be estimated as the total costs incurred in different processes. Taking this point of view into consideration, it should be considered possible to evaluate the effectiveness of the process of cost management through the efficiency of the production and business structure. This is facilitated by the fact that the classical definition of efficiency includes the notion of costs. Consequently, the effective cost management inevitably and directly affects the efficiency of the production-entrepreneurial structure. Proceeding from the fact that the main goal of industrial and entrepreneurial structures and all its processes, including the process of managing costs, is profit-making, as well as efficient functioning, it is the introduction of the concept of entrepreneurial cost management that focuses the attention of scientists and practitioners on the entrepreneurial effectiveness of such management.

Considering the effectiveness of cost management as an indicator of the effectiveness of the activity of an industrial and entrepreneurial structure, it should be emphasized that the latter are affected not only by cost management, but also by other factors. Just as the effectiveness of cost management is influenced not only by the system of tools used, but also by other factors and conditions (for example, the ability of management components to use these tools, etc.). The method of abstracting from the influence of various factors existing in

science is often used in works on efficiency and, also, can be applied in this study. Therefore, the key task is to identify which instruments of cost management are effective from the point of view of achieving the results of the functioning of industrial and entrepreneurial structures.

To assess the effectiveness we use a variety of indicators. In this study, we have selected the indicator of profitability of sales, which reflects the efficiency properly and can be obtained from a large number of different production and entrepreneurial structures (it is mentioned in available databases on firms, in particular in the SPARK database). Having selected the sales profitability index as an economic indicator of the efficiency of the production and business structure, that demonstrates the effectiveness of cost management, it should be noted that other indicators may be used as well. For example, private quantitative indicators, which directly characterize the process of cost management, are the return on assets, labor productivity, turnover of working capital, etc. Considering the dynamics of these indicators, one can judge the nature of the influence of the used or newly implemented cost management tools on the effectiveness of this process. As for qualitative indicators of the effectiveness of the process of managing costs, here we could include the degree of satisfaction of the goals and needs of the consumers of the services of this process, the timing of the process, etc. To solve the problem of determining the influence of cost management tools on efficiency, it is possible to use the sales profitability indicator, which characterizes the efficiency activity of industrial and enterprise structure most effectively.

In the course of the research, profitability indicators for sales of 100 production and entrepreneurial structures were revealed. As a result of the comparison of data, the dependence between the use of cost management tools and the efficiency of the production-entrepreneurial structure was proved (Table 1).

Table 1. Dependence between the use of cost management tools and the efficiency of activities of the production and business structure

Sl. No.	Cost management tools	Average profitability of sales of industrial-entrepreneurial structures using the tool, %
1	lean production	12,95
2	ABC- and XYZ- analysis	11,78
3	enterprise resource management systems	11,28
4	Cost accounting by place of origin	9,86
5	model of optimum order quantity	9,15
6	budgeting	8,54
7	standard-costing	7,34
8	operational analysis	6,21
9	target-costing	5,93
10	functional-cost analysis	4,76
11	direct-costing	4,63

Source: the author's development

Thus, the average efficiency of the production-entrepreneurial structure using the appropriate tools has been obtained. Obviously, these data only show a correlation between the use of certain tools for managing costs and the effectiveness of the activities of the production and business structure. It is likely that the use of certain tools is not the reason for the high efficiency of the industrial and entrepreneurial structure, but its consequence.

5. CONCLUSION

The detailed research results showing the relationship between the level of efficiency and the use of both individual instruments and their combinations complement the conclusion made in this part of the study on the impact of the system of cost management tools on the performance of production and business structures. An empirical relationship is established between the use of specific cost management tools and the level of efficiency of industrial and entrepreneurial structures. The tools studied are basic when developing a cost management system. Each of them, of course, can be used by any industrial and entrepreneurial structure. With the help of these tools, the production and entrepreneurial structure will be able to carry out more thorough execution of cost management functions. At the same time, effective management is impossible without taking into account the following provisions: none of the instruments mentioned above can be considered universal for all production and entrepreneurial structures, and the development of universal tools or their groups does not make sense. The choice of a particular instrument, in one way or another, is connected with comparison of the benefits of its use with the costs of its use. The construction of a system of cost management tools involves taking into account the entire spectrum of a number of factors that affect the choice of the components of the system.

REFERENCES

1. Belous A.B. Effective management and controllability // Economics and management, 9, (2010), 53-57.
2. Vrublevsky N.D. Managerial accounting of production costs and product costs in industries. Moscow: Publishing “Accounting”, 2014, 376.
3. Gavrilov D.A. Production management based on the MRPII standard. St. Petersburg: Peter, 2008, 416.
4. Golokteev K., Matveev I. Production management: tools that work. St. Petersburg: Peter, 2008, 281.
5. Gorfinkel V.Ya. Business Economics. Moscow: UNITY DANA, 2007, 607.
6. Dyukov I.I. Business development strategy. Practical approach. St. Petersburg: Peter, 2008, 236.
7. Krutik A.B. Fundamentals of entrepreneurial activity. Moscow: Academy, 2008, 320.
8. Meyer V. Evaluation of business performance. Moscow: OOO “Vershina”, 2004, 272.
9. Raizberg B.A., Fatkhutdinov R.A. Management of economy. Moscow: ZAO “Business School “Inter-Synthesis”, 1999, 784.
10. Tomilov V.V. Culture of entrepreneurship. St. Petersburg: Peter, 2000, 359.
11. Schumpeter I. The theory of economic development (study of entrepreneurial profit, capital, credit, interest and the cycle of conjuncture): Trans. from English. Moscow: Directmedia Publishing, 2008, 355.
12. Groth, J.C. and Kinney, M.R. Cost management and value creation. Management Decision, (2014), 32(4).



STRATEGIC SECURITY MANAGEMENT

Dusko Tomic, Maryam Al Saabri

*College of Security and Global Studies – American University in the Emirates (AUE), Dubai,
United Arab Emirates*

Abstract: Strategic Security Management is exceptional in that it meets the requirement for an authoritative content on security best practices, presents the idea of investigation for security basic leadership, and discuss about cutting edge threat, vulnerability, and risk assessment systems that might be applied for in any association's security program. Then, it will be easy to learn how to enhance a security program through utilizing security measurements to gain a genuine comprehension of the issue instead of depending upon nature or subjective evidence at security entities in United Arab Emirates.

This paper will show how to utilize security measurements to choose and execute countermeasures and calibrate the program to guarantee steady improvement and persistent effectiveness. The essential reason for writing this paper is because rarely we might find researcher who highlighted the security concepts beyond its practical approach. All of us has went through plenty of incredible books and researches that have been written by security scholars, specialists and visionaries, yet there is no one book that covers all security aspects. Therefore, the main objective of Strategic Security Management is to fill the gap between hypothesis and reality, through enhancing information driven security and measurement, based security decision making. Security measurements are traumatically lacking different industries today; however, they are commonly used approaches in certain other industries. Strategic Security Management concept is mainly considered being useful for three certain groups of people, including: Security experts; different experts who are in charge of settling on security decisions; and student measured in security management, security affairs or related fields. On the other hand, this paper might afford you with the main base required to go through the different stages in security at one corporate. Generally, this paper utilizes the term of “Security Decision Maker” in order to identify any person in security field and has the responsibility for making different decisions within security field.

Keywords: strategy, security strategic management, security measurement



ULOGA NOVOG BEZBEDNOSNOG MENADZMENTA I INVENTIVNIH TEHNOLOGIJA U ZAŠTITI KRITIČNE INFRASTRUKTURE - AERODROM “NIKOLA TESLA”

Eldar Saljic, Duško Tomić, Igor Konjović

American university in the Emirates, Dubai, United Arab Emirates, Fakultet za inženjerski menadžment, Alfa univerzitet-Beograd, Serbia

Abstract: Large number of people pass through airports every day. They represent potential targets for terrorism and other forms of criminal acts. High concentrations of people at the airport can cause high mortality rates in the event of a potential attack. Improving airport security can be helpful for preventing threats or potentially dangerous situations that might occur at the airport or in nearby areas. Airport security is important for several reasons:

- To protect the airport, people and goods passing through it,
- To protect the national sovereignty of any terrorist incidents and events that could be jeopardized,
- Reassuring the public to travel safely.

Given the fact that the critical infrastructure the airport "Nikola Tesla" is one of the important points in the transportation of people and goods in our country, the current security situation in the airport had to be at a much higher level than the present regarding usage of new technologies. The state of Serbia, as well as neighboring European countries, nowadays, have a large influx of migrants arriving from the Middle East, passing through our territory on their way to Western Europe. Among them, through operation process it was found that there are a large number of people who have been sent by terrorists to achieve their goals and interests. Therefore, terrorists could jeopardize critical infrastructure such as airports, since airports are a very important part of it and are very valuable to a country.

The goal is to show the necessity of increasing the security of the airport "Nikola Tesla" with the help of innovative technologies. The application of such technologies at the airport would significantly increase the ability of the defense airport by undesirable persons in this case the terrorists, who would be able to jeopardize large numbers of people who are passing through the airport, by smuggling packages in which it is possible to put the explosive device.

Keywords: airport, security, protection, technologies

1. UVOD

Proces globalizacije izmenio je prirodu bezbednosnih izazova, rizika i pretnji. Očiglednost ekspanzije terorizma i ekstremizma doveo je do toga da se mora razmišljati o svim aspektima bezbednosti aerodroma „Nikola Tesla“, kritične infrastrukture vezane za transport. Preispitivanjem postojećih bezbednosnih sistema, na značajnim infrastrukturnim tačkama na aerodromu, došlo se do zaključka da bi ih trebalo unaprediti. Nerealno je očekivati da postoji sistem koji je potpuno bezbedan. Međutim, zahvaljujući savremenim tehnologijama, prevazišli bi se mnogi problemi koji nastaju prilikom čekiranja putnika i prtljaga, kao i zaposlenog osoblja na aerodromu. Avio-saobraćaj se stalno modernizuje, ali ni teroristi ne miruju, pa je najvažnije od svega otkriti kritične bezbednosne tačke. Aerodrom je objekat sa mnogo otvorenih i zatvorenih javnih prostora, što predstavlja veliki izazov za stručnjake iz oblasti bezbednosti. U tako specifičnim okolnostima treba pronaći adekvatno rešenje. Jedno od ponuđenih rešenja je montiranje termovizijskih kamera na značajnim infrastrukturnim tačkama, ugrađivanje kamera za skeniranje IRIS-a (dužice oka) na graničnom prelazu koji se nalazi u sklopu aerodroma i molekularnog skenera [Genia Photonics](#).¹ Uvođenjem takvih sistema i saznanjem da je aerodrom „Nikola Tesla“ opremljen takvom tehnologijom, značajno bi se podigla bezbednost na aerodromu preventivno, a i u slučaju ugrožavanja bezbednosti, od strane terorista ili drugih lica, repesivno bi se moglo daleko lakše i brže delovati na suzbijanje navedenih.

2. VOLUMETRIJSKI SENZORI

Senzor (detektor) je uređaj koji meri fizičke veličine i konvertuje ih u signal čitljiv posmatraču ili instrumentu. Senzori imaju široku primenu u svakodnevnom životu: kod ekrana osetljivih na dodir, kod vrata i liftova u javnim objektima, kod osvetljenja i alarma i mnogih drugih uređaja: automobila, aviona, medicinskih uređaja, robota, industrijskih mašina i sl.

Tehnološki napredak omogućio je izradu senzora sa detaljima mikrometarskih dimenzija. Oni koriste MEMS tehnologiju i nazivaju se mikrosenzori.²

Senzori su vrsta konvertora (pretvarača). Oni jednu fizičku veličinu pretvaraju u drugu. Zbog toga se oni mogu klasifikovati po tipu energije koju prenose. Idealan senzor je onaj koji je linearan u celom opsegu merenih vrednosti. Trebalo bi da je dobijeni signal uvek linearno srazmeran merenoj vrednosti. Pri tome na njega ne bi smeo da ima uticaj nijedan drugi objekat u okruženju, niti bi on smeo da ima ikakav uticaj na mereni objekat. To je u praksi neostvarivo. Zato se meri njegova osetljivost kao odnos između izmerene i stvarne veličine. Odstupanja koja se javljaju kod različitih vrsta senzora tiču se osetljivosti koja može kod pojedinih senzora biti različita tj. varirati kod različitih veličina (greška osetljivosti).³ Opseg dobijenih veličina je uvek limitiran, tako da će jedan senzor dati svoju maksimalnu, odnosno minimalnu vrednost u slučaju da su izmerene vrednosti izvan punog opsega senzora. Ako dobijena veličina nije nula, kada je merena veličina nula kaže se da senzor ima pomeraj (offset).⁴ Kada osetljivost nije konstantna za različite izmerene vrednosti, to

¹ Želimir Radmilović: Biometrijski identifikacija Polic. sigur. (Zagreb), godina 17. (2008), broj 3-4,

² David, A. (2002). Principles of Emergency planning and Management, Harpenden: Terra Publishing, pg.168

³ Ibid, pg.55

⁴ Ibid, pg. 56

nazivamo nelinearnost. Ona se obično javlja na krajevima opsega merenja. Devijacija koja se javlja zbog velikih promena merenih veličina naziva se dinamička greška. Ako izlazni signal menja otpornost merenog objekta to nazivamo pomak (drift).⁵ Vremenski otklon - javlja se usled dugotrajnog korišćenja senzora. Šum (eng. noise) - nepredvidive devijacije u signalu tokom vremena. Histereza je greška koja se javlja kada se promenom položaja merenog objekta dobijaju različite i neodgovarajuće vrednosti na izlazu.⁶ Kod senzora sa digitalnim izlazom obavezno dolazi do aproksimacije dobijenih veličina i to je greška aproksimacije ili greška digitalizacije. Senzori u nekim slučajevima mogu biti ometeni delovanjem merenog objekta, recimo njegovom temperaturom ili zračenjem. Navedene greške mogu se podeliti na sistemske greške i slučajne greške. Sistemske greške se predupređuju različitim vrstama kalibracije, dok se slučajne greške kao što su različite vrste šumova smanjuju procesuiranjem signala, filtracijom i sl. Živi organizmi poseduju biološke senzore koji funkcionišu slično dosada opisanim tipovima senzora. U najvećem broju slučajeva oni su poslužili kao inspiracija za dizajniranje tehničkih senzora. Veštački senzori koji imitiraju biološke senzore koristeći biološke senzitivne komponente nazivaju se biosenzori. Kao i mikrotalasni, zemaljski orijentisani senzor vrši neprestanu akviziciju - osmatranje (neprestano SKENIRANJE) velikih otvorenih prostora na tlu, detektujući različite vrste kretanja unutar definisanog perimetra. Retko se koristi kao samostalan sistem za detekciju provale na perimetru, već je uglavnom integrisan sa inteligentnim PTZ video kamerama za automatsko ili, eventualno, ručno praćenje provalnika.⁷ U tom slučaju, zemaljski orijentisani senzor se koristi kao izvor inicijalne detekcije mesta provale, dok se perimetarski orijentisani podsistem video nadzora koristi za preciznije određivanje vrste objekta - izvršioca provale, kao i za njegovu verifikaciju i praćenje. Zemaljski orijentisani senzor je zasnovan na principu neprekidnog emitovanja mikrotalasnih impulsa putem jedne specijalne projektovane predajno - prijemne antene, na kojoj se ujedno vrši i prijem reflektovane energije, od eventualno prisutnog, udaljenog cilja, detektujući na taj način njegovo prisustvo u zaštićenom delu perimetra. Daljina do detektovanog cilja, odnosno rastojanje između antene i objekta, određuje se proračunom, na osnovu poznate brzine prostiranja impulsa i izmerenog vremena, koje je proteklo od momenta emitovanja pa sve do trenutka njegovog prijema nakon refleksije. Sa više zemaljski orijentisanih senzora, znalački razmeštenih na određenom rastojanju da pokriju jedno definisano područje, omogućava se prijem više povratnih signala od istog cilja. U takvom složenom tehničkom rešenju, te pojedinačne refleksije se kombinuju radi procenjivanja veličine "objekta" ili stvaranja njegove slike u tri dimenzije. Međutim, u smislu stvaranja preciznije slike o detektovanom objektu u zabranjenoj - šticej zoni, pojedinačni, zemaljski orijentisani senzorski sistem može jedino da pruži informaciju da je nekakav "objekat" detektovan u toj zoni (nadajući se da se radi o provalniku), ali ne i šta preciznije taj objekat predstavlja (životinju, vozilo, čoveka...). U takvom senzorskom sistemu smetnje nastaju u vidu redovne pozadinske aktivnosti - stalni odrazi od prisutnih nepokretnih objekata, ili "clutter-i" 8kao efekat okoline, recimo od naganjanja drveća, saobraćaja i drugo. Zbog toga se zemaljski orijentisani senzor retko koristi kao samostalan sistem za zaštitu perimetra, već se uglavnom taj sistem integriše sa podsistemom visokokvalitetnih kamera za video nadzor, a radi verifikovanja svake od realizovanih detekcija na otvorenom prostoru. Kao što je

⁵ Ibid, pg.58

⁶ Ibid,pg.55

⁷ Mijalkovski, M., Knežević, P., Ostojić, N. (2003.) „BEZBEDNOSNA OPREMA U SLUŽBI ŽIVOTA” Novinsko – izdavački centar „VOJSKA”, str. 25

⁸ Želimir Radmilović: Biometrijski identifikacija Polic. sigur. (Zagreb), godina 17. (2008), broj 3-4

istaknuto, ovako spregnuti sistemi zemaljski orijentisanog senzora i CCTV PTZ kamera, omogućavaju pouzdanu detekciju provalnika, njegovu brzu verifikaciju, autofokus pokretnih kamera uz automatsko praćenje i veoma inteligentnu video analizu i video statistiku.⁹ Ono što bi trebalo istaći je da su, zahvaljujući velikoj osetljivosti i mogućnosti za pokrivanje površina velikih dimenzija, ovi radari obično nepraktični za korišćenje u naseljenim područjima. Naime, tada je jako teško uskladiti antagonizam koji postoji prilikom njihovog podešavanja, između neophodne osetljivosti sistema i visokog nivoa „senzorskog šuma“, pošto u takvim sredinama postoji povećan broj „clutter-a“ i povišen nivo pozadinske aktivnosti. Da bi se smanjio nivo „senzorske šumnosti“, senzori se u takvim uslovima optimizuju za pokrivanje kraćih rastojanja i manjih zahvata površina, uz implementaciju posebnih filterskih algoritama, koji onda znatno poboljšavaju njihove performanse u naseljenim mestima. Kada se ostvari planska integracija zemaljski orijentisanog senzora CCTV podsistemom, onda se u praksi može obezbediti efektivan sistem detekcije provala, kako za uzak deo prostora uz granicu perimetra, tako i za široke ravne, otvorene prostore. To se posebno odnosi na one uslove, gde drugi sistemi uopšte nemaju ili imaju otežanu primenu, a koji uključuju civilne aerodrome, naročito na onim prostorima gde se ne želi postavljanje fizičke barijere (ograda, zid, i sl.).¹⁰ Ovakvi integrisani senzorsko-video sistemi imaju maksimalan opseg detekcije obično od 200 do 900 metara, pa i više (do 1.500 m). U posebnoj primeni na otvorenom delu oko aerodroma obično se koriste senzori velikog dometa spregnuti sa termalnim kamerama velikog dometa (5/10/25 km), ali su takvi sistemi izuzetno skupi. Pokrivanje i zaštita putem senzorskih signala su isključivo pravolinijski (osobina prostiranja mikrotalasnih signala).

3. TERMOVIZIJA

Termovizija (od grčke reči termo-toplo i latinskog glagola video, videre-videti, gledati) u bukvalnom prevodu „gledanje toplote“, je sistem snimanja toplote objekata. Thermal imager (termovizijska kamera) je kamera koja je sposobna da pokaze veoma male razlike u temperaturi. Te temperaturne razlike mogu da se konvertuju u video sliku u realnom vremenu. Ovakva slika na monitoru je naročito pogodna za aplikacije kod noćnih posmatranja i kontrole. Za razliku od ostalih tehnika noćnog osmatranja, pojačivača svetlosti gde sistemi moraju da imaju neku dozu svetlosti, termalna kamera nema takav uslov jer radi na principu percepcije zračenja toplih tela. To je čini perfektnim sredstvom za gledanje u totalnom mraku i pri posebnim ambijentalnim situacijama. Termalni imidžeri koriste tehnologiju IC da daju snagama bezbednosti pouzdanu toplotnu sliku okoline, omogućavajući da se efikasnije obavljaju poslovi nadgledanja, kontrole, sigurnosti ljudi i objekata a i samim ljudima koji koriste ovu opremu omogućava bezbedniji rad. Ove kamere pomažu osoblju u nepredviđenim situacijama, hitnim slučajevima gde je trenutna vidljivost smanjena ili potpuno onemogućena. Mrak, kamuflaža, naprikladni uslovi okoline, često mogu da obmane sisteme klasičnog noćnog osmatranja, dok kod termalnih kamera to nije slučaj jer toplota pokazuje svaku pojavu i dinamiku u vidnom polju kamere. Termalni imidžeri FLIR,¹¹ omogućavaju trenutno uočavanje razlike ljudi i okoline. Nemaju potrebu za svetlošću i vide i kroz dim i maglu dok klasični sistemi za noćno osmatranje podrazumevaju i specijalne pojačivače svetlosti,

⁹ David, A. (2002). Principles of Emergency planning and Management, Harpenden: Terra Publishing, str.168.

¹⁰ Zaw Win Than (26 December 2011). "Nay Pyi Taw International Airport opens". Myanmar Times. Retrieved 5 March 2012.

¹¹ Želimir Radmilović: Biometrijski identifikacija Polic. sigur. (Zagreb), godina 17. (2008), broj 3-4

iluminatore. Svi objekti emituju infracrveno zračenje kao funkciju sopstvene temperature. Infracrvena energija potiče od vibracija i rotacija atoma i molekula. Što je viša temperatura nekog objekta, veća je pokretljivost, pa je višeinfracrvenog zračenja emitovano. Ovo je energija koja se detektuje infracrvenim kamerama. Kamere ne vide temperaturu, one čitaju toplotnu radijaciju.

Pri apsolutnoj nuli (-273.16°C , -459.72°F), materijal je na svom najnižem stanju energije tako da je infracrveno zračenje minimalno.

3.1 TERMALNE KAMERE

Termalne kamere i kompletne mreže bezbednosnih kamera kao komplement, daju vam moć da vidite pretnje nevidljive golim okom, pretvarajući noć u dan. Termalne bezbednosne kamere vide toplotnu energiju koja je oko nas sve vreme, bez obzira na nivo vidljive svetlosti, dajući vam pravi uvid nekog scenarija 24h/7dana, nezavisno od svetla i dodatnih iluminatora. Toplotna energija prodire kroz atmosferu bolje i dalje od vidljive svetlosti, omogućavajući vam da vidite kroz maglu, dim, prašinu, pa čak i u susret svetlosti reflektora.

3.2 FLIR-HRC TERMALNE KAMERE

FLIR-HRC serija proizvoda je opremljena visoko pouzdanim, srednje-talasnim i hlađenim Indium Antimonide (InSb) detektorom koji omogućava ekstremno visok opseg detekcije pri svim vremenskim uslovima. Kamere poseduju kontinualni zum koji se koristi nakon otkrivanja sumnjivih aktivnosti. HRC - serija se može integrisati u postojeće mreže ili se može koristiti nezavisno. Uvođenjem ovakvih termovizijskih kamera i senzora za skeniranje velikih površina oko objekta aerodroma, kao što su zelene površine oko piste za sletanje i poletanje aviona, parking prostora i magacina, značajno bi se olakšao posao ljudi koji radena obezbeđenju aerodroma. Signaliziranjem volumetrijskih senzora pokretana određenom delu, osoblje u video analitici usmerava termovizijske kamere, utvrđuje problem i u koliko je potrebno alarmira ekipe zadužene za održavanje bezbednosti aerodroma (Žandarmeriju ili SAJ koji se nalaze u aktivnoj pripravnosti na području aerodroma).

4. MOLEKULARNI SKENER-GENIA PHOTONICS'THE GENIA PHOTONICS' PICOSECOND PROGRAMMABLE LASER SCANNER¹²

Molekularni skener baziran na laseru, kojim se u deliću sekunde mogu saznati sve informacije o telu, odeći i prtljagu. Može se koristiti sa udaljenosti od 50m bez znanja osobe koja je skenirana. Prepoznaje sve, od tragova baruta ili droge na odeći do nivoa adrenalina u telu, tako da agenti obezbeđenja mogu da dobiju bilo koju informaciju bez znanja ili odobrenja posmatrane osobe. Tehnologija je razvijena u SAD-u i prema njihovim zvaničnicima koristi se da se brzo identifikuju eksplozivi, opasne materije i biološka oružja sa bezbednog odstojanja. Ova mašina je 10 miliona puta brža i milion puta osetljivija od bilo kog sličnog sistema korišćenog ranije. Nije velika i lako je prenosiva, tako da može biti korišćena

¹² http://gizmodo.com/5923980/the-secret-government-laser-that-instantly-knows-everything-about-you_sajtu_pristupljeno_23.09.2015.god.

na svima koji prolaze kroz obezbeđenje aerodroma, a ne samo na onima koji su sumnjivi ili nasumice odabrani. Jedan od problema ove tehnologije je u tome što previše zadire u privatnost posmatranih subjekata, jer osim potencijalno opasnih materija ili nedozvoljenih supstanci, može da detektuje i druge stvari, od npr. toga šta je osoba imala za doručak, do toga od koje bolesti boluje. Drugi problem je povući granicu količine zabranjene supstance koja se sme nalaziti u posedu osobe. Tako je npr. 2008. godine na aerodromu u Dubaiu, koji ima nultu toleranciju prema drogama, uhapšen putnik koji je na koncu cipele imao trunku kanabisa od 0,003g (manje od zrna šećera). Ili švajcarski putnik koji je osuđen na 4 godine zatvora jer je “posedovao” 3 zrna maka na svom odelu, jer je doručkovao pecivo sa makom, na aerodromu u Londonu, sa kog je doputovao. Korišćenjem molekularnog skenera na brz i jednostavan način se mogu identifikovati osobe koje predstavljaju potencijalnu opasnost. Prilikom ulaska na aerodrom “Nikola Tesla” ljudi bi, neprimetno, bili skenirani i u slučaju posedovanja nedozvoljenih supstanci, suptilno odvođeni u posebne prostorije, na dalje ispitivanje, bez dizanja galame i uznemiravanja ostalih putnika.

5. UMETO ZAKLJUČKA

Novine koje su napomenute nisu novine stručnoj javnosti, aerodromi poput Atlante, Londona već imaju uveden TASS (total airport security system) koji predstavlja integralni sistem upravljanja spoljnjeg i unutrašnjeg dela aerodroma služi za dijagnostiku mogućih pretnjih. Ukoliko bi u sistem nadzora bio uveden softver za video-analitiku, mogli bi se identifikovati raznovrsni oblici pretnji. Bezbednosne ekipe na aerodromu mogu efikasno da nadgledaju događaje i putnike, tačno i brzo prate tok video-informacija i mogu da uoče sve sumnjive situacije (neobično ponašanje putnika i posetilaca, ulazak u ograđene zone i ostavljen prtljag, u kojem bi mogao biti eksploziv), očitavaju registarske tablice, prate signale volumetrijskih senzora i termalnih kamera, prate kretanje ljudi i prebrojavaju ih. Sva vozila koja stignu na aerodrom “Nikola Tesla” prvo treba da prođu kroz kontrolni punkt gde bi posebne vrste termalnih kamera skeniranjem mogle da uoče i signaliziraju nešto što bi moglo biti sumnjivo za bezbednost. Vozila bi prelazila preko senzora težine, a rendgen bi izvršio skeniranje donjeg dela automobila. Policajci u civilu bi trebalo da patroliraju područjem izvan zgrade terminala i pazena ljude koji ulaze u zgradu. U slučaju da neko izgleda sumnjivo, bezbednosno osoblje bi im prilazilo i uključvalo u razgovor sa njima, u nastojanju da saznaju njihove namere i raspoloženje. Dakle, video-analitika ima niz prednosti u odnosu na klasičan monitoring, kada je potrebno da se izoluje sumnjiva osoba i izbegne panika među putnicima.

Danas se to pomoću video-analitike radi mnogo suptilnije – sumnjiva osoba se identifikuje i privodi bez stvaranja velike galame i panike, što inače može da stvori nekontrolisan haos na aerodromima. Dodatna korist od video-analitike je duži radni učinak operatera, istraživanja pokazuju da se operateri umaraju nakon određenog vremena na terenu i da im pada koncentracija. Video-analitika i osoblje koje izvršava ove poslove 24 sata, 365 dana u godini, obraća pažnju na delove aerodroma na koje putnici ne zalaze, kao što je ograda oko kruga aerodroma. Ova područja se prate kamerama FLIR-HRC. Ulaskom u objekat aerodroma osoba i prtljag bi bili skenirani molekularnim laserom, kojim bi se otklonile sve sumnje da li se radi o teroristi ili o osobama koje ne izazivaju bilo kakvu pretnju. Udaljem kretanju dolazilo bi se nacheck-point (čekiranje) i prolazilo kroz sofisticirani rendgen aparat, a tradicionalni metal detektori bi bili još uvek u funkciji.

REFERENCE

David, A. (2002). *Principles of Emergency planning and Management*, Harpenden: Terra Publishing.

Mijalkovski, M., Knežević, P., Ostojić, N. (2003.), *Bezbednosna oprema u sluzbi zivota Novinsko – izdavački centar „VOJSKA”*

Zaw Win Than (26 December 2011). "Nay Pyi Taw International Airport opens". *Myanmar Times*. Retrieved 5 March 2012.

Želimir Radmilović: *Biometrijski identifikacija Polic. sigur.* (Zagreb), (2008), broj 3-4

Web:

<http://gizmodo.com/5923980/the-secret-government-laser-that-instantly-knows-everything-about-you> sajtu pristupljeno 23.09.2015.god.



IMPACT OF ORGANIZATIONAL STRUCTURE ON FINANCIAL RESULT OF THE COMPANY

Krešimir Starčević, Branislav Peleš

Atlantic grupa d.d., Zagreb, Croatia

Abstract: This paper deals with two main but connected topics. The first topic analyzes the connection and impact of organizational structure on the financial results and profitability of a company. From a theoretical point of view, only the organizational structure is being analyzed, which is just one of the essential elements for an analysis of organizational behavior, besides areas such as organization design, work performance evaluation and reward system, organizational culture and organizational changes. It should also be noted that in the paper, the organizational structure is analyzed only at the organizational level as one of the three possible levels of organizational behavioral analysis. The second topic tries to explain the term traditional culture and heritage, specifically the intangible cultural heritage. It further elaborates on the importance of traditional culture and intangible heritage for each nation living in certain territory. Furthermore, it explains the position of traditional culture and heritage in the world context and the kind of protection they enjoy worldwide. Finally, it analyzes the organizational forms in which the institutionalized attempts of protection and promotion of traditional culture and heritage appear. In the practical part, the paper analyzes and compares: (i) organizational structure of the studied example of a company dealing with interpretation, safeguarding and promotion of traditional culture and heritage; as well as (ii) financial results of the studied example of the company over the last three financial years. Ultimately, it is suggested that the organizational structure has a notable impact on the financial results of a company, which ultimately leads to profitability and thus to sustainability.

Keywords: organizational structure, organization, traditional culture and heritage, financial result, profitability

1. INTRODUCTION

The introductory part explains: 1. the topic of this paper; 2. the problem that prompted me to write a paper on the selected topic; 3. the need for further research; 4. the topicality of the chosen subject matter, and 5. the purpose and objectives of the paper.

1.1. SELECTED TOPIC

Almost all of my working life, along with the regular work, I have used my free time to study, follow, and promote the preservation of traditional culture and heritage, as well as to work on it actively. Following this area of interest, I have seen a number of more or less

successful examples of promotion of traditional culture and heritage, both in the Republic of Croatia and in the region. All the examples (the chosen example will be discussed later in this paper) are actually attempts to present the extremely rich and diverse national traditional culture and heritage - which constitutes the cultural treasure of each individual nation and state - to a target audience through various forms of institutional organization.

For a better understanding and reading of this paper, the terms “traditional culture and heritage” and “intangible cultural heritage” should first be explained in some detail. The paper seeks to familiarize the reader with: (i) the importance of traditional culture and intangible heritage for any people living on a particular territory; (ii) the position of traditional culture and heritage in the world context, and the level of protection those values enjoy worldwide; and (iii) the organizational forms taken by the institutionalized attempts at quality protection and promotion of traditional culture and heritage.

Given that there is no consensus among the authors dealing with the issue about a common and generally accepted definition of traditional culture and heritage, I am using the definition that, in my opinion, best describes what is actually being done. Both "*culture*" and "*heritage*", the two concepts that make up the central term of this paper, are equally broad. Art and culture historian Marasović says, for example, that culture "encompasses the totality of creations or phenomena in the material and spiritual life of every nation and of the humanity as a whole", while he understands heritage as "the legacy left by ancestors to their descendants" [1]. The notion of cultural heritage could thus be defined as "the achievements of our ancestors in language and literature, architecture and visual arts, including folk art, music, theater, film, science and other areas that together form the totality of culture" [2].

The importance of traditional culture and heritage for any people living in a certain locality is exceptional. The level to which a nation is civilized and culturally aware can be ascertained precisely through the level of protection and care about the nurturing and promotion of its traditional culture and heritage. By cultivating the traditional culture and heritage we preserve the rich legacy that many generations of our ancestors have created in a quite different environment and at a significantly slower pace of life than the one we experience today. For all of us entrusted with taking care of the culture and heritage until we pass it on to our descendants, the task is to make the utmost effort to keep and protect it in an organized and institutional manner, but at the same time to promote it and present to the public faithfully and appropriately, with the aim to: (i) conduct continuous education of young people on the inestimable value of traditional culture and heritage; (ii) preserve the traditions, songs and dances of peoples from an certain area; (iii) present preserved and reconstructed original folk costumes; (iv) present the richness of various types of traditional architecture, authentic folk dishes, autochthonous wine varieties; and (v) conduct a tourist promotion of a certain nation and state.

Worldwide, traditional culture and heritage enjoy special protection. As early as 2008, UNESCO (the United Nations Educational, Scientific and Cultural Organization) established the Representative List of the Intangible Cultural Heritage of Humanity. The fact that the Republic of Croatia has 13 items on the list bespeaks its importance, and thus the importance of the protection of intangible cultural wealth:

- 1.) Annual processions of the Bellmen of Kastav;
- 2.) Annual processions of Queens - Ljelje;
- 3.) Lace making in Croatia;
- 4.) Nijemo kolo (silent circle dance) of Dalmatian Zagora;

- 5.) Za Križen (Following the Cross) procession on Hvar;
- 6.) Two-part singing and playing in the Istrian Scale in Istria and Hrvatsko Primorje;
- 7.) Mediterranean diet of the Croatian Adriatic coast, islands and part of the hinterland;
- 8.) Gingerbread craft of Northern Croatia;
- 9.) Sinjska Alka tournament;
- 10.) Traditional manufacturing of children's wooden toys in Hrvatsko Zagorje;
- 11.) Festivity of St. Blaise in Dubrovnik;
- 12.) Bećarac song singing and playing in Eastern Croatia, and
- 13.) Klapa multipart singing of Dalmatia.

Also in 2008, the organization under the name of **Inter-City Intangible Cultural Cooperation Network (ICCN)** was established as the only international organization that brings together local and self-government units on the task of preserving the world's intangible cultural heritage. ICCN works on exploring the creative and effective policies for the conservation of local intangible cultural items as well as their inseparable link with the sustainable local development. The city of Dubrovnik became a full member of ICCN as early as 2012.

Studied in the theoretical part of this paper are the existing organizational forms (and their organizational structure) that aim to present the traditional culture and heritage (material and non-material) in the fields of architecture, construction techniques, gastronomy and culinary arts, folk customs, traditional rituals, mythology and - most of all - folk songs and dances from all over the country, to the target public. In this paper we will furthermore treat and analyze whether (and in which way) a **selected model of organizational structure** of an organizational system has an impact on the financial results and profitability, and thus on its sustainability. Finally, we offer our conclusions.

1.2. DESCRIPTION OF THE PROBLEM

For the sake of easier comprehension of the subject matter, the term "enterprise" will be used to designate the organizational system that is the subject of the study, although people and organizations dealing with the interpretation of traditional culture and heritage are also organized as institutions, citizens' associations, crafts and other forms of institutionally organized entrepreneurship with the goal of profitability as well as not-for-profit. The fact that some organizations declare themselves as not-for-profit does not exclude them from the theoretical sample that this paper deals with, because the terms "revenue", "expense", "financial result" and "sustainability" are equally applicable to profit-oriented and non-profit organizations.

So, when we talk about the notion of interpretation of traditional culture and heritage in general, in practice we mostly find the following terms for organized systems:

- 1.) interpretative center,

- 2.) ethno-village,
- 3.) ethno-park
- 4.) ethno-camp,
- 5.) open-air museum,
- 6.) ethnographic collection,
- 7.) museum.

All those existing forms, though formally different, are equally valid as subjects of research because they all have the same mission and a similar vision in common, and their strategies do not differ significantly. All companies are financed in a similar way, or generate their income from very similar sources, and are burdened by very similar costs. All of them definitely have a common problem, which comes down to the issue of the gap between the revenue and the expenditures - that is, the question of financial results, profitability, and hence the sustainability of the company.

The problem this paper treats is reflected in the desire to prove - through an analysis of the organizational structure of such companies in the chosen sample company - that this fact affects the financial results, i.e. the profitability, and therefore the sustainability.

1.3. NEED FOR FURTHER RESEARCH

Given that very few previously published scientific papers in this specialized field and on the specialized topic of this study can be found in the public sources of information, there is definitely a need to elaborate the model of management of organizations/companies engaged in the interpretation, promotion and protection of traditional culture and heritage, in a scientific way. The goal would be to see the scientific contribution of such research ultimately reflected in the active promotion and application of the kind of management models (and especially organizational structures) for the companies and organizations that would ultimately lead to their financial profitability and thus sustainability.

1.4. TOPICALITY OF THE ISSUE

The issue is so topical (see below under 1.1.) that it would be good for the academic community as well as experts and scientists in the field of social sciences in the Republic of Croatia and in the region to join the effort and add their own contributions. It would foster professional design, application and functioning of the chosen forms of organizational structures and business management models of companies active in interpretation, promotion and protection of traditional culture and heritage. That, in turn, would result in the emergence of as large number as possible of new companies that would be able to operate without subsidy from the state budget or from the budgets of local government units.

1.5. PURPOSE AND GOALS OF THE STUDY

In accordance with the problem described above, and the subject matter and the objective of the study, the purpose and objectives of the research have been defined.

The purpose of the shortened study in this paper is to show that a properly selected organizational structure influences the financial performance and profitability of companies that deal with the interpretation, promotion and protection of traditional culture and heritage, and thus also their sustainability without budget subsidies and/or grants.

The goals of this paper are:

- 1.) to process, analyze and present the model of organizational structure of the selected example of the system of organization;
- 2.) to analyze the financial performance indicators of the presented system of organization;
- 3.) to point out the existing causal link between the analyzed model of organizational structure and the associated financial indicators through a comparison.

2. THEORETICAL FOUNDATION

Before proceeding to an attempt to define organizational behavior, it would be good to offer a general definition of *organization*. Using the literature provided, we found a very simple definition: "the **organization** is a coordinated social unit composed of two or more people, which operates on a relatively continuous basis to achieve a common goal or set of goals" [3]. Why does anyone decide to organize to do a job? The purpose of almost every organization should be for entrepreneurs to organize themselves, and combine and organize their pooled resources, to produce goods or services that are offered on a market. To make it easier to understand the need for organization, one should offer a definition of the term *organizing*. We found the following definition: "**organizing** is the process of forming a regular use of all organizational resources in a management system. The primary focus of organizing is to determine what employees will be doing in the organization and how their individual efforts can best be combined to increase the achievement of goals of the organization" [4]. For the purposes of this paper, it should also be noted that in the field of organized dealing with the interpretation, preservation and promotion of traditional culture and heritage, various forms of organization occur with the very same, previously described objectives.

Organizational Behavior (often abbreviated as OB) is an area of research that studies the effect that individuals, groups and structures have on behavior within organizations for the purpose of applying knowledge to improve efficiency. If we tried to define the scientific discipline of organizational behavior (OB), the closest definition would be the following: "a systematic study of actions and attitudes that people exhibit within organizations" [5]. If we divide this definition into three parts, it is actually about studying *action*, *attitudes* and *organizations*. So, it is about studying actions/behaviors that have been shown to affect employee performance, such as *productivity*, *absenteeism* and *fluctuation*. In other words, the OB is engaged in studying what people in organizations do and how their behavior affects the organization's performance. Furthermore, *satisfaction at work*, which in essence represents attitudes, is also studied. Finally studied is the concept of *organization* and its impact on the behavior of employees at work.

Analyzing the various definitions of organizational behavior, there is a notable consensus on the point that organizational behavior "includes central topics related to motivation, behavior and authority of leaders, interpersonal communication, group structures

and processes, learning, development of attitudes and perceptions, the process of change, conflicts, design of jobs, and working stress" [6].

According to Robbins, there are three levels of analysis within the scientific discipline of organizational behavior. There is a study of analysis of organizational structure at the individual, group and organizational levels. Within the narrower area of *system of organization*, organizational behavior involves analyzing and studying: (i) the foundations of organizational structure, (ii) organization design, (iii) evaluation of work performance and reward system, (iv) organizational culture, and (v) organizational change and development.

For the purposes of this paper, only the topic of organizational structure is discussed, at the level of the system of organization. In order to facilitate the further elaboration of this paper, the term **organizational structure** is clarified. So, "the structure refers to a certain relationship between the management resources. Its purpose is to facilitate the use of each resource by the management system, individually and collectively, in its effort to achieve its goals" [4].

It is quite clear that a complete and comprehensive answer to the question posed by the paper as a hypothesis would require that all the elements that make up and describe the discipline of organizational behavior at the level of system organization be studied, explored and processed on a much larger sample. However, for the purposes of this paper, based on the information gathered and the conducted shortened secondary research and analysis, answers are given to the question of how some model of organizational structure in the organization system, selected and applied in practice, can influence financial results, profitability and thus sustainability of companies.

3. METHODOLOGY OF WORK AND THE HYPOTHESIS

The work on this paper includes theoretical consideration and a shortened form of secondary research based on the information gathered. Therefore, the scientific methods used in this paper are defined by the character of the individual parts of the research. In the preparation of the paper, the following scientific methods have been used in the appropriate combinations: methods of analysis and synthesis, the classification method, the description method and the compilation method. The latter was used carefully, with care taken over the faithful quoting and citing of the sources.

Based on previously defined problems and the set research goals, this is the hypothesis that will be tested by short research:

HYPOTHESIS (H):

A properly established organizational structure, on the example of an interpretative center of traditional culture and heritage, has an impact on financial results and profitability, and thus on sustainability.

4. DESCRIPTION OF RESEARCH AND RESEARCH RESULTS

4.1. SUBJECTS OF RESEARCH

For the purposes of this paper, I have conducted secondary research. I collected data on the organizational structure and financial indicators for the previous three fiscal years for a company dealing with interpretation, preservation and promotion of traditional culture and heritage.

The organization, or company, being analyzed is **Etnoland Pakovo Selo**. It is an old Dalmatian village made up of reconstructed stone houses and widely famous dry stacked walls. The Etnoland offers homemade traditional Dalmatian food, while the hosts, in a unique and original way, tell the visitors the story of their ancestors and the story of the richness of their history. Walking through the stone houses, visitors can recognize archaic items and tools, admire the art of living of our ancestors, and experience the traditional Dalmatia.

4.2. STUDY FINDINGS

Etnoland Pakovo Selo is organized as a company, specifically a limited liability company - Dalmati d.o.o. For an easier tracking of the topic, a diagram of the organizational structure of the company is given in Fig. 1. After the diagram, a brief summary is given of the most important data from the Balance Sheet and the Profit and Loss Account of the studied company for three fiscal years (2014-2016)

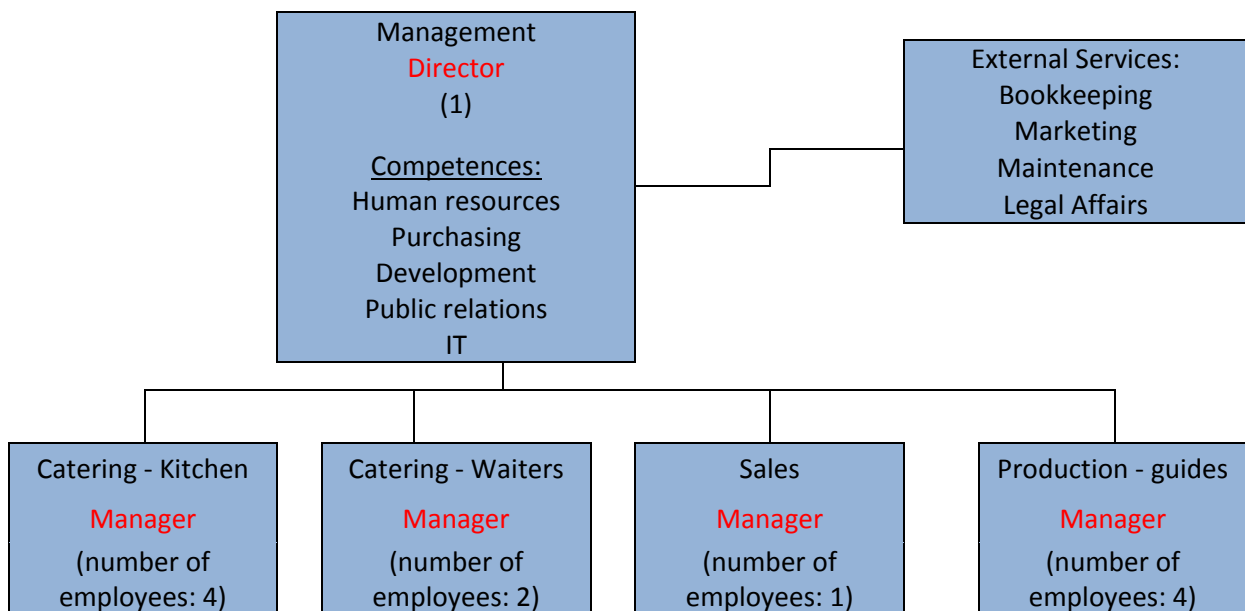


Figure 1. Organization chart of Dalmati d.o.o.

Table 1. A brief summary of the balance sheet of Dalmati d.o.o.

Business year	ASSETS (in HRK)				LIABILITIES (in HRK)		
2014	5,221,009				5,221,009		
	Non-current assets	Current assets			Capital and reserves	Long-term liabilities	Current liabilities
	4,614,780	Inventory	Receivables	Cash			
		42,826	213,827	329,058	1,111,847	3,518,978	100,868
2015	5,258,101				5,258,101		
	Non-current assets	Current assets			Capital and reserves	Long-term liabilities	Current liabilities
	4,633,552	Inventory	Receivables	Cash			
		45,364	161,761	394,818	1,247,448	3,538,455	84,228
2016	4,960,500				4,960,500		
	Non-current assets	Current assets			Capital and reserves	Long-term liabilities	Current liabilities
	4,396,104	Inventory	Receivables	Cash			
		27,426	143,482	376,216	1,445,906	3,169,038	55,744

Table 2. A summary of the profit and loss account of Dalmati d.o.o.

Business year	TOTAL REVENUE (in HRK)	TOTAL EXPENSES (in HRK)	PROFIT BEFORE TAXATION (in HRK)
2014	1,794,813	1,650,193	144,620
2015	1,833,123	1,663,251	169,872
2016	2,162,044	1,912,541	249,503

5. DISCUSSION

Before we proceed to the discussion based on the results of the research from the previous section, it is worth recalling a few theoretical points that help the analysis and understanding of the results. So, according to Robbins: "The organization structure comprises three components. The first refers to the amount of vertical, horizontal and spatial differentiation. This is called *complexity*. The next component is the degree to which the rules and procedures are used. This is the meaning of *formalization*. The third component, *centralization*, studies where the decision-making powers are located" [5].

In addition to the previous theory, it is important also to take the following thought in consideration: "Authority implies the right inherent in a managerial position to issue orders and to expect them to be followed. The authority should be delegated down to subordinate managers by giving them certain rights and certain prescribed limits within which they can act. Classical authors have argued that, when we delegate power, we have to tie it to a certain responsibility. In other words, when someone is given rights, it also implies appropriate obligations to be discharged. Assigning power without responsibility creates an opportunity for abuse. At the same time, no one should be held responsible for something over which he has no authority. Classical authors recognized two forms of responsibility: *operational and ultimate responsibility*. Managers delegate operational responsibilities to others, and it can then be delegated further down the rank. However, one aspect of responsibility - the ultimate component - must be retained. The manager is ultimately responsible for the actions of his subordinates to whom he has delegated operational responsibility. Therefore, managers should delegate operational responsibility equal to the delegated authority, while the ultimate responsibility can never be delegated. Today, organizations are increasingly turning to

participation in teams, and to other means of reducing the relationships of authority and superior-subordinate relationships. Managers increasingly look to their job with a view of freeing and training their subordinates, rather than just supervising them directly" [5].

Finally, it is necessary to interpret the analysis of the organizational structure also through the prism of the following theory: "What is the number of subordinates a manager can manage effectively and efficiently? Although there is no consensus with regard to the specific number of subordinates, classical theorists were inclined towards a small number - usually not more than six - to maintain strict control. However, a few classical authors have recognized levels in the organization as *contingency variables*. They argued that, as a manager climbs within an organization, he must handle a greater number of poorly structured issues. That is why the chief executives are given a narrower range of problems than managers at the middle level." [5].

The discussion of the analysis of the results of this study offers a review of all the above aspects, components and essential elements that define the form and type of organizational structure.

As the results of the study make apparent, the organizational structure of Dalmati d.o.o. (Etnoland Pakovo Selo) is an example of a very simple horizontal and vertical differentiation. With regard to vertical differentiation, the decision-making process takes place on only two levels, whereas it is horizontally divided into four distinct areas. Therefore, it is not a complex organizational system.

Because of the simplicity of the structure, the company uses very simple decision-making rules, which are not prescribed by corporate acts and/or procedures. Therefore, in this example we are talking about a low degree of formalization.

The organizational structure functions through daily joint meetings of the management and all four heads of departments, at which only operational decisions are made. In addition, a large number of competencies and operational affairs, as well as the making of all strategic decisions, is tied to the level of executive administration. All this leads us to the conclusion that a high degree of centralization in decision-making is in place.

The lower level managers have a very limited range of control and only have the daily delegated operational powers. The ultimate responsibility remains on the management (chief manager) so, in the analyzed example we are talking just about the partially delegated (operational) powers.

With regard to the scope of control and delegation of authority, Sikavica says: "The range of control is influenced by a number of factors. They are the complexity of the business, the level of management, the knowledge and skills of the co-workers/employees, the type and intensity of communication with the co-workers, the ability to delegate authority, etc. From one of the available analyses, it is apparent that managers consider the number of their daily contacts with employees as the least important factor, while the most important is the clear delegation of authority. The emphasis Croatian managers put on the importance of different factors and their influence on the range of control – in contrast to independent research variables – appears to be statistically significantly associated with certain individual characteristics of managers such as gender, age and management level." [7]. It seems that this statement perfectly corresponds with, and describes, the analysis of the organizational structure in the analyzed example.

With regard to the number of subordinates the management (the manager) can efficiently and effectively manage, in the example Dalmati d.o.o., it is not a complex contingency variable. Namely, the management (the manager) manages only four subordinates, while none of the lower ranked managers manage more than four.

The financial results of the Dalmati d.o.o. company, observed over a period of three financial years, show that the total revenues grow at a higher rate than total expenditures. The total revenue for the three financial years under review grew at the rate (CAGR) of 10.03%. In the same observed period, total expenditures grew at the rate (CAGR) of only 7.88%. Such results have led to a positive result (pre-tax profit), which also shows an upward trend over the three observed financial years.

While the profit margin was 8.05% in 2014, and rose to 9.26% in 2015, it reached 11.54% in 2016.

If we analyze the shortened balance sheet of Dalmati d.o.o., we find that the bottom line decreased by just 4.98% during the observed period. As a result of the decrease in long-term assets, the long-term liabilities of the company also decreased, and so did the total indebtedness of the company. This leads us to the next observation, which indicates that in 2014 the total long-term liabilities of the company were as much as 24 times greater than pre-tax profit. This ratio improves as early as 2016 and those liabilities are only 12 times greater than the pre-tax profit by then. Short-term liabilities are balanced with short-term receivables, so that the concern about the continuation of positive bottom line of the company is reduced to the concern about increasing the revenue and reducing long-term liabilities. Of course, such a high degree of indebtedness is not sustainable in the long run if there is no significant increase in pre-tax profit. However, given that the company shows positive trends in the overall growth of revenue, with controlled growth of total expenditures and thus a growth of pre-tax profit, the financial picture of the company from year to year can be expected to continue improving.

6. CONCLUSION

Given that the case of Dalmati d.o.o. is that of a company engaged in services, moreover in a new area of combined tourist, hospitality and cultural activity, it can be concluded that the business of the company shows a positive trend of growth of total revenue and that the company keeps control of its total expenditures. It is precisely in the latter segment - *the controlled growth of total expenditures* - that the organizational structure of the company and its financial indicators are linked.

If we recall the analysis mentioned in Chapter 5 of this paper, the following characteristics of the organizational structure at the level of Dalmati d.o.o. bear repeating:

- very simple horizontal and vertical differentiation;
- very low degree of complexity of organization and a small total number of managers and employees;
- very low degree of formalization;
- very high degree of centralization of decision making;
- partially delegated (operational) authority;
- a simple contingency variable.

It is quite obvious from the description of the organizational structure of Dalmati d.o.o. that the way its structure is set, its simplicity and the communication bandwidth, are among the main reasons for its success in managing the total expenditures of the company.

Particular attention is drawn to the fact that in 2016, for instance, staff costs compared to the total revenue were at the level of only 16%.

So, it is quite clear from just a few obvious examples and clarifications that the organizational structure has a direct impact on the control over total expenditures, and thus on the financial results and profitability of the company, which ultimately leads to sustainability.

The described observations lead to the conclusion that this hypothesis has proven that **a well-established organizational structure, in a chosen example of the interpretative center of traditional culture and heritage, has an impact on financial results and profitability, and thus on sustainability.**

REFERENCES

1. Marasović, T.: „Kulturna baština, sv. I“, Veleučilište Split, Split, (2001), 9;
2. Forrest, CJS: "International Law and the Protection of Cultural Heritage", Routledge, London, (2012), 1;
3. Robbins, S. P., Judge, T. A.: „Organizacijsko ponašanje“, naklada MATE, Zagreb, (2009), 5;
4. Certo, S. C., Certo, S. T.: „Moderni menadžment“, naklada MATE, Zagreb, (2008), 228, 233;
5. Robbins, S. P.: „Bitni elementi organizacijskog ponašanja“, naklada MATE d.o.o., Zagreb, (1992), 1, 189, 198-199;
6. Heath, C. i Sitkin, S. B.: „Big-B Versus Big-O: What Is Organizational about Organizational Behaviour?“, Journal of Organizational Behaviour, Duke University, Durham, (2001), 43-58;
7. Sikavica P., Šiber B. T.: „Menadžment – teorija menadžmenta i veliko empirijsko istraživanje u Hrvatskoj“, Društvena istraživanja: časopis za opća društvena pitanja, Zagreb, (2006), 21, - <https://hrcak.srce.hr/10901>.
8. Garcia, J. E. i Keleman, K. S.: „What Is Organizational Behavior Anyway?“, Annual Conference on Organizational Behavior, Columbia, Missouri, (1989).



WHY DO ORGANIZATIONS FAIL IN IMPLEMENTING MANAGEMENT PRACTICES? AND HOW DEPLOYING SUCCESSFUL TQM PROGRAMS IMPROVE THEIR OPERATIONAL PERFORMANCE?

Islam Bolbol

Doctoral School of Business Administration, University of Pécs, Hungary

Abstract: Attaining an excellent operational performance is still considered as a great challenge for several organizations where many of them fail in achieving high levels of performance and quality, although that they claim to implement several management practices. Thus, this paper discusses why organizations fail in implementing management practices such as Total Quality Management (TQM) program in which they tend to implement a particular management practice to correct certain fragilities in their operations where managers make a massive mistake and identically define their problems in term of starting and ending points. Meanwhile, these management practices must be implemented according to firms' capabilities and present opportunities as well as in dynamic and prolonged frameworks rather than static and short-term frameworks. Also, this paper reviews several examples of deploying TQM principles within organizations where selected empirical studies will be illustrated that focusing on achieving high levels of operational performance and quality through implementing successful TQM practices at organizations wherein some sample firms that are implementing these TQM practices would get more operational income and sales growth with 107% and 64%, respectively; compared to the control firms that they do not implement any TQM practices of only 49% and 24% for their operating income and sales growth, respectively. Furthermore, these TQM practices made companies got better cost control, higher employment growth, and total assets increase.

Keywords: Total Quality Management (TQM), Customer Satisfaction, Employees Involvement, Continuous Improvements, Management Practices, Operational Performance And Quality

1. INTRODUCTION

The essential organizations' resources are their capabilities which they are represented by culture, processes, and routines taking into consideration the low-cost manufacturing skills, high-quality production, and rapid product or service developments. Thus, these firms' capabilities must be growing over the time and transform the traditional inputs into superior product or service which in turn that this will develop the firms in successful manners to be able in competing in the global market as well as allowing the firms to implement effective management practices that fit with their capabilities.

As organizations' aims are increasing productivity, quality, manufacturing speed, customer satisfaction, and eliminating inefficiencies; several management practices have been spawned such as Total Quality Management (TQM), Just in time (JIT), benchmarking, time-based competition, change management, re-engineering, lean management, outsourcing, and partnering. Although it seems to be easily deploying any of these marvelous tools, some organizations still fail in implementing these management practices.

In the next section we will know the leading organizations' problems of why they fail in implementing these management practices under the light of existing strategy and how to avoid these fragilities through using dynamic and prolonged frameworks rather than focusing on static and short-term solutions which this would be followed by extensive literature reviews on TQM major principles. Finally, this paper will present some empirical studies that are focusing on achieving high levels of operational performance and quality through implementing successful TQM practices at these organizations. At the end of this paper, the paper's contribution, as well as possible future researches based on this paper limitations, would be epitomized at the section of conclusion and future researches.

2. WHY DO ORGANIZATIONS FAIL IN IMPLEMENTING MANAGEMENT PRACTICES UNDER THE LIGHT OF EXISTING STRATEGY?

Before answering this question, it must first define what strategy is in which according to [10] "it is creating fit among a company's activities which its successfulness relies on performing several things in a good manner with full integration between them. Nevertheless, the low sustainability together without a unique strategy would be happened due to no fit existence between these activities. Thus, the management would resort to a simplified supervising mission of separated functions which the operational efficiency would determine the pertained organizational performance."

2.1 THE MAJOR PROBLEMS

Thus, as [4] mention that "the problem is not with TQM, JIT, lean manufacturing, or concurrent engineering, but the major problem is with the firms' way in implementing these practices to their own problems." For example, firms tend to implement a particular management practice to correct certain fragilities in their operations where the managers identically define their problems in term of starting and ending points, i.e., managers get used to say that "our target is reducing defect level to 200 parts per million." or, they say that "our purpose is decreasing our variable cost by \$1 per unit."

So, managers usually think the solution would be through adopting a specific management practice in which they implement TQM to improve quality, or they would implement JIT to become more responsive; taking into consideration that these practices end in themselves without taking care that they must be implemented in term of firms' capabilities and opportunities; where the last would lead the managers to think in a different way regarding solving their problems.

Going deeply, in a static framework, solving the problems depend on one-shot treating; while within a dynamic framework, problems' solutions are illustrated as a piece of a continued improvements way term. Thus, implementing a selected practice must not be only for solving the current or instant problem but also to construct new proficiencies which unlock new opportunities. Altogether, implementing manufacturing practice is not only

required aligning operations to present competing priorities but also by choosing and inventing the needed future operating capabilities.

2.2 THE REASONS BEHIND THESE PROBLEMS AND HOW TO AVOID THEM

[12] interviewed and surveyed more than 20,000 managers from more than 12,000 firms in different four sectors: higher education, retail, healthcare, and manufacturing; within 34 countries asking about how far the firms are implementing their management practices utilizing 1 to 5 scale for 18 specific practices in four main areas: talent management, target setting, performance controlling, and operations management to rate organizations where the higher scores indicate higher adoption and implementation.

The results show two significant findings: Firstly, there is a massive enduring lacuna in implementing fundamental managerial practices which it would lead to permanent and inconsistent differences in firm performance. In other words, the well-managed firms are more profitable, growing in a faster manner, and less likely to die, especially that moving a particular company from the worst 10% to the best 10% in term of implementing management practice requires extra \$15 million increase in profits, 25% faster growth per annum, and 75% higher productivity. Nevertheless, the well-managed companies across industries and countries usually spend ten times more on R&D and raising up their patenting factor to 10 to sustain their efficiency and innovation together with hiring more talented employees and workers [12].

Secondly, attaining excellent operational performance is still considered as a great challenge for several organizations which this is true among well-structured and well-informed firms (variation reaches 30% between firms) across several industries and countries where the countries variation reaches 60% even within wealthy countries such as the U.S. Furthermore, 11% of companies had an average score of 2 or less which means that they have feeble control, low endeavor for determining and solving problems inside the firm, nearly no aims for employees, and rewards and incentives rely only on family relations or tenures. Moreover, 6% of firms had an average score of 4 or more which they have a strict performance monitoring, a systems utilize the maximum information flow within and across the functions, continues improvement practices that pillared short and long-term goals and rewarding systems depend on employees' performance where it encourages the underperformers either to turn around or move on [12].

Thus, [12] attributed several impediments that preventing the organization from implementing fundamental management practices. Firstly, *False perceptions*: The research results show that managers majority are unable to judge how well or bad their companies are run objectively. In other words, on a scale of 10, managers majority had a very optimistic evaluation of their firms' practices quality which the average answer was seven over ten wherein contrary, the results present a zero relationship between actual and perceived management qualities proposing that self-assessments are far away from reality. Identically, that with another research result shows that 90% of university teachers, 80% of drivers, and 70% of students rate themselves as above average. Furthermore, additional and common ground problem that had been done by employees that the last usually do not leverage problems to their managers due to the fear of being reprimanded for identifying them which as a consequence this act would prevent managers of getting critical and substantial knowledge that could help in the purpose of understanding the firm's problems [12].

Secondly, *Governance structure*: Some managers would have full knowledge of the required improvement of their firms' practices, but unfortunately, they scarify this opportunity due to the apprehension that this change would jeopardize private objectives. This problem is most popular in family-owned and family-linked companies across countries, industries, and firms' sizes which these firms had the lowest median scores of management. The reason behind this problem is that these family-linked firms are quite reluctant to implement strict management practices which it could have a severe personal price to other family members [12]. Finally, *Skill deficits*: According to the result that the more educated employees, the higher performance of the firms and vice versa, so it is a direct relationship that these well-educated employees including top managers would immensely help in adopting and implementing a particular managerial practice in which all of them would be motivated, having the proper skills, abilities, and capabilities to make certain changes. Thus, the skills deficit would be considered as leading failure factor of implementing the necessary practice [12].

3. LITERATURE REVIEWS

According to [8] which they said that "TQM is a philosophy that expresses three major essentials for attaining high levels of process quality and performance namely: (3.1) *customer satisfaction*, (3.2) *employee involvement*, and (3.3) *continuous improvement* in performance.

3.1 CUSTOMER SATISFACTION

[15] mention in their paper that "firms like Wal-Mart, Banc One, The Limited, Canon, and Honda became successful firms in term of capabilities-based competition due to theirs depend on converting a firm's key processes to strategic capabilities which consistently they supply outstanding values to their customers in which these capabilities are considered as a strategic weapon only and only if it starts and ends with the customer." Thus, Wal-Mart's success factor relies on profound strategic business decisions especially with a rigors focusing on customer's requirements and satisfaction in which targets of Wal-Mart are quite challenging but straightforward to implement starting with allowing customers getting quality products, passing through making these products obtainable wherever and whenever customers need them, followed by activating competitive pricing through enabling structural cost reduction, and finally reaching absolute trustworthiness by constructing and preserving an excellent reputation in which all of that occurred due giving the customers satisfaction the highest priority [15].

Going further, [14] build their company depending on their customers' satisfaction in which they invented an excellent system that its dominant priority is to get almost 100% satisfaction for their customers for growing up their firm and increasing its profitability. So, they focus on one main principle that their own success is depending on customers success in using their Siebel eBusiness Applications. So, they created Siebel Core Values where the first one is regarding customer satisfaction and considering it as Siebel privilege to serve their customers through disseminating them to all its employees all over the world. Furthermore, the integrated nature of Siebel system makes the management well periodically meets to measure customers' satisfaction and to activate the rewards and incentives system for employees depending on their customers' satisfaction level.

From another angle, in the world where customers and market forces are governing and dominating the business core, [1] said that we should think about "What else can we do for our customers instead of what else can we make?" which the answer to this question lies deeper in modern gravity demand centre together with a rethinking of the current strategy pillars. Thus, the strategic aim is to know what are the customers' purchasing criteria and introducing new favorable ones instead. So, [1] also mentioned that Hyundai used this option when it asked its customers that "Why you are not purchasing my cars?" were the most popular answer was "Because of the risk of losing my job at any time of the current financial crisis of January 2009." According to that, Hyundai offered a guarantee against this risk by saying that "If you lose your job within one year of buying the car, you can return it to us without any penalty to your credit rating." As a result, the sales of Hyundai doubled that month and sold more vehicles than Chrysler; while the industry's sales were decreasing by 37% that month. As a consequence, Hyundai increased its customers' satisfaction by selling cars better than the rivals [1].

3.2 EMPLOYEES INVOLVEMENT

Depending on [14] paper that the second Siebel Core Value is "implementing the highest levels of professional courtesy and business ethics." where this means that the firm adopted the open-door policy in order to encourage the respectful and constructive tones of communication, smooth coordination, high responding to phone call, calling back the customers in an appropriate manner, and never say that this is not my duty. In other words, taking the bonus awards, as an illustration, the bonus awards are given to employees according to the achieving a level of quarterly objectives such as right delivering of products, reaching sales targets and customer satisfaction. For example, reaching a customer satisfaction with 90%, the salesperson would get only 75% of his bouns; while if this customer satisfaction went back to 100%, the salesperson would get the full bonus in the next quarter which this bonus in some cases would reach four times of her or his salary. Another clear example that if the work were done by several groups inside the firm or even with the help of other Alliance group, all the people that participated in succeeding this work would get the targeted bonus compensation [14].

Furthermore, Siebel firm utilizes the stock ownership and options plans where its employees are owning 40% of company's stocks which this make all the employees do the right things for improving the performance of the firm. In contrary, Siebel firm uses a defined policy for improving workforce through ranking and discharging the bottom 5% of its employees semi-annually, to eliminate employees that were not efficient and were not good enough in fitting firm's culture and hindering firm's performance. So, Seibel firm's created mySiebel to avoid the strategy execution gap across its all global locations through investing in systematic workforce competency improvements to build an excellent team; and giving unified access for all employees reaching the firm's resources [14].

As a consequence of creating mySiebel, the firm got a consistent strategy execution through focusing on achieving its strategic goals together with enhancing the employees' responses in term of solving a service request inside the firm which it decreased from six to two days from the year of 2000 to the year of 2001. Finally and before releasing the product into the market, the product gets used to inspecting by 8,000 employees to catch quality problems and defects where in case of finding any, the defective items would be prioritized and given the full attention to fix them. Moreover, even after releasing the product, customers

still getting a continuous update, quality check-ups, and feedback service to keep the process maintenance for the undiscovered defects [14].

Taking Toyota Production System (TPS) that has been reviewed by [9] as an excellent example of involving employees into production process; TPS implements Jidoka principle (one branch of JIT and it is considered as one pillar of TPS) that whenever any production problem occurs and self-evident, the production line must be stopped by the concerned employee. Thus, this principle considers building in quality as the first priority where any deviation from it would be condemned as waste. Additionally, TPS relies on human infrastructure especially that it literally implements its slogan of "Good Thinking, Good Products." where the good thinking means that all employees and senior management must take good training programs which this lead them going down and search for the problem root using the standard of "let us go and see it" which it later improved and substituted by the "Five Whys" through asking a chain of "Why questions" until identifying the root problem and then determining the required countermeasures [9].

Indeed, TPS promotes the 4Ss (sift, sort, sweep, and spic-and-span) in its assembly line where the last has a green and red lines drawn at the right representing the starting and ending points of each workstation respectively in which a team member would start a working cycle whenever the car reaches the green line and finish all duties by reaching the red line; While the yellow line is existed in between indicating that 70% of the work has been accomplished [9]. Adding more weights, in case of finding any problem behind the yellow line, the employee pulls the Andon cord resulting in a stoppage of the production line together with high loud music in the related station where the team leader runs to the infected station to search the problem and try to correct it. Nevertheless, if the problem could not be solved instantly, the car would be eliminated from the assembly line to allow a continuous production and minimize the cost of this stoppage, and finally, the defective car would be sent to a clinic area where the problem would be fixed there by a special team [9].

Finally, Toyota Motor Manufacturing (TMM's) has a quality control (QC) department to reassure that rigorous quality criteria have been implemented through mandatory routine inspection for all vehicles before selling them together with following up the customers' experiences with the purchased vehicles; in which there are twenty patrol engineering inspectors on each shift of assembly line for monitoring and catching up the defective items and trying to solve their quality problems with suppliers. While, the other two functions of QC department: Firstly, providing feedback to direct operations including the final assembly instantaneously; Secondly, preventing the problems from happening by solving the problem in its cradle before it became more prominent and not to wait until occurring a massive problem where this function is considered as a unique proactive one [9].

From another angle, [17] tests the economic order and production quantity models under random defective fractions in two different production cycles to determine how the employees are involved in operations to catch the defectives items. Furthermore, at the first production cycle, the outputs would be changed from cycle to cycle due to differences in each cycle; while at the other production cycle, the outputs would be the same because of the current cycle is inherited from the previous cycle which all of these outputs' quality is checked by a special team where the last either eliminates the defects from both cycles or postponing them until the end of cycles; then accumulates them in lots to either selling them with a lower price through opening a new positioning segments or sending them back to their suppliers.

3.3 CONTINUES IMPROVEMENTS

Firms must upgrade the quality and number of their resources in a continuous manner as well as their operational activities together with the related competitive positions to defend the inescapable value deterioration and to protect their products from being imitated by rivals which all of that would lead to achieving the operational effectiveness (OE). [10] define OE as "performing similar activities better than competitors perform them." where it consists of efficiency and any other practices that permit the firm using its inputs in a better manner compared to rivals such as minimizing defects in goods or producing better goods faster than the others.

Taking TPS as a great example of reducing costs and continuous improving itself by eliminating waste in its manufacturing process through implementing JIT principle which refers to only produce what is required, whenever it is required, and how much is required; while any variation from them is considered as a waste. Then, TPS allows its employees to adopt "Kaizen" criteria which it refers to changing for better to keep on a continuous improvement not only in its operational level but also to the whole firm. Going further, TPS illustrates another JIT practice implementation which named as "Heijunka" and means (Balancing) the orders in a sequence of daily production [9].

In other words, if Toyota has a monthly order for 20 working days including 20,000 sedans equally divided between luxury and basic models; according to the Heijunka principle, Toyota should produce 500 cars for each model every single day. Nevertheless, in case of luxury cars model take more time to be produced, the daily production of 500 basic cars model would be finished before the luxury ones, and as a consequence utilizing Heijunka principle would support the luxury cars production and substituting it through utilizing the empty assembly line of basic cars model [9]. From another angle, Siebel firm always invests in its software improvements in a continuous manner especially that its clients such as Charles Schwab, General Motors, Fleet Boston, General Electric, and IBM are spending between 1 to 10 million of dollars for licensing Siebel eBusiness Applications [14].

Going deeply, [18] runs multi-period models to analyze price nature and process improvement activities dynamics in both decreasing or increasing manners. The result shows that in a stable environment, these dynamics tend to decrease; while improvement activities would raise up the cumulative productivity knowledge only if they are at positive level. In contrary, when the selling price of this cumulative knowledge is zero or near to it at the end of the period, the improvement activities would decrease over time. In other words, in case of using internal resources efficiently, the total cost would be minimized because of increasing productivity. Also, if the goods are successfully positioned into the market, the demand would raise up. Thus, these two factors led the improvement activities' rate to be increased and giving a significant benchmark of continuing sell of the cumulative knowledge. In contrast, if these improvement activities did not lead to a crucial increase in productivity or even if the demand deteriorate by the time, these dynamics would be decreased [18].

Indeed, [3] conduct research as an extension of [17] work to find the optimum lot size in case of random defects and to examine if the investment would speed up the quality screening process or not. They examine two different production cycles that at the first one, the defective items would have fixed percentage due to that the current cycle is inherited from the previous one; while at the other production cycle, the defective items would be different in each cycle because of cycles independence. As a result, the defects would be accumulated in lots and either be sold with a lower price or be sent back to the suppliers for reworking and selling them again as good ones for satisfying the required demands. According to that, the

utilized investments would accelerate and improve the quality screening process through raising up its capacity (by involving more employees, technologies, or even new firm's capabilities) as well as they would increase the system's responsiveness together with minimizing their backlogging costs; while the set up cost would be increased only if the defect rate is high [3].

Adding more weights, [13] analyze Littler Company where the last is concerned of an international labor law that doing work for many firms across several countries to show how it embedded products in service. Littler enhance the efficiency and quality of its services through unbundling its jobs by either assigning them to products with analytics capabilities and automation or to specialized knowledge team, relying on their sophistication levels. As a result, these offerings, develop the quality and responsiveness of Littler's work through decreasing costs for both Littler as well as its customers.

Last by not least, [2] conduct a paper for answering the question of "what should a retailer do when growth slows?" in which they tested 37 U.S. retailers financial data with present sales of at least \$1 billion where their top-line yearly growth rate had declined by a single digit; while others had double-digit earnings growth and even above-average stock market returns. The result shows that successful retailers had improved their operations at their current stores in order to get extra sales which as a consequence this made the revenues grow more than expenses and lead to increase retailers' earnings; while the less successful retailers had continued opening new stores for chasing growth which it diminished returns instead.

Presenting an example of successful Kroger's retailers where the last improved its operations as well as achieved more sales with more than 50 positive straight quarters compared to other stores and increased their customers' satisfaction by deploying infrared technology at 2010 in their retailers for the purpose of tracking customers whenever they enter the store then utilizing forecasting analytics that anticipate whenever they are near to reach the checkout lanes. As a result, this new technology allows Kroger to determine how many lanes are required to be operated at any time to meet the optimum waiting time criteria which a large dynamic screen tells customers the present waiting time where this technology minimized the waiting time from four minutes to 26 seconds [2].

4. EMPIRICAL STUDIES PRESENTS HOW SUCCESSFUL ENFORCEMENT OF THE TQM PRACTICES IMPROVES ORGANIZATIONS' OPERATIONAL PERFORMANCE

Some firms implementing TQM practices through exploiting their resources in a maximum manner in which they eliminate wastes, decrease costs, maximize customers' satisfaction, increase product or service quality, raise up employees motivation, continuous improving of the utilized technologies and operations for the purpose of achieving high level of process performance, efficiency, and quality which as a consequence all of these would leverage their profitability compared to their rivals. Thus, [6] investigate several organizations for the purpose of highlighting the sequential root influence of implementing TQM practices on their firms which the authors finally propose "The Product/Service-Profit Chain" where the last identifies the sequential chain that would result in high levels of process performance and quality in which they said that "in order to have a successful organization with a high competitive advantage, you must establish a significant relationships between product/service-profit chain and profitability, customer loyalty, and employee's productivity, loyalty, and satisfaction."

In other words, growth and profit are fundamentally generated by customer loyalty where the last is considered as a direct consequence of customer satisfaction. Furthermore, this satisfaction is mostly affected by the product or service value that provided to customers in which this value is usually produced by productive, loyal, and satisfied employees where the last directly result from high-quality policies and support services that allow employees to convey the final values to their customers [6]. Thus, that product/service-profit chain, have been developed from analyses of successful service organizations in which it puts “hard” values on “soft” measures; so it is not only helping managers seeking new investments to develop product, service, and satisfaction levels for getting the maximum competitive impact but also it is widening the gap between product or service leaders and their merely good competitors [6].

Another empirical research did by [5] which they investigate the influence of implementing TQM practices in improving the firms' operational performance in which the quality prizes that had been awarded by companies are utilized as a proxy to measure the implementation extent of these TQM practices. The authors analyzed 400 publicly traded companies during 10 years period (from 1983 to 1993) in which 6 years of them were before winning the first quality prize, while the other 3 years were after awarding this first quality prize where they also made a good comparison of the tested sample of quality-award winners with the control companies' sample who did not implement any TQM practices.

Furthermore, the reasons behind selecting winners of quality prizes as measuring sample by the authors are: Firstly, that the prizes' providers will not grant them unless they see an excellent performance due to implementing TQM programs to maintain the prizes credibility as well as their values of being significant incentives. Secondly, the authors tried to be unbiased through excluding firms' selections according to their financial performance whether good or bad since the prize-winning procedures were not based on the effect of companies' stocks prices, their financial situations, technical steps, fairness, or even their confidential information as well; while this prize depends on the achieved operational efficiency improvements [5].

The result shows that during the 10-year period, the enterprises that have won the quality prizes outperformed in term of operational income measurement with an average change of 107% compared with control companies with only 49%. As a consequence, the sales growth of firms that have won quality awards increased with a mean of 64% compared with raised sales growth of control companies with an average of only 24%. Moreover, the sample companies present better cost control, higher employment growth, and a total assets increase compared with the control companies; while these control firms show lower growth in their capital expenditures compared to the sample firms during the six-year period before winning the first quality prize [5].

A marvelous example was driven by [7] presenting how the implementation of Wal-Mart's TQM practices in its stores which this resulted to not only improving the operational performance of their stores but also the whole Wal-Mart performance. Wal-Mart was able to enhance its delivery procedures criteria through deploying coordination between its entire fleets where this lead to avoid the usual miscommunication among employees, truckers, and traffic coordinators. Thus, Wal-Mart invested in a satellite network, store level point-of-sale systems, central database, and Universal Product Bar Code (UPAC) to collect and analyzing information to develop its operational and purchasing anticipations accuracy through providing extra support to buyers such as weather forecasts.

As continuous improvement operations, in 2006, Wal-Mart established two different initiatives: "Remix" and "RFID" (radio frequency identification tags). Remix aim is to

decrease the out-of-stock merchandise percentage at retailers by rearranging distribution centers network and get the final reward of improving the present system, enhancing productivity, and increasing sales per square foot. While, Wal-Mart deployed RFID tags on its merchandises to track them, raising up the stock rates of its stores by replenishing the shelves as soon as possible, and minimizing the sales losses due to out-of-stock or even overstocking expenses [7].

Altogether, [7] mentioned in their paper three different proofs on the benefit of these RFID tags: Firstly, some researchers said that "around 25% of out-of-stock inventory in the U.S. was not really out-of-stock, the items could be either misshelved in the backroom or misplaced on the floor."; While another study mentioned that "8% of merchandisers were out of stock at some given time of their commercial lives made them losing a great sales for retailers."; Finally, a study conducted by the University of Arkansas said that "Deploying RFID tags by Wal-Mart stores on its products resulted in decreasing 16% of its out-of-stock and improving its sales' revenues.

Additionally, [16] investigates whether that implementing some TQM practices would consequence to a profit growth sustainability or not where the market setting has a tremendous monopolistic competition as well as quality inflation (QI: means that the customers' expectations are continuously increasing concerning the products or services performances). Going deeply, the author considered that the sample company is excellent in defining and applying its business strategy in a sustainable manner where it gives a monopolistic competition for some periods while its product demand is not only relying on performance quality but also on its product's price. The results show that the optimum investment rate in both quality knowledge and productivity is rather quasi-convex which means it would be either increasing, decreasing, or decreasing then increasing by the time while the QI would restrain investment in several operations for raising up the quality enhancement efforts which it is considered as a good strategy where the non-strategic quality features is not influenced. Thus, this represents a new contribution of how QI role guarantees profit growth sustainability. Furthermore, raising up the quality knowledge and productivity would minimize not only non-strategic quality features but also production costs while the strategic quality aspects would be increased [16].

Recalling another astonished example, Toyota's president Mr. Watanabe illustrates in his paper [19] the two pillars of Toyota Way that these two pillars officially implement the spirit of TQM practices: Firstly, under the first pillar, the continuous improvement must be deployed to all firm's levels through creating a long-term vision confronting challenges with a highly innovative bravery for achieving the intended dream. Then, using the principle of "Kaizen" to keep on the persistent improvements through using a human-like intelligence technology together with innovation and evolution. Lastly, utilizing the principle of "Genchi Genbutsu" which means to go and see by yourself to find the problem source and reaching the needed consensus to take a corrective decision to fix this problem and achieving the targets.

While, the other pillar states on respect for people which Toyota always respects others such as customers, suppliers, and employees through understanding the exerted efforts and persisting the required obligation to get higher satisfaction, coordination, and reciprocal confidence. Moreover, Toyota's second pillar also depends on encouraging the teamwork spirit through maximizing its performance using awards incentive for the employees that show outstanding performance and make them professionally share the growth opportunities. As a result of implementing these two pillars, Toyota produces "Better cars for more people" in which these cars meet customer preferences with flawless quality as well as delivering them in a perfect timing and affordable prices [19].

Finally, [11] said that Sysmex improved its equipment that analyzing blood and urine samples by adding a connectivity tool to its machines permitting remote monitoring as well as providing particular service. This tool allows service technicians accessing to these machines whether if they are on-site or off-site for solving software problems, upgrading the system, knowing customers' preferences, minimizing and preventing defects in the system, increasing the product or service capabilities, and guiding the practitioners into how to use these machines; where all of these resulted to not only maximize customers' satisfaction and increase employees involvement but also to a continuous minimizing of service and equipment costs as well as their downtime periods.

5. CONCLUSION AND FUTURE STUDIES

As seen that this paper notably classifies the most popular failure reasons of organizations in implementing TQM practices where managers usually measure the organizations' problems in term or starting and ending points instead of fitting up their firms' capabilities and current opportunities such as improving employees' skills, building and mentoring a transparent governance structure, and utilizing the actual managers' perceptions of their performances to avoid any obstacles and failure reasons within companies. Additionally, for mentioning but not limited to, this paper presents that some sample organizations that implemented successful TQM practices got more operational income and sales growth with 107% and 64%, respectively; compared to other the control firms who did not implement any TQM practices with only 49% and 24% in their operational income and sales growth, respectively. Another advantage of implementing these TQM practices that these sample companies would have better cost control, higher employment growth, and a total assets increase compared with the control ones.

Altogether, this paper contributes the TQM science through provoking that these TQM practices must be enforced in a dynamic framework and according to the actual firms' capabilities and present opportunities as well as considering a prolonged solution of firms' problems rather than using a static framework and one-shot useless solution together with perceived firms' capabilities and anticipated opportunities. Nevertheless, future research may be conducted to connect these TQM practices in creating an entire firm's strategy or even amending the existing one to connect its long-term strategy map objectives and scorecards with its near as well as long terms processes improvements especially that this TQM practice is not only utilized for fixing short-term problem but also to improve the whole long-term firm's progress.

REFERENCES

1. Dawar, N., When marketing is strategy. *Harvard business review*, 91(12), (2013), 100-108.
2. Fisher, M., Gaur, V., & Kleinberger, H., Curing the addiction to growth. *Harvard Business Review*, 95(1), (2017), 66-74.
3. Hauck, Z., & Vörös, J., Lot sizing in case of defective items with investments to increase the speed of quality control. *Omega*, 52, (2015), 180-189.
4. Hayes, R. H., & Pisano, G. P., Beyond world-class: the new manufacturing strategy. *Harvard business review*, 72(1), (1994), 77-86.

5. Hendricks, K. B., & Singhal, V. R., Does implementing an effective TQM program actually improve operating performance? Empirical evidence from firms that have won quality awards. *Management Science*, 43(9), (1997), 1258-1274.
6. Heskett, J. L., Jones, T. O., Loveman, G. W., Sasser, W. E., & Schlesinger, L. A., Putting the service-profit chain to work. *Harvard business review*, 72(2), (1994), 164-174.
7. Johnson, P. F., & Mark, K., Supply chain management at Wal-Mart. Harvard Business School Press 907D01, (2006), 1-15.
8. Krajewski, L. J., Ritzman, L. P. & Malhotra, M. K., Total Quality Management. In: *Operations Management: Processes And Supply chains*. 10th ed. Prentice Hall, Boston, 2013.
9. Mishina, K., & Takeda, K., Toyota motor manufacturing, USA, Inc. Harvard Business School, (1992), 1-22.
10. Porter, M., What is Strategy, *Harvard Business Review*, November-December, (1996), 61-78.
11. Porter, M. E., & Heppelmann, J. E., How smart, connected products are transforming companies. *Harvard Business Review*, 93(10), (2015), 96-114.
12. Sadun, R., Bloom, N., & Van Reenen, J., Why Do We Undervalue Competent Management? Great Leadership And Brilliant Strategy Will not Succeed Without Operational Excellence. *Harvard Business Review*, 95(5), (2017), 120-127.
13. Sawhney, M., Putting products into services. *Harvard Business Review*, (2016), 82-89.
14. Simons, R., & Davila, A., Siebel Systems: Organizing for the Customer. Harvard Business School, (2002), 1-25.
15. Stalk, G., Evans, P., & Shulman, L. E., Competing On Capabilities: The New Rules Of Corporate Strategy. *Harvard business review*, (1992), 57-69.
16. Vörös, J., The dynamics of price, quality and productivity improvement decisions. *European Journal of Operational Research*, 170(3), (2006), 809-823.
17. Vörös, J., Economic order and production quantity models without constraint on the percentage of defective items. *Central European Journal of Operations Research*, 21(4), (2013a), 867-885.
18. Vörös, J., Multi-period models for analyzing the dynamics of process improvement activities. *European Journal of Operational Research*, 230(3), (2013b), 615-623.
19. Watanabe, K., Lessons from Toyota's long drive, (2007), 74-83.



HOW IS CORPORATE ENTREPRENEURSHIP INTERCONNECTED TO ENTREPRENEURSHIP? AND HOW CORPORATE ENTREPRENEURSHIP DIMENSIONS WOULD IMPROVE THE ORGANIZATIONS' FINANCIAL PERFORMANCES?

Islam Bolbol

Doctoral School of Business Administration, University of Pécs, Hungary

Abstract: In the world of everyday innovation and under the light of existing and improving technologies in continuous manners, Corporate Entrepreneurship (CE) is considered as focal debate point in which it would lead to either a destructive successfulness or massive destruction and loss for a particular organization. This paper presents the astonished interconnection between CE and Entrepreneurship through recalling their definitions together with emphasizing on CE major types. Then, recent and diversified literature reviews and empirical studies would be illustrated that clarifying how CE dimensions would positively and significantly influence the organizations' financial performance (OFP). This paper also shows the most popular reasons that are making the CE quite important. Going deeply, innovative activities could increase a country's GDP by remarkable proportions not only in developed countries such as the US but also in developing ones such as Netherlands, Malaysia, and Turkey in which the SMEs innovative activities in these developing countries would participate in their respective GDPs by approximate percentages between 40% to 60%; meanwhile this great ratio would be considered as a huge contribution to their economies and as a consequence it would lead to a rapid economic growth. A special section would be specialized to determine how to create a successful CE training program to be as an applied and generalized model for other organizations throughout doing an investigative analysis to determine the organizational orientation, then aligning the objectives and targets of their respected innovation within the organization and stakeholders ones. Moreover, the appropriate leaders should activate rewarding system on the employees to encourage their innovative and entrepreneurial skills together with making unique theoretical and practical training programs and courses for refining their articulate skills. Lastly, the conclusion together with the anticipated future studies depending on this study limitations would be drawn at the end of this paper.

Keywords: Corporate Entrepreneurship (CE), Organizations' Financial Performance (OFP), Corporate Entrepreneurship Major Types, & successful CE training program

1. INTRODUCTION

Corporate Entrepreneurship (CE) has received massive attention not only from academicians but also from practitioners and economic policymakers. CE is considered as a renewable and active phenomenon since the last century which a lot of scientists and researchers had provoked the influence of CE on several factors which for examples but not

limited to strategic management. Furthermore, if there are studies, they would be very little that have been conducted to investigate how is CE interconnected to entrepreneurship and how CE dimensions would improve the organizations' financial performance (OFP) together with focusing on the importance of CE and how to create a successful CE training program to be as an applied and generalized model for other organizations wherein all of that would be considered as the main contribution of this paper. Moreover, CE is a crucial issue, and it creates enormous debates worldwide due to the technological revolutions that have been happening not only in our era but also since the last few decades.

Nevertheless, the most famous goal of an entrepreneur is either to establish, contribute, or even to enhance entrepreneurship or CE performances by making innovative and creative activities and be the first stepper within the market, which leads to having a competitive advantage compared to the rivals in the particular industry. In other words, to enhance OFP, it needs an innovative and successful CE where the last needs to exploit the new and the available opportunities together with utilizing current resources to have robust, competitive, and unique organizational performance.

Thus, to understand the marvelous connection between CE and entrepreneurship, their definitions would be recalled in the following section together with an emphasizing on CE major types. Then, it would be followed by illustrations of literature reviews and empirical studies on how CE together with its various dimensions would improve the OFP. Going further, the reasons behind the importance of CE would be presented after that section in which it would be followed by a special section that determining how to create a successful CE training program to be as an applied and generalized model for other organizations. Lastly, the conclusion together with the anticipated future studies depending on this study limitations would be drawn at the end of this paper.

2. HOW IS CORPORATE ENTREPRENEURSHIP INTERCONNECTED TO ENTREPRENEURSHIP?

2.1 ENTREPRENEURSHIP DEFINITION

According to the Godfather of entrepreneurship [29] who described the entrepreneur as an innovator who does certain alterations inside the market by executing new combinations such as new products, new production methods, or even open a new firm. Nevertheless, [29] defined the entrepreneurship "as a "creative destruction" process in which entrepreneurs change the present goods or production methods with new ones continuously or destroy." Adding more weights, [33] define the entrepreneurship as the exploitation and the usage of certain opportunity with neglecting of presently controlled resources. In other words, it is the process of creating and distributing an absolute value by a human creative act. Furthermore, [28] said that the entrepreneurship represents any attempt at creating whether a new business, a new venture or an expansion of specific business activity.

2.2 CORPORATE ENTREPRENEURSHIP DEFINITION AND ITS MAJOR TYPES

2.2.1 Corporate Entrepreneurship definition

Being more specific, [7] described the CE as the company's diversification activities which they include the using of new resources and exploiting of new opportunities to let the

firm extend its operations throughout interior enhancement. Furthermore, [36] defined the CE as certain improving actions inside the firm that inducing it towards innovation, taking the risk, and exploiting the existing market opportunities. Moreover, CE which it is also named as an Intrapreneurship, it could be defined as the innovative stimulation of certain notions and operations with a usual concentration on creating of wealth [30].

Thus, CE is entrepreneurship inside an existing firm with a new behavior where it should be different from the traditional act [3]. Going deeply, [14] mentioned that the CE is referred to resurrecting of a firm's business through modifying its competitive profile or affirming rejuvenation throughout research and development department by following up the new markets' orientations.

2.2.2 Corporate Entrepreneurship major types

According to [32] there are four types of CE, Firstly: Corporate Venturing: It is the operational start of a new venture which it pertains to the firm's essential business, and that could be considered as an attractive strategy. Secondly: Organizational Conversion: It is the improvement of operational qualifications to allow and facilitates the organizational transformation. Thirdly: Intrapreneuring: It means that the employees' diversifications inside the firm may lead to entrepreneurial acts. In other words, not all employees must have CE skills to flourish where some of these skills could be acquired or be learned. Finally: Industry Rule Curvature: It is establishing ideal shifts inside an industry which mean that any firm could innovate certain product, it would have the first step status and win the market share.

3. LITERATURE REVIEWS AND EMPIRICAL STUDIES ON HOW CORPORATE ENTREPRENEURSHIP AND ITS DIMENSIONS WOULD IMPROVE ORGANIZATIONS' FINANCIAL PERFORMANCE

In order to understand how CE influence the OFP, the last would be defined firstly. According to [1] the OFP is referred to the ability of a firm to generate new resources from daily operations during a given period. Furthermore, the OFP could be measured by several factors for example but not limited to: return on income (ROI), return on equity (ROE), return on asset (ROA), economic value added (EVA), market value added (MVA), and so forth.

Nevertheless, [36] did research where he questioned Chief Executive Officers (CEOs) together with collecting secondary financial data of 450 firms listed on the Fortune 500 list of U.S. industrial companies, which the result presents that 83.3% of the correlation between CE and OFP is significantly positive. Furthermore, [35] investigated the relationship between CE and OFP under the light of firm's external environment. The author divided the environmental setting into four factors which they are: expansion dynamism, hospitable, static and impoverished, and a well-driven expansion which the regression's result proved that there is a significant and positive relationship between the CE and OFP under the light of using the respective environmental clusters.

Moreover, [37] collected data from three different samples during seven years to examine the longitudinal impact of CE on OFP. The three samples were 39 chemical firms, 24 medium-sized manufacturing companies which they represent 14 industry segments, and 45 Fortune 500 industrial companies representing five industry segments. After doing the regression analysis, they find that the CE has a significant and positive relationship with OFP

where the result is humble during the first few years, while it starts to increase during the time.

Going deeply, [8] used the CE dimensions such as organizational structure and entrepreneurial style to investigate their impact on OFP. They questionnaired 507 executive seniors which they were working in non-diversified, single-industry, and the subsidiary firms where they are located in the U.S., and they represent 40 different industries. The discovered result shows that there is a significant and positive impact of entrepreneurial top management style on the OFP of mechanistically structured companies.

From another angle, [16] examined a CE model with a three-factor key to investigate the relationship of financial results against OFP involving nonfinancial firms where they listed in the industrial sector of Johannesburg Stock Exchange. The study indexed that the CE has a positive and significant influence on the OFP where the last was measured by profitability and growth proxies namely: return on assets, total asset growth, share return and return on average equity.

Additionally, [5] mentioned that several CE dimensions are strong moderators in supporting organizational performance in which their study proves that only two CE dimensions namely: new firm formation together with product/service, and process innovation are significant and positively correlated with the OFP where the last is measured by the company's growth and profitability. Moving to another part of the world, [34] examined three CE dimensions which they are proactiveness, risk-taking, and innovation in small and medium-sized manufacturing and exporting enterprises (SMEs) in one of the most prominent industrial regions of such an emerging market, namely Turkey. They find a significant and positive relationship between these CE dimensions and the OFP.

Also, [21] used some of the human resource management (HRM) practices to moderate the relationship between CE and OFP where he surveyed 124 companies which they are operating in different industries in Turkey. The result of this study presents that, with or without using the HRM practices, the relationship between CE and OFP was positively correlated. Moreover, the author finds that an additional 9% of the variance was explained by using these HRM practices in mediating the relationship between CE and OFP.

Adding more weights, [9] investigated the influence of CE dimensions such as innovation, proactiveness, risk-taking, and organizational renewal on OFP with a group of companies that are publicly traded in Istanbul Stock Exchange (ISE). The findings indicate that only organizational renewal is positively correlated with firm's profitability as a proxy of OFP. Nevertheless, the other three dimensions have neutral effects on OFP.

More or less, [1] inspected the impact of CE dimensions on OFP of 312 companies where the respondents number reached 2,032 from these 312 firms, which the authors used the following variables in measuring that influence: the return on equity (ROE), return on investment (ROI), and sales expansion based on market measurements such as economic and market values added. They deduce that there is a significant and positive relationship between CE dimensions and OFP. Moving to another region, [4] investigated the relationship between CE and OFP for both countries: Slovenia and Romania. They find for Slovenian firms' that the correlation between CE and growth which it is used as a performance proxy is 86%; while the correlation between CE and profitability which it is also used as a performance proxy is only 71%.

[23] investigated the CE dimensions of senior managers in random 400 auto-parts manufacturing firms where they had been chosen from Thailand Automotive Industry sector for the years of 2006 and 2007. In other words, that study examines the relationship between CE and OFP where the last one proxies were growth and profitability; which the study used

twenty-three items of CE Likert-type scale which they consist of three proactiveness items, eleven self-renewal items, four venturing items, five innovativeness items; together with four financial performance items.

They find that CE has a significant and positive impact on OFP in which the innovativeness proved that it has the sturdiest influence on the outstanding OFP where this result is consistent with the published results by [36] and [2]. Furthermore, they also find that the self-renewal and firm support is correlated in a positive and significant manner too with OFP; While the other CE dimensions such as proactiveness and new business ventures are negatively correlated with OFP.

On the other hand, [22] investigated the influence of CE on OFP of large Croatian firms. They questioned executive managers in 150 large firms, only 35 respondents were returned their responses which it created a research generality problem. Moreover, their paper showed that only one dimension of CE namely innovativeness is positively correlated with the large Croatian firms' performances which this attributed to the trial of Croatian firms to innovate.

Nevertheless, [12] surveyed 347 companies in Turkey for the purpose of examining the relationship between CE dimensions and OFP. They find that innovation is the most effective dimension of CE that influencing OFP with a highly positive significant correlation. Furthermore, all other CE dimensions are still positively correlated with OFP but not as much as the innovational dimension.

Adding more weights, [26] investigated the relationship between CE dimensions and OFP in the list of Istanbul Chamber of Industry (ICI) with estimated 12,000 members by doing face to face interviews, mailing and telephoning surveys to reach the maximum participation. He finds that the most effective CE dimension is a new business venturing where the last has a significant and positive influence on OFP followed by self-renewal and innovativeness dimensions; while proactiveness did not show any impact of OFP.

Over and above, [31] investigated the relationship between CE dimensions namely proactiveness, risk-taking, innovativeness, and self-renewal on one side; and OFP of Malaysian state government-linked companies (GLCs): namely Johor state and Jcorp Group on the other side; which there were three moderating variables namely: resources availability, supportive organizational structure, and rewards. They found a significant and positive relationship between proactiveness and OFP under the light of only two moderating variables which they are supportive organizational structure and availability of resources. However, they also found that the risk-taking did not have any direct effect on the OFP; while, after interfering of the three moderators, the risk-taking is correlated in a positive and significant manner with the OFP. Going deeply, they found that with and without intervening these three moderating variables, self-renewal and innovativeness have pertained negatively and insignificant to OFP.

Additionally, [19] tested two CE models in empirical research with 140 manufacturing companies which are publicly trading in Istanbul Stock Exchange (ISE) to explain the interaction between CE and OFP. The study proved that the traditional CE dimensions such as risk-taking, innovativeness, and proactiveness are positively correlated with OFP; while other CE dimensions such as autonomy and competitive aggressiveness did not present any relationship with OFP.

From another angle, [6] examine the long-term influence of CE dimensions namely: risk-taking, pro-activeness, and innovativeness on OFP proxies such as return on capital employed, turnover growth, and operating profitability. Furthermore, the authors surveyed 98 companies which they have more than 400 (FTE) in Dutch-based companies from several

sectors in Netherlands Stock Exchange to measure the impact of CE intensity on OFP during the years of 2000 - 2013.

Moreover, they also used annual industry data together with firm-specific survey data to see how the moderators would affect the economic conditions, market environment, and the retrospect of multiple CE intensity. The results illustrate that for the first four years, there is a positive relationship between CE dimensions and OFP proxies in which this result pillar that CE has a long-term influence on OFP. Going deeply, in term of either sharp economic recession or sharp growth, the effect of CE on OFP would be high in which this relationship is considered as a highly dependent on such market situations.

Also, [20] conduct a research for the purpose of investigating the relationship between CE dimensions namely: industry experiment, risk-taking, proactivity, and innovation, and OFP utilizing of 70 SMEs of Turkish Machinery and Equipments Manufacturing Industry in which the findings show that these CE dimensions are positively influenced these SMEs performances in the respected sector.

Last but not least, [25] tests the relationship of CE dimensions such as autonomy, competitive aggressiveness, pro-activeness, risk-taking, and innovation and OFP of 44 commercial banks in Kenya through using closed-ended questionnaires. In other words, the author tries to answer the following questions: What are the influences of risk-taking and innovation on commercial banks' financial performances in Kenya? And Which of these three dimensions namely: autonomy, competitive aggressiveness, and pro-activeness has a greater effect on commercial banks' financial performances in Kenya?.

The results present that there is a positive and significant relationship between all of CE dimensions and commercial banks financial performance. From another angle, between the emphasized three dimensions, the competitive aggressiveness had the highest effect on commercial banks financial performances followed by autonomy and pro-activeness respectively.

4. WHY IS CORPORATE ENTREPRENEURSHIP QUITE IMPORTANT?

There are several reasons that clarify the importance of CE in which [13] mentioned the most important ones. Firstly, Growth reason: under the light of the economic recession and whenever most firms could not invest in future projects and just sit down on their cash piles due to the fear of loss; the CE knows exactly how to grow through creating the required infrastructure and mindset of entrepreneur which pillar that transformational growth framework. Secondly, Innovation reason: CE and Innovation are entwined and tied to each other in which the company required to be innovative in a continuous manner to get a sustainability feature of its innovation where the appropriate environments, the efficient employees, and the correct processes are needed to have a successful CE; taking into consideration that the failure ratios would swing from 50% to 90% which means either a destructive successfulness or a massive destruction and loss.

Thirdly, Leadership reason: it the most popular forecaster of successful innovation where most of the Organizations' CEOs are in the driving seat and have the needed capabilities and the desired skills which make them eligible to think, build, and act differently in which they have various aspirations and motivations, and they could work under different environments for achieving their growth agenda. Fourthly, Change reason: this element is highly correlated with the right leadership in which the organizations' majority are reluctant to change their cultures together with risk aversion where that, in turn, would impede organizations' ability to grow further. Moreover, CE enables firms to create new tracks

through becoming more challenging together with spreading up the culture of change all over their departments and branches to accelerate and managing that change taking into consideration that the average change failure rate swings from 60% to 70%.

Finally, Engagement reason: in the US, the forecasted productivity loss due to disengaged employees within their organizations exceeded \$450 billion wherein only 30% of American employees were engaged in their workplaces. Going deeply, this loss in productivity leads to either depreciate the growth or stop it at all; while CE supply a solid platform for employees and allowing them to be committed to their works in a meaningful and challenging manner. Furthermore, intrapreneurs who do CE within their organizations inspire other employees and companies to follow their steps and try to innovate, and as a consequence of that, the organizations would achieve an astonishing growth not only financially but also operationally where all of that would lastly lead to having a survival and sustainable strategy over the rivals.

5. HOW TO CREATE A SUCCESSFUL CORPORATE ENTREPRENEURSHIP TRAINING PROGRAM TO BE AS AN APPLIED AND GENERALIZED MODEL FOR OTHER ORGANIZATIONS?

Firstly, the organization should do an investigative analysis of its culture to know whether it has an entrepreneurial orientation or not where this investigation should be done by specialist and consultants to prove its validity. Secondly, managers have to consider their targeted employees as entrepreneurs by dealing, paying, and rewarding them as real entrepreneurs even though that the money is not a major element to motivate them, but they would expect a fair compensation regarding their efforts and values in which as a return they would work and align in the best interest of firm's stakeholders [10].

Then, the firm goals, objectives, and responsibilities must be clearly written and be aligned with the CE target and vision to match the primary goal of CE [18]. Thus, at this stage, the most prominent obstacle to the CE is bureaucracy, so there should be a special decentralization for certain procedures that accelerate the CE process to be released [17]. Going back to the employees, the corporate entrepreneurs should have sufficient self-motivation to accomplish the committed objectives [5]; where the continuous training for all employees inside the firm would increase their creativities [17]. So, spreading the concept of training by generalizing it to all departments within the organization wherein each department should have its own type of innovation, common innovation with other departments, or even both of them [32].

Additionally, the organization should be a highly flexible by keeping up the learning process within the entrepreneurship especially that there is a proved positive relationship between entrepreneurship and learning process [24]; meanwhile the higher level of management such as senior managers should take care and train the ambitious entrepreneurs to improve a valid innovative idea which it would be easy for them to implement it in the future [11]. Finally, not only theoretical training is required, but also a practical one is crucial and necessary for the employees to make sure that they would get diversifications in learning methodologies [27].

6. CONCLUSION

As seen that the CE sits on the throne and lies on the heart of organizational characters such as innovation, growth, leadership, cultural change, and employees engagement; together with taking into consideration the current market orientation in which most of the mentioned studies have a consensus on the positive and significant relationship between CE dimensions and OFP proxies. In other words, under economic recession, growth, or stabilized one, the more innovative and effective CE within the organization, the OFP would be improved. Moreover, innovative activities could increase a country's gross domestic product (GDP) by remarkable proportions not only in developed countries such as the US but also in developing ones such as, Netherlands, Malaysia, and Turkey in which the SMEs innovative activities in these developing countries participate in their respective GDPs by approximate percentages between 40% to 60%; meanwhile this great ratio would be considered as a huge contribution to their economies and as a consequence it would lead to a rapid economic growth.

Going deeply, this paper present how to create a successful CE training program to be as an applied and generalized model for other organizations throughout doing an investigative analysis to determine the organizational orientation, then aligning the objectives and targets of their respected innovation within the organization and stakeholders ones. Moreover, the appropriate leaders should activate the rewarding system to the employees for the purpose of encouraging their innovative and entrepreneurial skills together with making specialized theoretical and practical training programs and courses for refining the skills of their articulate employees especially that there is a positive and significant relationship between improving entrepreneurship and learning process.

Future studies could be conducted to find out how these CE dimensions would affect the organizations' operational performance taking into consideration not only the mentioned internal organizational characteristics but also the external ones such as the suitable organizational environment which it is related to market policies and barriers, taxes, cost of raw material, product manufacturing and supplying cost and so forth. Last but not least, not only employees and entrepreneurs should think creatively, but also all the people need to think creatively too because the opportunity does not wait for them to be picked up; where first come would be first served.

REFERENCES

1. Aktan, B., & Bulut, C., Financial performance impacts of corporate entrepreneurship in emerging markets: A case of Turkey. *European Journal of Economics, Finance and Administrative Sciences*, 12(8), (2008), 1530-2275.
2. Antoncic, B., & Hisrich, R. D., Corporate entrepreneurship contingencies and organizational wealth creation. *Journal of management development*, 23(6), (2004), 518-550.
3. Antoncic, B., & Hisrich, R. D., Privatization, corporate entrepreneurship, and performance: Testing a normative model. *Journal of developmental entrepreneurship*, 8(3), (2003), 197.
4. Antoncic, B., & Scarlat, C., Corporate Entrepreneurship Performance&58; Slovenia and Romania &61; Notranje podjetništvo in poslovni rezultati&58; Slovenija in Romunija. *Management*, 3(1), (2008), 15-38.

5. Antoncic, B., & Zorn, O., The mediating role of corporate entrepreneurship in the organizational support-performance relationship: An empirical examination. *Managing Global Transitions*, 2(1), (2004), 5.
6. Bruining, H., & Saly, A. W., Longer Term Financial Performance And Corporate Entrepreneurship (Interactive Paper). *Frontiers Of Entrepreneurship Research*, 34(16), (2014), 17.
7. Burgelman, R. A., A process model of internal corporate venturing in the diversified major firm. *Administrative science quarterly*, (1983), 223-244.
8. Covin, J. G., & Slevin, D. P., The influence of organization structure on the utility of an entrepreneurial top management style. *Journal of management studies*, 25(3), (1988), 217-234.
9. Danişman, A., & Erkocaoğlan, E., Corporate entrepreneurship and firm performance: a research study on İstanbul stock exchange firms. *İktisat İşletme ve Finans*, 22(260), (2007), 80-101. , 22(260), 80-101. In Turkish: (Kurumsal girişimcilik ve firma performansı: İMKB’de işlem gören firmalar üzerinde bir araştırma. *İktisat İşletme ve Finans*, 22(260), (2007), 80-101).
10. Dess, G. G., & Lumpkin, G. T., The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship. *The Academy of Management Executive*, 19(1), (2005), 147-156.
11. Echols, A. E., & Neck, C. P., The impact of behaviors and structure on corporate entrepreneurial success. *Journal of managerial psychology*, 13(1/2), (1998), 38-46.
12. Fis, A. M., & Cetindamar, D., The missing link between firm-level entrepreneurship and performance. In 9th International Entrepreneurship Forum, Istanbul, (2009), 1-12.
13. Foley, S., Five Reasons Why Intrapreneurship is Important (2013). Retrieved April 11, 2018, from Corporate Entrepreneurs: <https://corporate-entrepreneurs.com/2013/11/08/5-reasons-why-intrapreneurship-is-important/>
14. Kellermanns, F. W., & Eddleston, K. A., Corporate entrepreneurship in family firms: A family perspective. *Entrepreneurship theory and practice*, 30(6), (2006), 809-830.
15. Gaw, A., & Liu, S., Corporate Entrepreneurship: Beyond 2 guys in a garage (2004). Retrieved May 23, 2016, from University of Southern California: http://www.marshall.usc.edu/media/pressroom/pdf_short/STRAT_CorpEntrepreneurp
16. Goosen, C. J., De Coning, T. J., & Smit, E. D. M., Corporate entrepreneurship and financial performance: The role of management. *South African Journal of Business Management*, 33(4), (2002), 21-27.
17. Duane Ireland, R., Kuratko, D. F., & Morris, M. H., A health audit for corporate entrepreneurship: innovation at all levels: part I. *Journal of business strategy*, 27(1), (2006), 10-17.
18. Johnson, D., What is innovation and entrepreneurship? Lessons for larger organizations. *Industrial and commercial training*, 33(4), (2001), 135-140.
19. Karacaoglu, K., Bayrakdaroglu, A., & San, F. B., The impact of corporate entrepreneurship on firms’ financial performance: Evidence from Istanbul stock exchange firms. *International Business Research*, 6(1), (2012), 163.

20. Kaya, N., Corporate entrepreneurship, generic competitive strategies, and firm performance in small and medium-sized enterprises. *Procedia-Social and Behavioral Sciences*, 207, (2015), 662-668.
21. Kaya, N., The impact of human resource management practices and corporate entrepreneurship on firm performance: evidence from Turkish firms. *The International Journal of Human Resource Management*, 17(12), (2006), 2074-2090.
22. Kolaković, M., Sisek, B., & Milovanović, B. M., Influence of corporate entrepreneurship on the performance of Croatian large companies. In *Business & Economics Society International Conference*, (July 15-19, 2008), Lugano, Switzerland.
23. Lekmat, L., & Selvarajah, C., Corporate entrepreneurship and firm performance: an empirical study in auto parts manufacturing firms in Thailand. In *Proceedings of The 2nd International Colloquium on Business and Management (ICBM 2008) in conjunction with the International Conference on Business and Management Education (ICBME 2008)*, Bangkok, Thailand 17-20.
24. McFadzean, E., O'Loughlin, A., & Shaw, E., Corporate entrepreneurship and innovation part 1: the missing link. *European journal of innovation management*, 8(3), (2005), 350-372.
25. Njoroge, G. S., The impact of Corporate Entrepreneurship on financial performance of firms: evidence from Kenya's banking industry, Doctoral dissertation, United States International University-Africa, (2016).
26. Özdemirci, A., Corporate entrepreneurship and strategy process: A performance based research on Istanbul market. *Procedia-Social and Behavioral Sciences*, 24, (2011), 611-626.
27. Rae, D., Entrepreneurial learning: a narrative-based conceptual model', *Zeitschrift für KMU & Entrepreneurship*, Universität St Gallen, Schweiz, (2006).
28. Reynolds, P. D., Hay, M., & Camp, S. M., *Global entrepreneurship monitor*, (1999).
29. Schumpeter, J. A., *The Theory Of Economic Development*. Watertown, Harvard University Press, Massachusetts, 1934.
30. Scott, M. G., Rosa, P., & Klandt, H. (Eds.), *Educating entrepreneurs for wealth creation*. Avebury, 1998.
31. Shamsuddin, S., Othman, J., Shahadan, M. A., & Zakaria, Z., The dimensions of corporate entrepreneurship and the performance of established organization. *ACRN Journal of entrepreneurship perspectives*, 1(2), (2012), 111-131.
32. Thornberry, N., Corporate entrepreneurship: antidote or oxymoron?. *European Management Journal*, 19(5), (2001), 526-533.
33. Timmons, J. A., Spinelli, S., & Tan, Y., *New venture creation: Entrepreneurship for the 21st century (Vol. 4)*, IL: Irwin, Burr Ridge, 1994.
34. YILMAZ, C., BULUT, Ç., ERGÜN, E., & ALPKAN, L., Effects of Corporate Entrepreneurship on Firm Performance (Şirket Girişimciliğinin Şirket Performansına Etkileri). *Dogus University Journal*, 6(2), (2005), 175-189.
35. Zahra, S. A., Environment, corporate entrepreneurship, and financial performance: A taxonomic approach. *Journal of business venturing*, 8(4), (1993), 319-340.

36. Zahra, S. A., Predictors and financial outcomes of corporate entrepreneurship: An exploratory study. *Journal of business venturing*, 6(4), (1991), 259-285.
37. Zahra, S. A., & Covin, J. G., Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of business venturing*, 10(1), (1995), 43-58.



MULTI-CRITERIA ANALYSIS OF THE ENVIRONMENT DESTRUCTION BY THE OPEN PITS

Dejan Bogdanović, Ivan Jovanović, Nenad Milijić

Univerzitet u Beogradu, Tehnički fakultet u Boru, Odsek za menadžment, Serbia

Abstract: Opening, development and exploitation of useful mineral resources on open pits create environmental pollution. This is manifested in several ways - by blocking land, degradation of land and other forms of pollution (dust, gases, mineral waters and noise, which affect the pollution of air, water, land, plants and human health). Consequently, a multi-criteria analysis was carried out aiming to rank all types of environmental pollution in order to identify the most difficult types of pollution. PROMETHEE method was used for ranking.

Keywords: Open Pit, Environment, Multi-criteria Analysis

1. INTRODUCTION

Surface exploitation of mineral raw materials seriously affects the environment. The most important effects are related to the relief, the regime of underground and surface waters and microclimate, occurrence of dust and gases from the mining equipment, etc. These pollutants are released from the open pit to the environment by the influence of natural air currents and the atmosphere is polluted. Dust pollutes the soil, water and plants in the wider area around the open pit [1].

The best way to assess the quality of the environment in the open pit mine and its surroundings is using the data obtained by measuring the concentration of harmful substances (dust and gases) in open pit area [2].

The previous researches in this field investigated separately each individual type of pollution, without taking into account integration of the all types of pollution and without determining which one is dominant. Accordingly, in this paper comparison of all or most important types of pollution has been done in order to rank them and to determine the most harmful types of pollution. The importance of ranking is to provide better overview to managers in order to determine the priorities and, accordingly, to properly direct the appropriate measures to suppress or reduce the most serious forms of environmental pollution around the surface mine.

The PROMETHEE method is used for ranking the different types of pollution on the environment.

2. TYPES OF ENVIRONMENTAL DESTRUCTION BY OPEN PIT

There are many types of environmental destruction by open pit. The most important types of destruction and pollutions are, as follows:

- land blocking (alternative A1),
- land degradation (alternative A2), and
- pollution of air, water, soil and plants (alternative A3).

The blocked land is the area around the open pit where are concentrated the contaminants created by the mining technological procedures in the open pit. This area where the land is blocked is called the zone of increased influence. On the blocked land the surface is not changed, but it is prohibited the human habitation and agricultural production, and plants from this area are not recommended for animal and human consumption. The land in this zone is bought by the open pit.

Degraded land represents the area where are performed the mining operations. In this area the land surface loses its original appearance as a result of mining operations. Previous forests, orchards and arable land are destroyed and the new surfaces are created without the ability to restore its previous eco-system. The funnel or crater is formed at the location of mine. On the other side, the additional land is degraded by the overburden (tailings) that cover the original land and artificial hills are formed.

Mining operations create pollution such as dust, gases, mineral waters and noise, which affect the pollution of air, water, land, plants and humans. Due to this types of pollutions, the mine pays compensation to the owners of the land for the resulting damage in the amount of income that would be realized on that land, but the land is not redeemed in these zones by the mine – zone of significant influence (monitoring zone), zone of moderate influence and zone of possible impact.

In order to identify the most harmful pollution types that cause environment destruction, the ranking of the above mentioned most serious types of environmental pollution has been performed. Ranking was performed by the PROMETHEE method. In addition, the Decision Lab software was used for the calculation.

3. THE CRITERIA FOR ENVIRONMENTAL DESTRUCTION RANKING

The criteria include the most important parameters for open pit environment destruction ranking, such as:

Size of destruction (criteria C1) is a very important factor that has a great influence on ranking process. This criterion indicates the total damage that was caused by the open pit. The weight coefficient of this criteria is estimated to 0,25.

The degree of threat to employees (criteria C2) is also a very important factor that significantly affects the ranking of environment destruction. It points to the danger to the health and lives of employees at the open pit, depending on the type of pollution. The weight coefficient of this criteria is estimated to 0,25, too.

Impact on a wider environment (criteria C3) is a criterion that takes into account the harmful effects of the mining operations on wider environment that include nearby settlements, woods, crops, waters, etc. The weight coefficient of this criteria is 0,20.

The possibility of recultivation and restore the land to its original state (criteria C4) is a criteria that takes into account the rehabilitation of the devastated areas by the open

pit. This include the recultivation of the open pit area and other necessary measurements in order to minimize the destruction. The weight coefficient of this criteria is 0,20.

The possibility to prevent destruction (criteria C5) is a criteria that includes all the measures, along with their costs in order to prevent or minimize the harmful effects of the mining operations in open pit. The weight coefficient of this criteria is estimated to 0,10.

4. PROMETHEE METHOD

PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) is an multicriteria decision method for a finite set of [3]. This method is based on the choice of an appropriate preference function and the weighting given to each criteria. There are six preference functions represented by specific shapes in the PROMETHEE method.

The PROMETHEE method calculate the positive flow (Φ^+) and negative flow (Φ^-) for each alternative according to the given criteria weight. The positive flow expresses how much each alternative is outranking all the others. The higher the positive flow ($\Phi^+ \rightarrow 1$), the better the alternative. The negative outranking flow expresses how much each alternative is outranked by all the others. The smaller the negative flow ($\Phi^- \rightarrow 0$), the better the alternative. The balance between the positive and negative outranking flows is base for PROMETHEE II complete ranking. The higher the result, the better the alternative [4]. The procedure of the PROMETHHE method is presented below:

Step 1. Establishment of an impact matrix/double entry table. An impact matrix for the selected criteria ($j=1\dots n$) and alternatives ($i=1\dots m$) can be established by using cardinal (quantitative) and ordinal (qualitative) data.

Step 2. Application of the preference function $P(a,b)$. For each criteria, the selected preference function $P(a,b)$ is applied to decide how much the outcome a is preferred to b.

Step 3. Calculation of an overall or global preference index $\Pi(a,b)$ that represents the intensity of preference of a over b.

Step 4. Calculation of outranking flows for each alternative $a \in A$.

PROMETHEE I provides a partial ranking of the alternatives, while PROMETHEE II provides a complete ranking of the alternatives.

5. RANKING THE ENVIRONMENTAL DESTRUCTION

After defining alternatives and the criteria, they are being scored and ranked by PROMETHEE method. In addition, the Decision Lab software was used for calaculations.

In this process, all criteria have a qualitative structure. The qualitative evaluation has been done by a 5-point scale – Table 1. The worst category is very poor (numerical value 1), and the best category is very high (numerical value 5).

Table 1. Qualitative scale

Qualitative value	Very poor	Poor	Average	High	Very high
Numerical value	1	2	3	4	5

The evaluations of the alternatives is done by the evaluation matrix – Table 2.

Table 2. Evaluating matrix

Criteria	C ₁	C ₂	C ₃	C ₄	C ₅
Max/min	max	max	max	max	max
Coef. weight	0.25	0.25	0.20	0.20	0.10
Preference function	Level	Level	Level	Level	Level
A ₁	5	1	3	1	5
A ₂	3	4	1	4	2
A ₃	4	5	5	2	3

Based on the evaluation matrix, the alternatives are evaluated by the Decision Lab software. Table 3 shows the positive flow (ϕ^+), negative flow (ϕ^-) and net flow (ϕ) values.

Table 3. The positive flow (ϕ^+), negative flow (ϕ^-) and net flow (ϕ) values

	Φ^+	Φ^-	Φ
Alternative A1	0.1875	0.4000	-0.2125
Alternative A2	0.2750	0.2625	0.0125
Alternative A3	0.2750	0.0750	0.2000

The final ranking is determined via PROMETHEE II (Fig. 1) on the basis of the flow values in Table 3.

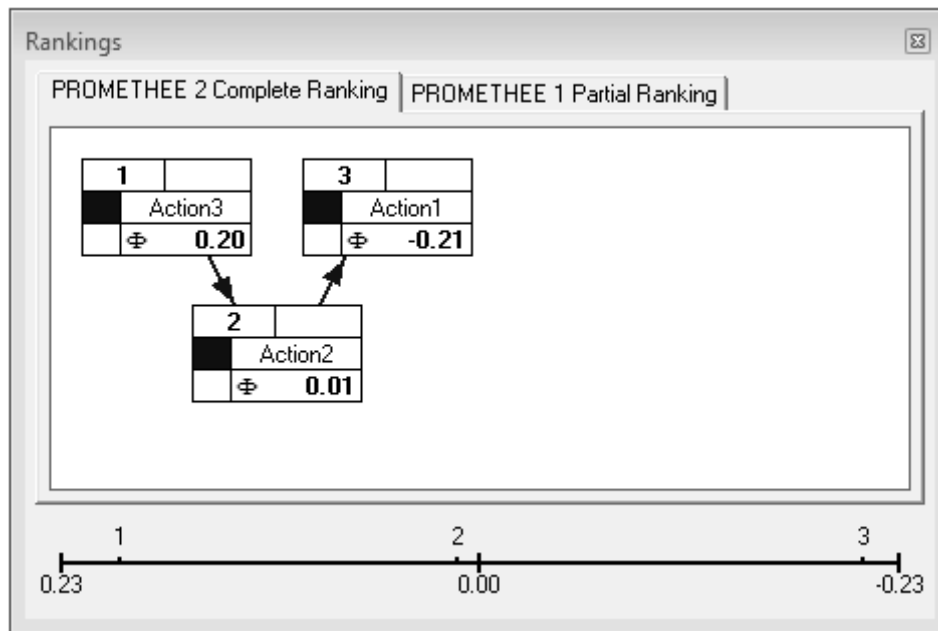


Figure 1. PROMETHEE II complete ranking of alternatives

The best alternative is identified by PROMETHEE II complete ranking (Fig. 1). Alternative A₃ (pollution of air, water, soil and plants) is selected as the most harmful alternative, and the other alternatives are ranked in the order of A₂ (land degradation), and A₁ (land blocking).

6. THE ANALYSIS OF THE RESULTS

In the analysis of the final rank of alternatives it is started from the most devastating alternative. This is alternative A3 (pollution of air, water, soil and plants). These are the worst forms of environment destruction that affect the wide area around the open pit. Most of these pollutions are permanent (for example underground water pollution) and need a lot of efforts to minimize their influence on the environment.

The second place in the ranking process is alternative A2 (land degradation). This is the destruction that usually cause less environmental damage, but the damage is permanent. The terrain is changed and the dent is formed. The only thing that can be done is to carry out the recultivation of the open pit and monitoring.

On the third (last) place is alternative A1 (land blocking). This land is contaminated by open pit pollutants, but it can be faster and easier recovered with less investments.

7. CONCLUSION

In this paper is applied multicriteria method for ranking of environment destruction by open pit. The mine operations on the open pit largery affects on environment. It is analyzed the three types of environment destruction – land blocking (alternative A1), land degradation (alternative 2) and the pollution of air, water, soil and plants (alternative A3). It is also discussed five criteria for ranking – size of destruction (criteria C1), the degree of threat to employees (criteria C2), impact on a wider environment (criteria C3), the possibility of recultivation and restore the land to its original state (criteria C4) and the possibility to prevent destruction (criteria C5).

Ranking of accidents in underground production systems is carried out by the PROMETHEE method of multicriteria decision making.

Based on the obtained results by PROMETHEE method, it is identified the most dangerous and difficult environment destruction by the open pit, which are alternative A3 (pollution of air, water, soil and plants). The most influential criteria for ranking the environment destruction are the criteria C1 (size of destruction) and C2 (the degree of threat to employees).

ACKNOWLEDGEMENTS

Research funded by Serbian Ministry of Education and Technological Development as part of the project No.: TR-34023.

The authors also feel indebted to the company Visual Decision Inc. Montreal, Canada, for providing the software package Decision Lab 2000 free of charge.

REFERENCES

1. Jovičić V. et al., Sigurnost i tehnička zaštita u rudarstvu, Tuzla, Jugoslavija, 1987.
2. Miljković M., Stojković Z., Uticaj površinske eksploatacije ruda metala na ekološke faktore životne okoline, Monografija, Tehnički fakultet u Boru, Bor, Srbija, 1998.

3. Brans J.P., Mareschal B., Vincke P.H., PROMETHEE: A new family of outranking methods in multi-criteria analysis. Operational Research. North-Holland, Amsterdam, 1984.
4. Anand G., Kodali R., Journal of Modelling in Management 3 (1), (2008), 40-70.



ENTREPRENEURIAL INTENTIONS OF STUDENTS IN RELATION TO FAMILY BUSINESS EXPERIENCE: EVIDENCE FROM MACEDONIA AND SLOVENIA

Emilija Egger¹, Makedonka Dimitrova², Ana Tomovska Misoska³

¹University American College, Skopje, Doctoral studies in Business Administration (DBA);

²UAKS Institute for Entrepreneurship and Leadership Development; ³University American College Skopje, Associate Professor, School of Business Economics and Management, Macedonia

Abstract: Entrepreneurship as one of the most powerful economic tools in the modern society, it is primarily associated with small and medium companies, which today, practically in every modern country have important position, often dominant in the development of the economy and society, given the fact that these companies are the backbone of one country's economy. The future practically depends on the future entrepreneurial activities. Students particularly, represent the entrepreneurial activities of tomorrow and widening the knowledge on what drives the young population to pursue entrepreneurial career, is of great importance. A number of authors emphasized that becoming an entrepreneur is an intentional and planned behavior and, as such, intentions are best predictors of behavior, not attitudes, beliefs, personality or demographics, but however, the majority of prior research suggests that individuals with entrepreneurial role models display a stronger entrepreneurial intention and, hence, have a higher likelihood of pursuing an entrepreneurial career. Even though, the relationship between past (positive or negative) exposure and future intention it is very complex and unclear, this paper adds knowledge on the matter by taking two South East European Countries as a research sample. For the purpose of this paper, secondary data are used from the literature, mainly from the GUESS Project past and present publications. The research is based on GUESSS (Global University Entrepreneurial Spirit Student Survey) that analyzes the level of entrepreneurial intentions among students from 2 selected countries in Southeast Europe. The expected results should uncover what type of environmental forces, behavior and motivation lead to entrepreneurial intentions among student population and also explains in detail the relationship of the positive/negative family business experience with the entrepreneurship behavior of the students in Macedonia and Slovenia.

Keywords: entrepreneurship, drivers, students, business, family, Macedonia, Slovenia

1. INTRODUCTION

According to Dimitrova et al. (2014) entrepreneurship is primarily associated with small and medium companies, which today, practically in every modern country have important position, often dominant in the development of economy and society, given the fact that small and medium companies are the backbone of one country's economy. The interest

among experts in this field stems from the entrepreneurial creativity, innovation and the risk taking initiatives that are basically changing the world (Fiti et al., 2007). Entrepreneurship as a phenomenon has been a research topic for many years, but as any phenomenon, it constantly changes and requires deeper exploring, especially in fast developing economic and business environment (Greblikaite and Daugeliene, 2009). It should be noted that reaching consensus among scholars for creating widely accepted definition of this phenomenon, has not been reached yet. In the business literature, numerous definitions can be identified. One of them is proposed by Hisrich et al. (2008) which describes the entrepreneur as a person who acts in hazardous circumstances, or in other words, a person who buys products at known price, to sell them at unknown price in the future. Shuklev and Ramadani (2012) proposed more structured definition explaining that entrepreneur is an individual who makes allocation of resources from less productive areas in areas of high productivity. Given these points of view, it can be concluded that entrepreneurship is the process of seeking innovative opportunities in uncertain and risky circumstances, combining effectively and efficiently the factors of production in order to achieve profitability and business growth.

2. LITERATURE REVIEW

2.1 SUCCESSION INTENTIONS

To understand entrepreneurial behaviour, researchers have been particularly interested in the processes and factors that are initiating the creation of entrepreneurial ventures. A specific stream of research explored the cognitive aspects of entrepreneurship and various factors connected to starting a business. One aspect is related to prior entrepreneurial exposure, defined as individuals' experiences in the course of their lives leading to knowledge accumulation regarding an entrepreneurial career (Venkataraman, 1997) and influencing individuals' succession intention. Individuals gain prior entrepreneurial exposure through entrepreneurial role models such as parents or relatives/friends who previously started a business or direct entrepreneurial experiences such as work experience in a small/newly founded firm or prior founding experience (Krueger, 1993). The majority of prior research suggests that individuals with entrepreneurial role models display a stronger succession intention and, hence, have a higher likelihood of pursuing an entrepreneurial career (Tomovska-Misoska et al., 2015; Crant, 1996; Matthews and Moser, 1995). In contrast, other studies find no such influence (Brenner et al., 1991; Tkachev and Kolvereid, 1999). Furthermore, several studies found that direct entrepreneurial experiences positively influence individuals' entrepreneurial and succession intention (Autio et al., 2001; Goethner et al., 2012), while others (Linan & Chen, 2009; Matthews & Moser, 1995) find no such influence. This leads to the conclusion that relationship between prior entrepreneurial exposure and entrepreneurial succession intention is apparently complex and far from being resolved, so further research is welcomed.

There are few studies that suggest positive relation between family support and entrepreneurial intention and that family ecosystems with business background motivate other family members to join the companies in the case of students show intention for building their own ventures (Ilesanmibenga, 2017; Van Auken et al., 2006).

2.1.1 Intention Models

Authors define entrepreneurial intention from different points of view (e.g. personal motivation, attitude, marriage, social situation). In order to enhance the understanding of entrepreneurial intentions most authors use three models (Jagodic, 2016) but we will focus only of the concept of entrepreneurial intentions based on the Theory of Planned Behaviour (TPB). According to the TPB (Ajzen, 1991; 2012), intentions capture the motivational aspect of behaviour and are dependent on three different beliefs: beliefs about the likely consequences of the behaviour (behavioural beliefs), beliefs about the normative expectations of other people (normative beliefs) and beliefs about presence of factors that might hinder behaviour (control beliefs) (Ajzen, 2002). These beliefs are resulting in perceived behavioural control which means the extent to which people think that they will be successful in performing certain behaviour if they want to do so and this is closely related to self-efficacy and also perceived as controllability of the behaviour (Ajzen, 2002; 2012). The normative beliefs are resulting in subjective norm which translates to the perceived social pressure to perform a particular behaviour (Ajzen, 1991). The control beliefs are resulting in attitude towards behaviour which refers to the attractiveness of the outcomes of certain behaviour (Ajzen, 2012). This means that the entrepreneurial intentions are based on the positive or negative personal appraisal about becoming an entrepreneur (attitude towards behaviour), perceived difficulty in becoming an entrepreneur (perceived behavioural control) and perceived approval or disapproval of family, friends and significant others of the decision to become entrepreneur (subjective norm). In all of the cases, essential elements primarily relate to personal manner. Authors like Nabi et al. (2006), Wu & Wu (2008) and Guerrero et al. (2008) are connecting the entrepreneurial intention with a specific situation in which people wish to start a business as a new firm as well as within an existing organization. The study by Linãn et al. (2011) pointed out that the main factors affecting entrepreneurial intentions are personal attitude and perceived behavioural control. Sánchez (2011) gets similar research results stressing that the main factors initiating entrepreneurial intentions are personality traits, risk acceptance, and self-efficacy. On the individual level, entrepreneurial intentions effect personal beliefs, social, political, cultural and economic environment (Fishbein and Ajzen 1997).

Having the use of the intentions models as a well-accepted chapter in the literature, the researchers have shifted their attention to developing richer, more understandable models to predict the intentions responsible for starting a business. Nevertheless, these models strive to determine the factors that may indirectly stimulate entrepreneurial intentions by influencing key attitudes and/or perceptions, such as desirability and feasibility (Drennan et al. 2005). These factors basically include life situations such as family commitments (Hisrich & Brush, 1984) and most important personal background variables such as prior exposure to a family business (Autio et al., 1997; Davidsson, 1995; Krueger, 1993). One variable that had been researched the most and gained considerable attention by the scholars is prior exposure to a family business. Authors like Crant (1996), Dyer (1992), Roberts & Wainer (1968) have established that entrepreneurs often come from homes where one of the parents was self-employed. Dyer and Handler (1994) will add that the parental role models and the exposure to having their own business (being self-employed), influences further entrepreneurial beliefs and attitudes. The importance of entrepreneurial family business exposure has been imbedded into the entrepreneurial-intention models (Krueger, 1993; Shapero & Sokol, 1982) which theorized that this particular exposure to a family business indirectly influences entrepreneurial intentions through perceived desirability and feasibility. The impact of the

family business may depend on both the quantity and quality of the exposure. One example of this is Krueger's (1993) study of university business students found that the breadth of prior exposure to entrepreneurship such as parents having a business was positively related to perceived feasibility and the affirmative prior exposure was positively related to perceived desirability. On the contrary, Peterman & Kenedy (2003) in a study of secondary school students reported that positivity of experience was related to perceived desirability, but, breadth of prior experience was not related to perceived feasibility.

3. METHODOLOGY

This research paper is based on the Global University Entrepreneurial Spirit Students' Survey (GUESSS) carried out in 2016/17. This project was launched in 2003 at the Swiss Research Institute of Small Business and Entrepreneurship at the University of St. Gallen, and has been held every two years since. Building upon the Theory of Planned Behaviour (Ajzen, 1987), the survey aims at gaining an understanding on the drivers and peculiarities of students' entrepreneurial succession intentions and activities across different countries, with particular focus on students' individual characteristics, the university environment, and the roles played by family and socio-cultural context. In the last edition of the GUESSS survey, 50 countries participated, resulting in 122,000 completed questionnaires, distributed throughout 1,000 universities around the globe. For the purpose of this study, only two countries were selected for further research, Macedonia and Slovenia. Macedonia is represented with 124 completed responses from 3 universities, corresponding with 0.1 valid percent and Slovenia with 575 completed responses across 5 universities with valid percent of 0.5.

We have adopted three composite variables for the statistical analysis as already validated constructs (Maresch, 2014). These composite variables were created for the following constructs Attitude towards behaviour, Perceived behavioural control and Subjective norm.

Three items were included to capture the students Attitude towards behaviour, in particular 'being an entrepreneur implies more advantages than disadvantages to me', 'if I had the opportunity and resources, I would become an entrepreneur' and 'being an entrepreneur would entail great satisfactions for me'.

To continue, the second construct describing the Planned behaviour control captured four items from the questionnaire, as follows 'I will make every effort to start and run my own business', 'I am determined to create a business in the future', 'I have the strong intention to start a business someday' and 'my professional goal is to become an entrepreneur. And, the third construct reflecting on the Subjective norm, captured the following sets of items: '...to solve a specific problem for a group of people that I strongly identify with (e.g., friends, colleagues, club, community)', '...to play a proactive role in shaping the activities of a group of people that I strongly identify with', '...to solve a societal problem that private businesses usually fail to address (such as social injustice, environmental protection) and '...to do something that allows me to enact values which are core to who I am'. As part of this construct, another set of items was taken into consideration, in particular, 'Being a role model for other businesses resulting in '...to be able to signal my capabilities to others (i.e., future employers, colleagues)', '...to play a proactive role in changing how the world operates' and '...to advance my career in the business world'. Finally the third set of questions belonging to the last construct was reflecting on the reaction to 'your close family', 'your friends and 'your fellow students'.

To shape the research we have developed the following working hypothesis:

H₁: There is a significant relationship between the attitude to become successor in a family business and Attitude towards behavior.

H₀: There is no relationship between the attitude to become successor in a family business and Attitude towards behavior.

H₂: There is a significant relationship between the attitude to become successor in a family business and Subjective norm.

H₀: There is no relationship between the attitude to become successor in a family business and Subjective norm.

H₃: There is a significant relationship between the attitude to become successor in a family business and Planned behavioral control.

H₀: There is no relationship between the attitude to become successor in a family business and Planned behavioral control.

2.2 INTERNAL CONSISTENCY ANALYSIS

George and Mallery (2003) provided a framework of: “_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and _ < .5 – Unacceptable” Cronbach’s Alfa results (pg. 231). Table 1, shows the calculations measured for PBC with Cronbach’s Alpha result of 0.95, which is >0.8 displaying good internal consistency of the cinstructs.

Table 1. Cronbach’s Alpha- Perceived Behavioural Control (PBC)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.955	.956	4

Table 2 shows the same calculations for the Subjective Norm variable. In this section we can observe a Cronbach’s Alpha result <0.8 or 0.78, which represents acceptable internal consistency as well.

Table 2. Cronbach’s Alpha- Subjective Norm (SN)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.785	.778	8

Table 3. Cronbach's Alpha- Attitude towards Behaviour (ATB)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.901	.900	3

Table 3 represents the results from the ATB tested variable. With a Cronbach's Alpha of 0.9, there is an excellent internal consistency of the items tested. So, to conclude, we have an acceptable internal consistency of the variable to continue with the statistical analysis of the researched topic.

3. RESULTS

We further investigate the relationship between the environmental forces, behavior and motivation that lead to entrepreneurial intentions among student population and the direction of the relationship given the positive/negative previous family business experience among the students in Macedonia and Slovenia. The control variable was set to be the following 'a career as a successor is attractive for me'. The analysis was performed in the IBM SPSS statistical software using correlation matrix.

The results from Table 4 suggest positive strong correlation $r_s = 0.358$ between the variable "A career as a successor is attractive for me" and the ATB_sum_MK variable at .05 level of significance. This practically implies that the increase in the values "A career as a successor is attractive for me" will result with the moderate increase of the values ATB_sum_MK. There is also, positive moderate relationship $r_s = 0.249$ between the variable "A career as a successor is attractive for me" and ATB_sum_SL variable at significance level of .01 level. We have found strong positive relationship among the variable "A career as a successor is attractive for me" and the PBC_SLO variable at significance level of .01. The value of 0.328 suggests weak positive correlation between these two variables.

The correlation matrix indicated a very strong relationship $r_s = 0.662$ between the variable ATB_sum_MK and PBC_MK variable at significance level of .01. The Spearman correlation coefficient of $r_s = 0.813$ suggests very strong towards perfect correlation between the PBC_SLO and ATB_MK variables at significance .01 level. This suggest that the high values of ATC_sum_SLO variable are very likely to be followed with the high values of PBC_SLO variable.

Table 4. Correlation Matrix for ‘A career as successor is attractive for me’ and ATB, SN and PBC.

			Correlations						
			A career as a successor is attractive for me.	ATB_sum_MK	ATB_sum_SLO	SN_MK	SN_SLO	PBC_MK	PBC_SLO
Spearman's rho	A career as a successor is attractive for me.	Correlation Coefficient	1.000	.358*	.249**	-.291	.288	.179	.328**
		Sig. (2-tailed)	.	.038	.003	.527	.298	.310	.000
		N	196	34	138	7	15	34	139
ATB_sum_MK		Correlation Coefficient	.358*	1.000	.	.	.	.662**	.
		Sig. (2-tailed)	.038	.	.	.	.	.000	.
		N	34	108	0	0	0	106	0
ATB_sum_SLO		Correlation Coefficient	.249**	.	1.000	.	.	.	.813**
		Sig. (2-tailed)	.003	.	.	.	.	.	.000
		N	138	0	532	0	0	0	532
SN_MK		Correlation Coefficient	-.291	.	.	1.000	.	.	.
		Sig. (2-tailed)	.527	.	.	.	.	.	.
		N	7	0	0	14	0	0	0
SN_SLO		Correlation Coefficient	.288	.	.	.	1.000	.	.
		Sig. (2-tailed)	.298	.	.	.	.	.	.
		N	15	0	0	0	36	0	0
PBC_MK		Correlation Coefficient	.179	.662**	.	.	.	1.000	.
		Sig. (2-tailed)	.310	.000	.	.	.	.	.
		N	34	106	0	0	0	106	0
PBC_SLO		Correlation Coefficient	.328**	.	.813**	.	.	.	1.000
		Sig. (2-tailed)	.000	.	.000	.	.	.	.
		N	139	0	532	0	0	0	533

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

To conclude, we accept the H₁ since it was found that there is moderate to strong relationship between the career intention to become a successor and ATB in both countries with a slightly positive coefficient for Slovenia. Further on, we reject the H₂ and adopt the H₀ given that there is not relationship evidence between the dependent and the independent variable. And finally, H₃ is partially rejected or adopted in the case of the Slovenian students since it evidences moderate relationship between the two variables.

There are also limitations to this research since the population of the Macedonian students was relatively limited to only 3 universities out of 13 in operation and only one university is dominating the sample. Another limitation is that we have not tested for quantity and quality of the family business exposure to entrepreneurial intentions as well.

4. CONCLUSION

We have found that there is a positive relationship between the experience in family business and the decision to become an entrepreneur in future that was also concluded by Goethner (2012), Ilesanmibenga (2017) and Van Auken et al. (2006). On the other hand, social pressure was indicated to have no relationship with the family business experience in becoming an entrepreneur.

To sum up we agree with Linñan et al. (2011), Sánchez (2011) and Krueger (1997) that as in other studies of students, the student population in Macedonia and Slovenia with prior exposure to entrepreneurial activities of their parents is positively related to perceived feasibility and desirability to start their own career as entrepreneur. But, also that this relationship is stronger among the students in Slovenia which might be cause by the long years of entrepreneurial culture in the country. On the contrary Macedonia has low evidence of family owned businesses and yet shows good intention.

As family businesses, succession and their impact on entrepreneurial intentions are topics to be further researched, we suggest future research to be directed towards these areas. More to add, the Macedonian family businesses are now in their first business leadership

transition and might need external support to evidence successful generation takeover. But also, to continue the practice of GUESSS research in Macedonia and get a good set of data to be able to explore other relationships and suggest adaptations and trainings to better meet the business environment challenges as well as to be able to stimulate enabling environment for young entrepreneurs.

REFERENCES

- Ajzen, I. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, 50, (1991), pp. 179-211.
- Ajzen, I. Perceived Behavioural Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behaviour, *Journal of Applied Social Psychology*, 32 (4), (2002), pp. 665-683.
- Ajzen, I. Theory of Planned Behaviour, in P.A.M. Lange, A.W. Kruglanski and E.T. Higgins (eds) *Handbook of Theories of Social Psychology*, (2012), pp. 439-459. London: Sage.
- Autio, E., Keeley, R. H., Klofsten, M., and Ulfstedt, T. Entrepreneurial intent among students: testing an intent model in Asia, Scandinavia, and USA, *Frontiers of Entrepreneurship Research*, Babson College, Wellesley, MA, (1997), pp. 133–147.
- Bandura, A. *Social Learning Theory*, New York: General Learning Press, (1977).
- Crant, J. M. The proactive personality scale as a predictor of entrepreneurial intentions, *Journal of Small Business Management*, Vol 34, No 3, (1996), pp. 42–49.
- Davidsson, P. Determinants of Entrepreneurial Intentions, paper presented at the RENT IX Workshop, Piacenza, Italy, (1995).
- De Jorge-Moreno, J., L. L. Castillo and M. S. Triguero. The Effect of Business and Economics Education Programs on Students' Entrepreneurial Intention. *European Journal of Training and Development* 36 (4), (2012), pp. 409–25.
- Dimitrova, M., Vadnjaj, J., Petrovska, I. and Bojadziev, M. Should I become an entrepreneur or an employee: dilemmas of students in Macedonia and Slovenia? *Acta Oeconomica Universitatis Selye*, (2014), pp. 35-44.
- Dyer, W. G. J. *The Entrepreneurial Experience*, JosseyBass, San Fransisco, CA, (1992).
- Dyer, W. G. Jr, and Handler, W. Entrepreneurship and family business: exploring the connections, *Entrepreneurship Theory and Practice*, Vol 19, No 1, (1994), pp.71–84.
- Drennan, J, Kennedy.,J , Renfrow., P.Impact of childhood experiences on the development of entrepreneurial intentions, *Entrepreneurship and Innovation*, (2005), 231-238.
- Fishbein, M., and I. Ajzen. Attitudes and Opinions. *Annual Review of Psychology*, 23, (1997), 488–543.
- Gliem., Joseph A. and Gliem., Rosemary R. Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales, *Midwest Research to Practice Conference in Adult, Continuing, and Community Education*, (2003), [available at]:

<https://scholarworks.iupui.edu/bitstream/handle/1805/344/gliem+&+gliem.pdf?sequence=1>

- George, D., & Mallery, P. SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th Ed.). Boston: Allyn & Bacon, (2003).
- Goethner, M., Obschonka, M., Silbereisen, K. R., & Cantner, U., Transition to academic entrepreneurship: Economic and psychological determinants. *Journal of Economic Psychology*, (2012), 33(3), pp. 628-641., DOI:10.1016/j.joep.2011.12.002
- Guerrero, M., J. Rialp, and D. Urbano. ‘The Impact of Desirability and Feasibility on Entrepreneurial Intentions.’ *International Entrepreneurship Management Journal* (2008), 4:35–50.
- Hisrich, R. D., and Brush, C. G. The woman entrepreneur: management skills and business problems, *Journal of Small Business Management*, Vol 22, No 1, (1984), pp 30–38.
- Ilesanmibenga, J. Factors Influencing International Student Entrepreneurial Intention in Malaysia. *American Journal of Industrial and Business Management*, Vol 7. (2017), pp. 424-428.
- Jagodic, G. Using of Information Communication Technology Tools by the Students with Entrepreneur Intent. *Management (18544223)*, 11(3), (2016), pp. 239-254
- Linán, F., J. C. Rodríguez-Cohard, and J. M. Ruenda-Cantuche, Factors Affecting entrepreneurial Intention Levels: A Role for Education. *Entrepreneurship and Management Journal* 7 (2): (2011), pp 195–18.
- Nabi, G., R. Holden, and A. Walmsley, Graduate Career-Making and Business Start-up: A Literature Review. *Education+Training* 48 (5): (2006), pp. 373–85.
- Peterman, N., and Kennedy, J. Enterprise education: influencing students perceptions of entrepreneurship’, *Entrepreneurship Theory and Practice*, Vol 28, No 2, (2003), pp. 129.
- Sánchez, J. C. University Training for Entrepreneurial Competencies: It’s Impact on Intention of Venture Creation. *International Entrepreneurship and Management Journal* (2011), 7:239–54
- Sieger, P., Fueglistaller, U., and Zellweger, T. *Student Entrepreneurship 2016: Insights from 50 Countries*. St.Gallen/Bern: KMU-HSG/IMU.
- Maresch, D., Harms, R., Kailer, N., Wimmer-Wurmc, B. The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs, (2014), pg.5.
- Matthews, C. H. and Moser, S. B. Family background and gender: Implications for interest in small firm ownership. *Entrepreneurship & Regional Development* 7(4): (1995), pp. 365–378.
- Mueller, J., Zapkau, F., & Schwens, C. Impact of Prior Entrepreneurial Exposure on Entrepreneurial Intention - Cross-Cultural Evidence, *Journal Of Enterprising Culture*, 22, 3, (2014), pp. 251-282; Business Source Complete, EBSCOhost, viewed 25 March 2018.
- Sieger, P., Fueglistaller, U., and Zellweger, T. *Student Entrepreneurship 2016: Insights from 50 Countries*. St.Gallen/Bern: KMU-HSG/IMU.

- Sieger, P., Fueglistaller, U. & Zellweger, T. Student Entrepreneurship across the Globe: A Look at Intentions and Activities. St. Gallen: Swiss Research Institute of Small Business and Entrepreneurship at the University of St. Gallen (KMU-HSG), (2014).
- Tomovska Misoska, A. Dimitrova, M. Mrsik, J. Drivers of entrepreneurial intentions among business students in Macedonia. *Economic Research-Ekonomska Istraživanja*, 29(1), (2016), pp. 1062-1074, DOI: 10.1080/1331677X.2016.1211956
- Wu, S., and L. Wu. The Impact of Higher Education on Entrepreneurial Intentions of University Students in China. *Journal of Small Business and Enterprise Development* 15 (14): (2008), pp. 752–74.
- Roberts, E. B., and Wainer, H. A. New enterprise on Rte 128, *Science Journal*, Vol 4, No 12, (1968), pp. 78–83.
- Van Auken, H., Fry, F.L. and Stephens, P., The Influence of Role Models on Entrepreneurial Intentions. *Journal of Developmental Entrepreneurship*, 11, (2006), pp. 157- 167. <https://doi.org/10.1142/S1084946706000349>.



TOURISM POLICY AND LEGAL FRAMEWORK OF RURAL TOURISM IN MACEDONIA

Ljupcho Janevski¹, Dejan Metodijeski², Oliver Filiposki²

¹Agency for support and promotion of tourism in the Republic of Macedonia; ²Faculty of tourism and business logistics, Goce Delchev University-Shtip, Macedonia

Abstract: Tourism has significant social and economic benefits for rural communities, and tourism policy and legal framework created by government on national, regional and local level are one of the primary factors for the existence and development of tourism in rural areas. The subject of this thesis is tourism policy and legislation concerning the rural tourism in Macedonia, seen through the prism of tourism development strategies and tourism legislative. The thesis provides basic data for the rural tourism in Macedonia such as: historical development, regional distribution of rural tourism, accommodation facilities, number of tourists, rural tourism activities, promotion, tourism law, European Union funds and existence of a government initiatives for rural tourism development. Charts, presenting the governmental bodies responsible for tourism, national tourism development strategies as well as tourism related to legislation, are used for preparing a basic profile of rural tourism in the country. For the purpose of this thesis, we use research methodology and secondary data sources from relevant literature, official tourism development strategies and laws. An analysis and review of tourism strategies and laws have been made, based on systematical evaluation of their actual content using the method of content analysis. The thesis concluding remarks are regarding the structure, past issues and future challenges of rural tourism in Macedonia.

Keywords: rural tourism, Macedonia, tourism policy, tourism law

INTRODUCTION

According to the United Nations World Tourism Organization (UNWTO 2017), the arrival of tourists in 2016, has reached 1,235 million at international level. The tourist consumption was \$ 1.235 billion, and the tourist industry participated with 10% in the global gross domestic product. Every tenth employee in the world is employed in this sector. Tourism will maintain its continuous and positive level of development from the past 60 years and in the upcoming period. Forecasts are moving in the direction where the European continent, in the following years, can hold the primacy of the world tourism market and will be the main source of tourist offer, demand and movement of tourists. According to the United Nations World Tourism Organization (UNWTO 2004), the concept of rural tourism covers a number of constituent elements, based on the rural tourism community. Rural tourism depends on the rural environment and what this environment territorially can offer as heritage and culture, rural activities and rural life.

The existing relevant literature in the world dealing with the issue of rural tourism is rich in publications and research by various authors (Lane 1994; Sharpley & Sharpley 1997; Page & Getz 1997; Butler et al 1998; Richards & Hall 2000; Roberts & Hall 2001; Hall et al 2003; Hall et al 2005). The specific feature of rural tourism which distinguishes it from other types of tourism is its development in rural areas; based on small and medium enterprises, traditional activities, aspects of the surrounding environment and heritage (cultural and historical); smaller buildings and cities; based on the traditional characteristics of the rural environment; developing slowly under the control of the local population; and has different forms because it covers the complexity of the rural environment. Ruzic, makes the next division of the types of rural tourism (Ruzic 2005): Agro-tourist types of rural tourism (where only accommodation is offered, where only food is offered and where accommodation and food is offered) and other types of rural tourism (residential, nostalgic, sports and recreational, adventurous, health, cultural and religious, hunting and fishing, gastronomic and wine, eco-tourism, educational, camping tourism, nautical tourism).

In different countries, the determination of the type of rural areas is performed in different way. For example, in England, Portugal and Switzerland, a rural area is considered the area with less than 10. 000 inhabitants, Austria 5 000, France 2 000, Canada and Australia below 1,000, Denmark and Norway below 200 inhabitants (OECD 1994). In Macedonia, a rural area is considered a territory of municipality, where the populated place in the municipality has more than 30 000 inhabitants, according to the national population and households census or population density which is less than or equal to 150 inhabitants per square kilometer of the municipality. Differences in the definitions of different European countries for the rural environment, set the needs for a clear definition of the content of the particular rural tourism product, as the tourist's expectations can be seriously differentiated with its representation of a holiday in a rural environment (Statev 2007).

The use of the rural area in the territory of Macedonia for recreation exists from ancient times (Metodijeski 2012). The beginnings and development of rural tourism can be linked to: the construction of the road Via Egnatia (accommodation and other facilities beside it) and the use of baths by the Romans; in the Middle Ages, hospitality and stay in the monasteries; the estate of 2,700 hectares of vineyards and the construction of a villa by Aleksandar Karadjordjevic in Demir Kapija et al. Although this type of tourism has a long tradition, however, the targeted influence of the society and the tourism economy on its development with specific measures in the country is observed at the beginning of the 21st century. The Strategy for Tourism Development of the Republic of Macedonia (2009), states that rural tourism is a new activity and 10 existing locations of rural tourism are indicated: Brajchino, Vevchani, Galichnik, Zrnovci, Berovo, Pehchevo, Bansko, Smolare, Mokrino, Koleshino. These locations would be followed by: Lazaropole, Varvara, Makedonski Brod, Demir Kapija, Krushevo, Prespa and Pelister villages, Lesново, Dojran, Vladimirovo, Babino, Janche and others. Taleska indicates about 60 villages where rural tourism can be developed (Taleska 2009). In Macedonia, there are no accurate statistics on how many facilities offer services, related to rural tourism. According to us, about 250-300 facilities in rural areas offer rural tourism. Most of these facilities are concentrated mainly in three regions: the Southwest, Pelagonia and the East.

1. THEORETICAL FRAMEWORK OF RESEARCH AND METHODOLOGY

Countries around the world are encouraging the development of tourism through direct and indirect forms of support. At national level, the development of tourism enters the

scope of Ministries, National Tourism Organizations or State Tourism Agencies. In general, these institutions are engaged in performing activities for: controlling and regulating tourism activity through the tourism laws, gathering information about the branch, preparing a national strategy for tourism development, preparing a national tourist advertisement, etc. National tourism organizations exist in more than 100 countries. The World Tourism Organization has revised the budget of 109 such Organizations and defined Agencies and their subsidiaries as follows (Jeffries 2001):

a) The National Agency for Tourism is defined as: Central administrative body with administrative responsibility for tourism at the highest level i.e a central management authority with powers for direct intervention in the tourism sector; and all administrative state bodies that have the authority to intervene in the tourism sector.

b) Other governmental or administrative bodies of lower rank. An example is the National Tourism Organization, which is defined as: an autonomous body with state, semi-public or private status, established or recognized by the state as a body with a national competence to promote, and in some cases to advertise the tourism.

The term "tourist policy" means the conscious activity of the state, i.e the society in the field of tourism. The main task of this policy is to undertake measures and activities that will maximally activate the factors for tourism development, in order to increase tourism turnover and consumption as well as to improve their structure and quality (Ackovska et al 2017). More specifically, the tourist policy fulfills the following functions (Goeldner & Ritchie 2009): defines the rules of the game - the conditions under which tour operators must function; sets the activities and behavior that are acceptable to visitors; provides a common goal for all interested parties in the destination; facilitates consensus on specific strategies and goals for a given destination; provides a framework for public / private discussions on the role and contribution of the tourism sector in the economy and society in general; and enables more effective link between tourism and other sectors of the economy.

The tourist policy has direct and indirect holders, or executors. Direct holders and executors of the tourist policy are (Ackovska et al 2017): the representative bodies of the government at all levels (assemblies, parliaments, individual councils, homes, commissions, etc.); and executive organs of the government (government) at all levels (secretariats, ministries of tourism, hospitality and tourism committees, General Directorates of catering and tourism at national, regional, municipal, city and a similar level).

Indirect carriers and executors of tourist policy are: special bodies outside the state administration (chambers of municipalities and special business associations); social organizations in the field of catering and tourism (tourist alliances at all levels, tourist bureaus); local communities; other economic and non-economic organizations in the tourism area that directly or indirectly participate in meeting the tourist needs.

Various measures (instruments, funds) are applied for realization of the goals and are set for the needs of tourist policy. In general, all tourist policy instruments can be divided into four groups (Ackovska et al 2017): legal regulations that mainly include: constitutional provisions, laws, prohibitions, permits, decisions, orders, etc.; administrative instruments, which mainly include taxes, duties, fees, contributions, public loans and other public revenues and subsidies (compensation, donations, premiums, guarantees, regress, etc.); economic instruments, mainly including: plans, programs, resolutions, funds, loans, bonds, money, courses and prices, and contracts and agreements.

The aim of this thesis is to review the tourism law and policy related to rural tourism in Macedonia. For the needs of the thesis, secondary sources of data were used from relevant literature in the field of tourism policy, the legislation related to rural tourism as well as the

Internet. Using the Internet, we have collected materials such as tourism development strategies and tourism laws which have been analyzed in this thesis. The main method, used in the research is content analysis (Hall & Valentin 2005). Content analysis is a research method used for systematically evaluation of the content of the phenomenon that is investigated i.e the content of the tourism laws and tourist policy of Macedonia related to rural tourism.

2. TOURISM POLICY, STRATEGIES AND LEGISLATION RELATED TO RURAL TOURISM IN MACEDONIA

2.1. TOURIST POLICY

Tourism as a branch in Macedonia is under the authority and is managed by the Sector for Tourism and Catering within the Ministry of Economy.

Chart 1. Governmental authorities at national, regional and local level responsible for the development of the tourism policy in Macedonia

Governmental authorities responsible for developing tourism policy (official website)	National Tourism Organization (NTO) / Agency (official website)	Regional centers	Municipalities
Ministry of Economy, Sector for Tourism and Catering (economy.gov.mk)	Agency for Promotion and Support of Tourism in Macedonia (tourismmacedonia.gov.mk)	8	80

Source: Official websites of the institutions

The body dealing with the promotion of tourism in Macedonia is the State Agency for Promotion and Support of Tourism. This body has developed an official website, and also performs the function of promoting the tourism potentials of the country on international level, through promotional campaigns, fairs, print, video and audio advertising material. In addition to these two bodies at national level, there are eight regional centers and 80 municipalities that deal with the development and promotion of tourism at regional and local level.

2.2. STRATEGIC DOCUMENTS

One of the instruments of tourism policy is the development of tourism development strategies. To manage the development of individual enterprises, economic branches or sectors at national, regional and destination level, special programs and development strategies are often developed, (Budinoski 2010). The term strategy has been used since ancient times in connection with the knowledge of the military leaders. This term enters the last forty years in the economy and specifically in tourism and catering. Today, the development of a strategy is more than recommended and defines a system of governance solutions that determine the development perspectives, spheres, forms and ways of action, the allocation of resources for achieving specific goals, etc.

Chart 2, represents an overview of the strategies for rural tourism development in Macedonia, where we can see how strategies have been developed at national, regional and local levels. In Macedonia, besides the regions, most of the municipalities have developed strategic plans for local economic development or rural development strategies that emphasize the importance of rural tourism. However, there are few municipalities that have developed and adopted strategies directly related to rural tourism.

Chart 2. Overview of strategic documents for development of rural tourism at national, regional and local level in Macedonia

Level of action	Strategic document	Year of preparation
National	1. National Strategy for Development of Rural Tourism of the Republic of Macedonia 2012-2017	2012
	2. Substrategy for traditions and events of the Republic of Macedonia	2014
Regional	1. Study on tourism development in the region of Shara	2010
	2. Strategy for development of rural and mountain tourism in the region of Deshat Mountain	2014
	3. Study on the situation with the potentials for tourism development in the East Mountain Region	2014
	4. Register of potentials for development of rural tourism in the South-west region	2016
	5. Register of potentials for development of rural tourism in the Northeast region	2016
	6. Register of Potentials for Development of Rural Tourism in the Region of Skopje	2017
Local	1. Strategy for development of eco-tourism in the municipality of Berovo	2005
	2. Study on the development of agro-tourism in the municipality of Resen	2006
	3. Strategy for development of rural tourism in the municipality of Zrnovci	2007
	4. Strategy for development of rural tourism in the municipality of Cheshinovo-Obleshevo	2007
	5. Strategy for development of rural tourism in the municipality of Pehcevo 2018-2023	2017

Source: Strategic documents for the development of rural tourism in Macedonia

The review of the strategic documents in Chart 2 shows that in Macedonia there are studies, registers and strategies for development of rural tourism at national, regional, and six other regional and five local levels. In these reviewed documents and in their preparation, is included the mission and vision of the level and development of rural tourism. Strategies are prepared by ministries and experts in the field of tourism, regional and municipal administrations, as well as education and non-governmental organizations. Most of the strategies are implemented over a period of five years and contain an action plan for the implementation of activities related to the development of rural tourism.

2.3. LEGISLATION

It should be noted that Macedonia until 1991, was a country with a socialist system and legal system, and after this stage the country has changed its system and modified the tourist laws according to its own convenient model and in accordance with the level of activities related to tourism and its development. In Macedonia, the basic laws which are regulating the tourism, are the laws for tourism and catering. There are additional laws related to tourism in the country, such as: Law on Establishing the Agency for Promotion and Support of Tourism of the Republic of Macedonia 103/2008; Law on temporary residence tax 19/1996; Law on Tourist Development Zones 141/2012; Law on auto camps 13/2013. Regarding rural tourism, the rural environment and its activities are regulated by the Law on Agriculture and Rural Development 49/2010.

Chart 3. Overview of the legislation related to rural tourism in Macedonia

Legislation	Significant provisions from the legislation on rural tourism
Law on Tourism. Official Gazette of the Republic of Macedonia No. 62/2004	Tourism services in rural and ethno tourism are: renting horses for riding, photo safari, manufacture and sale of domestic handicrafts, souvenirs, tools and other products and services in rural household.
Law on catering activity. Official Gazette of the Republic of Macedonia No. 62/2004	Rural households provide services for renting rooms and apartments, whose owner or holder of the right to use is a member of the village household, and has up to ten rooms, or 20 beds. In rural households, hot and cold meals are prepared and served, beverages and drinks mainly from own production for more than 50 people (travelers) simultaneously. In rural households, wine tasting or brandy can be provided, as well as serving food from domestic production, in a tidy part of a residential or office building, in a closed space, covered by a tent or open space, for up to 50 people at the same time. For the purpose of improving the quality of the catering offer, in rural households, hikers (people residing in rural households) can prepare meals, drinks and beverages for their own needs.
Rulebook on the manner and the detailed criteria for obtaining the mark in rural households in the rural areas, as well as the form and the content of the mark. Official Gazette of the Republic of Macedonia No. 169/2014	By designation of rural areas, at the request of the village household, are marked: houses, apartments and rooms for renting. The house, the apartment or the rooms for rent are catering facilities owned by the village households which are rented to tourists. They should meet the minimum technical conditions for providing accommodation services, and if food services are provided, the conditions for providing food according to food safety regulations should also be met. The mark for rural households in rural areas that perform catering activity is the sunflower.

Source: Legislation related to rural tourism in Macedonia

The legislation, that is regulating the rural tourism in Macedonia, presented in Chart 3, shows that there are laws for tourist and catering activity in the country, as well as a rulebook for accommodation of guests by rural households in the rural environment. According to these laws and regulations, rural tourism is terminologically defined as rural and ethno tourism. The legislation regulates the services provided in rural tourism, however, there is still a number of specific regulations regarding the regulation of rural tourism, such as the collection of services, records of the capacities in rural tourism, taxation, and other. The aforementioned laws in Macedonia have been amended many times since their adoption. This indicates that the country takes care not only for adoption, but also for reviewing the proposed legal solutions, as well as for possible amendments and supplements to the tourist laws in order to improve the regulation of the interests and needs of all interested parties.

2.4. FINANCIAL SUPPORT

Financial support by the state is one of the key factors for the development of rural tourism. In Macedonia, there are programs designed for citizens who decide to open a business in rural areas and they are granted financial support in the amount of 50 percent of the costs for setting up a business. Support relates to the opening of any business, ranging from the smallest to motor fitters, car washers, hairdressers and craftsmen, up to processing facilities and production facilities for small and medium enterprises. The Ministry of Economy (Sector for Tourism and Catering) subsidizes various touristic goals of village households that are categorized in the amount of 200,000 MKD through a public call that is published annually. Ministry of Agriculture, Forestry and Water Economy supports rural tourism by financing projects for its development according to the IPARD program (measure 302 - Investments for diversification of rural economic activities). Moreover, the Agency for Financial Support of Agriculture and Rural Development, supports rural tourism through measure 4 - Financial support for promotional activities for rural tourism development.

2.5. EDUCATIONAL INSTITUTIONS

From the aspect of the educational system, rural tourism in the Republic of Macedonia exists in the formal education. From 2012, in the secondary municipal school "St. Naum Ohridski" in Makedonski Brod was introduced a new profile, catering technician for rural tourism in catering and tourism profession. At the faculties where tourism is studied, we come across as a subject or as a course of undergraduate or postgraduate studies. At the Faculty of Agriculture, at the State University "Goce Delchev" in Shtip, there is a module-Rural Tourism for undergraduate studies.

2.6. NON-GOVERNMENTAL ORGANIZATIONS

Other factors in the development of rural tourism are non-governmental organizations. A dozen associations related to rural tourism can be found on the official website of the Public Revenue Office of Macedonia (ujp.gov.mk). These associations carry out activities and participate in projects in the field of rural tourism. Besides domestic associations, the role of foreign associations and foundations is also not very small in Macedonia and implements

projects related to the development of rural tourism, like the German Society for International Cooperation (GIZ), which has performed a number of investments in the form of trainings and projects, for development of rural tourism; Slow food; USAID-supported projects through various grants and programs; Swiss contact and others.

2.7. PROMOTION OF RURAL TOURISM

The promotion of rural tourism in Macedonia, in addition to local and regional centers, the main role is taken by the State Agency for Promotion and Support of Tourism through promotion of tourism fairs, marketing campaigns in the country and abroad, preparation and printing of prospectuses, brochures, rural tourism, financial support for manifestations in rural areas, etc. Despite the Agency, 40 reports were recorded at national level for visiting different destinations in the country for domestic tourists (the tourist demand in rural tourism in relation to the seasons and the short stay of tourists which is characteristic for domestic tourists). These reports are presented on most of the television channels and are part of the campaign - Explore Macedonia, and refer to the promotion of Macedonia as a tourist destination. From the data on the official website of the campaign-Explore Macedonia, the recorded reports by regions can be presented in the chart below.

Chart 4. Regional prevalence of recorded reports from the campaign Explore Macedonia

Ordinal no.	Region	Story	Number of reports
1	Skopje	Matka, Gazi Isa begova mosque, Skopje, Vodno	4
2	Polog	Tresonche and Lazaropole, Janche, Galichnik, Shar Planina, Vrutok	5
3	Southwest	Skrebatno, Struga, Rajchica, Debar and Kosovrasti, Vevchani, Ohrid	6
4	Southeast	Veljusa, Smolare Waterfall, Dojran, Kozhuv	4
5	Vardar	Begnishte, Demir Kapija, from Skopje to Bitola by train, Papradishte	4
6	East	Berovo, Lesново, Plachkovica, Shtip, Novo Selo	5
7	Northeast	Kratovo, Kuklica, Kokino, Osogovo Monastery, Ponikva	5
8	Pelagoniski	Zovikj and Dunje, Prilep, Treskavec, Zrze, Krushevo and Cer, Brajchino, Resen	7

Source: www.istracijamakedonija.com.mk

From Chart 4 we can conclude that most of the recorded reports or 7 of them refer to the destinations that are located in the Pelagonia region, while the other regions are represented with 6, 5 or 4 video reports. These data indicate that the regions have equal representation in terms of the number of reports made for destinations within their territory. The reports most often cover natural beauties and anthropogenic values of destinations that are recommended for visiting, interesting legends related to these places, local gastronomy and are related to rural tourism destinations.

3. CONCLUSION

The thesis reviewed the tourism policy and legislation in Macedonia, which is manifested through the work of the relevant authorities at national, regional and local level, the preparation of strategic documents for the development of rural tourism, as well as the financial support, the non-governmental sector, the education and the promotion of rural tourism.

Macedonia has good natural and anthropogenic resources that are a prerequisite for the development of rural tourism. To make tourism sustainable in the future, it is vital that to set up effective policies and legislation. Those who create politics, develop strategies and all stakeholders in tourism should be able to identify new trends in tourism and to propose appropriate measures that will lead to the creation of better quality tourism products.

The research for the needs of this thesis shows that serious attention is dedicated to the tourism industry in Macedonia, and there are appropriate state institutions in which the tourism sector is represented through its ministries that directly participate in the creation of tourism policy and legislation. There is a State Agency in the country that takes care of the tourist promotion; Strategies for development of rural tourism on local, regional and national level have been adopted, which are in connection with the modern tourist needs. There are adequate laws and regulations related to rural tourism that have undergone numerous changes and amendments for the needs of the interested parties and directed to improvement from the moment of their adoption. We consider that the following recommendations can be of great importance for the development of rural tourism in Macedonia: Improvement of the legislation and precise definition of the activities related to rural tourism; Statistical database for facilities offering rural tourism; Association of entrepreneurs offering rural tourism at local, regional and national level; Exploring the supply and demand of a rural tourist product; Adequate national strategy for development of rural tourism; Greater use of European funds for rural development; Trainings by higher education institutions and competent ministries for the local population while participating in rural tourism and opening tourism departments within the regions and municipalities that plan to develop rural tourism.

REFERENCES

- Ackovska, M., Petrovska-Angelovska, N., Metodijeski, D., Filiposki, O. (2017), *Economics and organization of hospitality*, Longurov, Stip.
- Budinoski, M. (2010), *Tourism development and planning*, University of tourism and management, Skopje.
- Butler, R., Hall, M., Jenkins, J., eds., (1998), *Tourism and recreation in rural areas*, John Wiley & Sons, New Jersey.
- Goeldner, C., Ritchie, B. (2009), *Tourism: principles, practices, philosophies*, John Wiley & Sons, New Jersey.
- Hall, D., Kirkpatrick, I., Mitchell, M., (2005), *Rural tourism and sustainable business*, Channel View Publications, Clevedon.
- Hall, D., Roberts, L., Mitchell, M., eds., (2003), *New directions in rural tourism*, Ashgate Publishing Limited, Surrey.

- Hall, M., Valentin, A. (2005), Content analysis. In Ritchie, B., Burns, P., Palmer, C., Tourism research methods: Integrating theory with practice, CAB International, Oxford shire.
- Jeffries, D. (2001), Governments and tourism, Butterworth-Heinemann, Oxford.
- Lane, B. (1994), "What is rural tourism?", Journal of Sustainable tourism, 2(1-2), 7-21
- Metodijeski, D. (2012), Tourism in rural areas, Sovremenost, Skopje.
- OECD (1994), Tourism strategies and rural development, OECD, Paris.
- Page, S., Getz, D., eds., (1997), The business of rural tourism: International perspectives, International Thomson Business Press, London.
- Richards, G., Hall, D., eds., (2000), Tourism and sustainable community development, Routledge, London.
- Roberts, D., Hall, D., (2001), Rural tourism and recreation: principles to practice, CAB International, Oxford shire.
- Ruzic, P. (2005), Ruralni turizam, Institut za poljoprivredu i turizam Poreč, Pula.
- Sharpley, R., Sharpley, J., (1997), Rural tourism: an introduction, International Thomson Business Press, London.
- Statev, V. (2007), Rural tourism, Faber, Veliko Turnovo.
- Taleska, M. (2009), Rural tourism, Studiorum, Skopje.
- UNWTO (2004), Rural Tourism in Europe: Experiences, Development and Perspectives, UNWTO, Madrid.
- UNWTO (2017), UNWTO Tourism Highlights, 2017 Edition, UNWTO, Madrid.



EMPLOYEE SATISFACTION, ALBANIAN ELECTRICITY DISTRIBUTION NETWORK SECTOR

Ardita BORIČI, Frensis SHKJEPANA

University of Shkodra “Luigj Gurakuqi”, Albania

Abstract: Employee satisfaction is a critical factor in the success of organizations. This way, this concept has gained the attention of both academics and practices. The most inimitable element of an organization in the 21st century are Human Resources, so it is very important for an organization to have satisfied employees.

There is a massive literature on what employees like and dislike, and how this can be used to increase job satisfaction. Employee satisfaction is a multi-dimensional and interdisciplinary concept that also relates with various disciplines such as Human Resource Management, Organizational Behaviors, TQM and so on. However, there is no universal definition of employee satisfaction that reflects all these dimensions at the same time.

The aim of this study is to identify the variables that affect employee’s job satisfaction in the Albanian Electricity Distribution Network Sector. The dataset is collected through questionnaires. Some of the independent variables that affect the dependent variable (job satisfaction) are: payment and rewards, relationship with colleagues, management, working conditions, participation in decision making, stability, feedback and challenges. Recommendations have been made according to the evidence found from the analysis of the collected data.

Keywords: Employee satisfaction, job satisfaction, decision making, participation in decision making

1. INTRODUCTION

Employee satisfaction is a critical factor in the success of organizations. It is a factor used to help leaders and academics understand how happy, fulfilled, and evaluated employees feel at their work. There is a large number of internal and external factors that affect these feelings. The concept of employee satisfaction has been the focus of research and practice over the last few decades, and is considered a critical factor in the performance of organizations (Greasley, Bryman, Dainty, Price, Soetanto, & King, 2005).

This concept has gained the attention of both academics and practices, also because the most inimitable element of an organization in the 21st century are Human Resources. For the employee, job satisfaction gives the feeling of safety and fulfillment. In return, it leads to employee engagement, reduces the number of shortages at work and reduces staff turnover. For the employer, the work satisfaction of its employees is ensured by dedicated staff and stable workforce, which leads to reduced recruitment and training costs. There is a massive

literature on what employees like and dislike, and how this can be used to increase job satisfaction.

Employee satisfaction is a multi-dimensional and interdisciplinary concept that also relates with various disciplines such as Human Resource Management, Organizational Behaviors, TQM and so on. However, there is no universal definition of employee satisfaction that reflects all these dimensions at the same time.

The aim of this study is to identify the variables that affect employee's job satisfaction in the Albanian Electricity Distribution Network Sector. Mission and Strategic Priorities of the organization are the fulfillment of customer requirements for uninterrupted and quality supply of electricity through an efficient and modern service. Integrity, dedication and accountability are the main pillars for accomplishing the mission. This organization has a considerable number of employees who work in different positions, including the director, supervisors, specialists, cashiers, billers etc. All of these employees have gone through the recruitment, selection and training stages before they are positioned in the respective positions. The dataset is collected through questionnaires.

2. OBJECTIVE

This study aims to identify the variables that affect employee's job satisfaction of the organization that we considered. The purpose of this study is to answer the question: "What are the independent variables that explain the dependent variable employee's job satisfaction in the Albanian Electricity Distribution Network Sector?"

3. THEORETICAL BACKGROUND

The concept of employee satisfaction has been the focus of research and practice over the last few decades, and is considered a critical factor in the performance of organizations (Greasley, Bryman, Dainty, Price, Soetanto, & King, 2005).

Employee satisfaction is a prerequisite for employee performance in any organization. It is important for both employee and employer. For the employee, job satisfaction gives the feeling of safety and fulfillment. In return, it leads to employee engagement, reduces the number of shortages at work and reduces staff turnover. For the employer, work satisfaction of its employees is ensured by dedicated staff and stable workforce, which leads to reduced recruitment and training costs.

According to Stogdill (1965), successful organizations consider employee morale and employee satisfaction as equally important output as productivity. (Locke, 1969) describes employee satisfaction as a positive or liked emotional state that results from evaluating someone's work or experience. Accordingly, employee satisfaction is a function of perceived relationships between what one seeks out of someone's work and what some perception as an offer (Locke, 1969).

Schneider and Snyder (1975), determine employee satisfaction as a personal assessment of working conditions, or feelings that arise from having a job. In this way, employee satisfaction is related to individual perception and appreciation for their work, and this perception is influenced by the unique circumstances of the individual such as needs, values and expectations. Therefore, people will appreciate their work based on the factors they consider most important to them.

Judge & Hulin, (1993), say employee satisfaction is positively correlated with: motivation, inclusion in the work, organizational engagement, the pleasures of life, mental health, as well as performing work, and negatively correlated with: shortages,ncirculation (movement of job positions), perceived stress.

Cranny, Smith, & Stone, (1992) suggest that employee satisfaction includes many different aspects. Thus general employee satisfaction is described as a person's overall emotional reaction to the workgroup and factors related to work, while aspects of employee satisfaction include employee feelings towards work and the working environment.

Spector (1997) argues that employee satisfaction is the extent to which people like (satisfied) or dislike (disgruntled) their work. Job satisfaction is a positive orientation to the work role that the individual currently has. It further adds that the variables associated with satisfaction at work include; achievement, advancing, job growth, enriching the work and group work.

One of the toughest management tasks today is to keep the most qualified employees satisfied and be able to keep them at work.

Armstrong (2006) defines the pleasure of work: the attitudes and feelings that people have towards their work. Positive and positive attitudes to work show satisfaction with work, while negative and disadvantaged attitudes to work show dissatisfaction with the job. Morality has often been determined to be equivalent to pleasure.

Hertzberg (1957) notes that aspects of work such as responsibility, degree of freedom to act, the purpose used to develop skills, interesting and challenging job development opportunities, will affect the level of employee satisfaction at work.

Studies show that employees participating in decision making may feel more committed to their proper implementation. Moreover, the successful process of making a decision, its execution, and then seeing the positive consequences can help meet one's achievement needs, ensure recognition and accountability, and increase an employee's sense of self- esteem. By participating in decision-making, employees can better understand the relationship between performance and rewards they want for themselves. Studies also show that participation in decision-making has a positive impact on high performance and job satisfaction. (Moorhead and Griffin, 1989).

4. RESEARCH QUESTIONS AND HYPOTHESES

As said above this study aims to answer the question: "What are the independent variables that explain the dependent variable employee's job satisfaction in the Albanian Electricity Distribution Network Sector?"

Consistent with the research questions raised, the following hypotheses are derived:

H₁: There is a significant impact of payment and rewards on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. There is a significant impact of efficiency on financial/operational self-sufficiency.

H₂: There is a significant impact of relationship with colleagues on employee's job satisfaction in the Albanian Electricity Distribution Network Sector.

H₃: There is a significant impact of management on employee's job satisfaction in the Albanian Electricity Distribution Network Sector.

H₄: There is a significant impact of working conditions on employee's job satisfaction in the Albanian Electricity Distribution Network Sector.

H₅: There is a significant impact of participation in decision making on employee's job satisfaction in the Albanian Electricity Distribution Network Sector.

H₆: There is a significant impact of stability on employee's job satisfaction in the Albanian Electricity Distribution Network Sector.

H₇: There is a significant impact of feedback on employee's job satisfaction in the Albanian Electricity Distribution Network Sector.

H₈: There is a significant impact of challenges on employee's job satisfaction in the Albanian Electricity Distribution Network Sector.

5. METHOD

I. Subject and procedure:

Data was collected through questionnaires filled from employees of Costumar Care 1 and Costumer Care 2 offices in Shkodra of the Albanian Electricity Distribution Network Sector. There are eight indipendet variables and one dependet variable. Each one of the independent variables is a result of the combination of two or three components used to measure the variable itself. The level of credibility is measured using Cronbach Alpha. Factorial analysis with Varimax Rotation from SPSS version 20 (Statistical Package for the Social Sciences v20) program was used. All factors are measured by Likert Scales (by 1-very insignificant...to 5very significant).

II. Independent Variables:

Payment and rewards, which was measured by including wages (factor weight=0.401), and rewards(factor weight=0.421). Cronbach Alpha=0.698 (which is acceptable being so close to 0.7)

Relationship with colleagues which was measured by including respect among colleagues (factor weight=0.554), help between colleagues (factor weight=0.641) and interference from colleagues (0.552). Cronbach Alpha=0.726.

Management which was measured through management skills of the leaders (factor weight=0.947), leaders's attention (factor weight=0.980) and relationship with leaders (factor weight=0.976). Cronbach Alpha=0.962.

Working conditins which was measured by including material basis (factor weight=0.986), equipment (factor weight=0.904) and conditions in which employees are working (factor weight=0.886). Cronbach Alpha=0.949.

Participation indecision making was measured through participation of employees in decision making (factor weight=0.552) and the evaluation of employees's thoughts (factor weight=0.546). Cronbach Alpha=0.984).

Stability which was measured by including stability in the job position (factor weight=0.726), company stability (factor weight=0.726) and job security (factor weight=0.679). Cronbach Alpha=0:983.

Feedback which was measured by including the existence of feedback (factor weight=0.917), its frequency (factor weight=0.749) and the estimation of its results (factor weight=0.672). Cronbach Alpha=0.905.

Challenges which was measured by including the existence of challenges (factor weight=0.920) and their role in professional growth (factor weight=0.615). Cronbach Alpha=0.732.

III. Dependent variable:

As mentioned above, we want to find out the amount of employee satisfaction at work, specifically of those who are part of Albanian Electricity Distribution Network Sector, in Shkodra. So the dependent variable, the one that depends on the eight independent variables, is employee satisfaction, which is measured using the SPSS 20v program.

6. RESULTS

To find out employee satisfaction using eight independent variables we used multiple regression (stepwise model) from SPSS v20. But first, let's have a look at all single linear regressions one by one.

Hypotheses	Accepted or Not
H ₁ : There is a significant impact of payment and rewards on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² = 0.427).	Accepted
H ₂ : There is a significant impact of relationship with colleagues on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² =0.165)	Accepted
H ₃ : There is a significant impact of management on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² =0.550)	Accepted
H ₄ : There is a significant impact of working conditions on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² =0.559)	Accepted
H ₅ : There is a significant impact of participation in decision making on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² =0.104)	Accepted
H ₆ : There is a significant impact of stability on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² =0.333)	Accepted
H ₇ : There is a significant impact of feedback on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² =0.363)	Accepted
H ₈ : There is a significant impact of challenges on employee's job satisfaction in the Albanian Electricity Distribution Network Sector. (Adj R ² =0.318)	Accepted

As seen, every hypothesis was accepted according to the evidence. Now let's go back to the multiple regression. Employee satisfaction was entered as dependent variable and eight other variables were entered as independent variables. Stepwise method was used, so only significant independent variables came out as output.

Model	R	R²	Adj. R²	T	P
	0.890	0.792	0.790		
<i>Constant</i>				0.985	0.000
<i>Working Conditions</i>				8.256	0.000
<i>Payment & rewards</i>				5.249	0.000

So only working conditions and payment & rewards are significant variables to this study. Variation of the dependent variable employee satisfaction was explained by 79.2% from variations of the independent variables working conditions and payment and rewards, while the Adj R2 value is 0.790. These high value mean that we are dealing with a good pattern. The evidence proves that this regression is significant for level 0.01 (for p <0.01).

This indicates that the two independent variables are able to explain the dependent variable. The value of the Fisher test is $F = 167.62$. Regression coefficients are positive 0.650 and 0.366, which indicates that an increase in each of the two independent variables accepted leads to increased satisfaction at work.

$$\text{Satisfaction at work} = -0,085 + 0,650 \text{ Working conditions} + 0,366 \text{ Payment \& rewards.}$$

7. CONCLUSION AND FUTURE RESEARCH

This study investigated some of the many factors that affect employee satisfaction in the Albanian Electricity Distribution Network Sector, such as payment and rewards, relationship with colleagues, management, working conditions, participation in decision making, stability, feedback and challenges. The evidence found out that if every single independent variable is set towards the dependent variable (one by one), there is a significant impact of the independent variable on employee's job satisfaction in the Albanian Electricity Distribution Network Sector, which is the dependent variable of the study.

But if we want to be realistic, then we have to understand that we are dealing in an environment where all these independent variables collaborate and affect at once the employee satisfaction. Results came out after multiple regression was done. The evidence found out that only two from the eight independent variables were statistically significant for this study. These were working conditions and payment and rewards. Regression coefficients are positive 0.650 and 0.366, which indicates that an increase in each of the two independent variables accepted leads to increased satisfaction at work.

According to this, the organization has to be careful to offer appropriate working conditions. We must emphasize that the large group of employees is divided in two minigroups: the one whose employees work indoor and the one whose employees work outdoors. Better working conditions can be offered for the employees of the first group, if new investments are made to keep in order offices and the row of costumers, which is a big problem nowadays especially in Customer Care1 offices. While better working conditions can

be offered for the employees of the second group, if new investments are made to guarantee transports for the billers, electricians and other employees working outdoors.

Evidence proves that also payment and rewards are significant, but as we know there is no organization in the world that can increase wages to infinity. But the organization has to work on the rewarding system, which is not as encouraging as it has to be.

Nothing is everlasting and so is this study, so we also recommend to repeat this study every year for two reasons: to see if anything was done to complete the recommendations, and to see if a new variable is statistically significant year by year.

REFERENCES

1. Armstrong, M. (2006). *A Handbook of Human Resource Management Practice* (10th edn) London, Kogan page
2. Cranny, C. J., Smith, P. C. & Stone, E. F. (1992). *Job Satisfaction*. Lexington Books: New York, New York.
3. Herzberg, F, Mausner, B. & Snyderman, B. (1957). 'The Motivation of Work,' New York: Wiley
4. Judge, T. A., & Hulin, C. L. (1993). Job satisfaction as a reflection of disposition: A multiple source causal analysis. *Organizational Behavior and Human Decision Processes*, 56, 388 – 421.
5. Kay Greasley, Alan Bryman, Andrew Dainty, Andrew Price, Robby Soetanto, Nicola King, (2005) "Employee perceptions of empowerment", *Employee Relations*, Vol. 27 Issue: 4, pp.354-368
6. Locke, E. A. (1969). "What is Job Satisfaction?," *Organizational Behavior and Human Performance*, 4,309-336.
7. Moorhead, G. & Griffin, R. (1989). *Organisational Behaviour*, (2nd ed) Boston, Houghton Mifflin Company.
8. Schneider, B. & Snyder, R. A. (1975). "Some Relationship between Job Satisfaction and Organizational Climate," *Journal of Applied Psychology*, 60(3). 318-328.
9. Spector, P. E. (1997). *Job Satisfaction: Application, Assessment, Causes, and Consequences*, Thousand Oaks, CA: Sage Publications
10. Stogdill, R. (1965). "Managers, Employees, Organizations," Columbus, OH. The Ohio State University



FOREIGN DIRECT INVESTMENTS IN THE ECONOMIC DEVELOPMENT OF BULGARIA

Sibel Ahmedova

Technical University-Varna, Varna, Bulgaria

Abstract: The paper presents a brief theoretical overview of foreign direct investments (FDI) and their significance for the economic development of Bulgaria, and then shifts the focus onto their positive and negative effects on the country's economy. The methodology employed in the research data collection is that of the statistical and survey methods on the basis of which examined has been the impact of FDI on the economic indicators of gross domestic product and rate of unemployment. Specific recommendations have been offered as to a potential increase in the foreign investment inflow into Bulgaria.

Keywords: unemployment, gross domestic product, competitiveness, foreign investment

1. INTRODUCTION

Over the last decade countries all over the world conduct the so-called open door policy towards foreign investments by virtue of its focusing on the transfer of innovations, modern management, knowledge and experience. On the one hand, such a policy leads to an increase in manufacturing and competitiveness, in labour productivity and levels of employment, in the workforce development and qualification and accordingly, in their standard of living, and on the other hand such a policy is aimed at accelerating the country's economic growth and prosperity, both at regional and national level.

Foreign direct investments (FDI) are by nature financial resources invested in buying fixed tangible assets, patents, trade marks, know-how, securities, acquisition of new fixed tangible assets, reconstruction and expansion or extension of already existing ones, etc.

The International Monetary Fund defines FDI as a “specific form of international capital movement”. A large proportion of direct investment is realised in order to extend the production far beyond national borders by establishing industrial enterprises and setting up overseas sales organizations, or by organizing the production of goods in another country for import into one's own country, as well as for export to third countries”. FDI is an approach for entering a foreign market with a high level of control, in which the investor has management control over the investee. The minimum share to be held by the investor in order for the investment to be classified as direct is 10% of the corresponding company's shares. A lot of foreign companies, however, tend to make direct overseas investments only if they would acquire 100% of the shares, or at least 51% of them [8].

According to *Farrell*, FDI is a strong set of capital, technology, entrepreneurial management activities, which allows a given company to perform its normal business activities and provide goods and services to foreign markets [3].

The Organisation for Economic Cooperation and Development (OECD) states that FDI is a “key element in the international economic integration. FDI builds and develops direct, stable and lasting inter-relations among economies. They encourage the transfer of technology and know-how between countries and provide considerable opportunity for the host economy to promote its products more widely in international markets. FDI is also an additional source of funding for investments and in the appropriate (supportive) policy environment could be an important development tool” [5].

Rappaport in turn, points out that FDI can improve the performance and productivity not only of the investee firms but also of the host country firms’ productivity due to the possibility of technology transfer [6].

De Gregorio observes that FDI allow the host countries to bring in technologies and knowledge that are not otherwise readily available to them, which in turn will lead to real productivity gains and higher competitiveness of the economies concerned [2].

Javorcik, Alfaro & Rodriguez-Clare split FDI into two categories: horizontal and vertical. As horizontal direct investments, they define FDI which are distributed in depth at an internal (domestic) production level, and as vertical-foreign investments that have succeeded into entering two different productions. In general, horizontal FDI refer to the acquisition of a particular industry-specific knowledge regardless of the intentions of the foreign investor. Such a type of FDI brings some advantages to domestic producers through workforce skills qualifications, replacing foreign imports with domestic production, etc. The vertical FDI, on their part, provide general rather than specific knowledge of the sector’s development and are beneficial for both supplier and buyer firms [1,4,8].

Consistent with the conducted analysis of the FDI theoretical formulations and their significance to the economies of the respective countries, summarized below are their strengths and weaknesses:

Table 1. Effects of FDI on local economies

Positive aspects	Negative aspects
1. Restructuring of production; 2. Widespread introduction of innovations; 3. Effective implementation of management and marketing systems; 4. Technology and knowledge transfer; 5. Raising national competitiveness ; 6. Access to external markets ; 7. External financing which does not create additional indebtedness; 8. Higher labour productivity; 9. Reducing unemployment.	1. Use of high control approaches; 2. Possibility of influencing local policies; 3. Considerable and unstable cash outflows associated with the balance of payments; 4. Failure on the part of the State to implement large-scale FDI resulting in financial instability and outflows of other foreign investors; 5. Low-level activities and sporadic efforts by the local businesses to acquire know-how.

The effects of the foreign investments on the host country and its economic sectors should be achieved through:

- 1) Enhancing the country's economic development through increase in its GDP, export, gross capital formation, etc.;
- 2) Improvement in the socio-economic and technical/technological characteristics of modern economy, as well as in the industry–advanced workforce skills and qualifications, higher levels of employment, increase in employees' profitability and wellbeing, higher levels of productivity through greater innovation and technical sophistication, and others;
- 3) Infrastructure renewal and extensive transfer of environmentally sound technologies bringing about improved environmental performance not only of the respective sector but also of the region as a whole.

2. FOREIGN DIRECT INVESTMENTS IN BULGARIA

Investment direction and sustainability are contingent upon the trends of the global trade and investment flows as well as on the investment climate of the investee countries they are directed to. The positive effect will be determined by the specific socio-economic, administrative-judicial and organizational management prerequisites in the host country such as: gross domestic product, the purchasing capability of the working population, the aptitude of the government to impose strict control over the FDI by granting foreign investors access to the given market, by providing better opportunities for return on the invested capital, for loyal market competition, for profit reinvestment, for easy conversion of one currency into, et al.

In the first years of Bulgaria's membership in the EU, relatively large volumes of foreign direct investments were made in Bulgaria, one third of which were in the industry. Examining the FDI by investing countries, the results over the 2013-2016 period give prominence to the EU countries –Austria, Germany, Greece and the . Switzerland, Great Britain, Cyprus and Luxembourg constitute a substantial share of the foreign investment in Bulgaria. Due prominence should also be given to Russia for its considerable investment share in the country's economy. Their most attractive areas of investment were largely in the sector of production of chemical, rubber and plastic products, production of non-metal mineral (raw material) products, food, beverage and tobacco product manufacturing, textile and clothing manufacturing (fig.1).

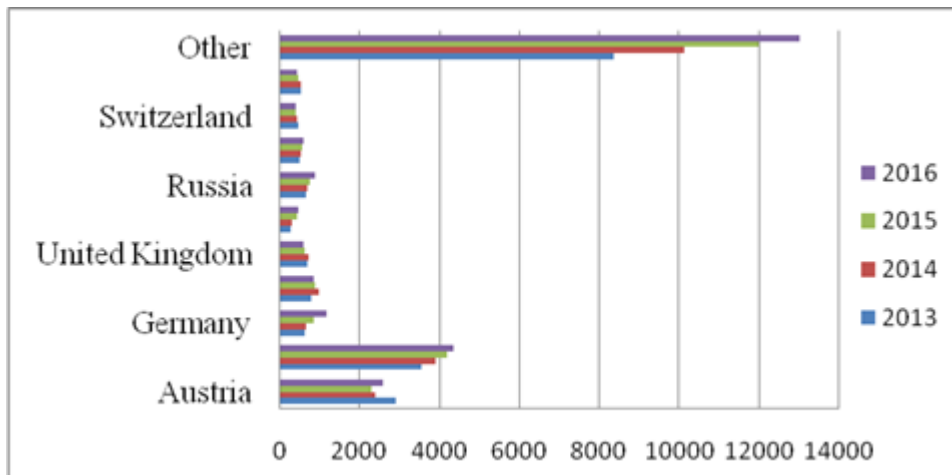


Figure 1. Volume of foreign direct investment in Bulgaria by country, mln. leva. [7]

The distribution of these investments by industry, however, is heavily concentrated in three sectors — “Construction and Real Estate”, “Industry” and “Financial intermediation”. Directed towards construction and repair are 25% of the foreign investments, followed by 18% in the financial sector. As stated in *fig.2*, 20% of foreign investments have been made in the industry, with a major part of them being concentrated in the chemical, food and processing industries. Trade accounts for 15% of the foreign investments, which is attributed to the presence of foreign brands such as: Lidl, Kaufland, Billa, Baumax, Praktiker and others. 10% of the foreign investments have gone into the public sector, and 4% in the transport and logistics sector. And yet, the unstable development of some of the sectors leads to an unbalanced structure of economic growth, which in turn produces negative effect on other key macroeconomic indicators. First and foremost, this results in a rapid and substantial increase in the demand of labour, which creates a serious lack of sufficiently qualified workforce in many sectors (*fig.2*).

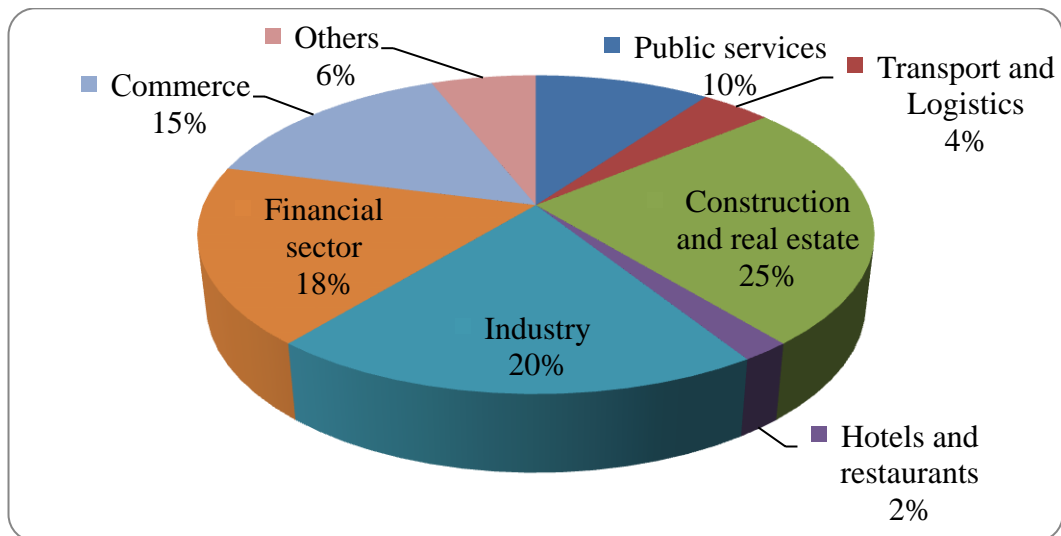


Figure 2. Distribution of foreign direct investment in Bulgaria by economic sectors [7]

At regional level, the distribution of foreign investment in the territory of Bulgaria is relatively uneven. According to NSI's surveys result, a major part of foreign investments tend to poured into regional markets around the larger cities such as Sofia, Varna, Plovdiv, Bourgas, Rousse, Stara Zagora and Shumen (fig.3).

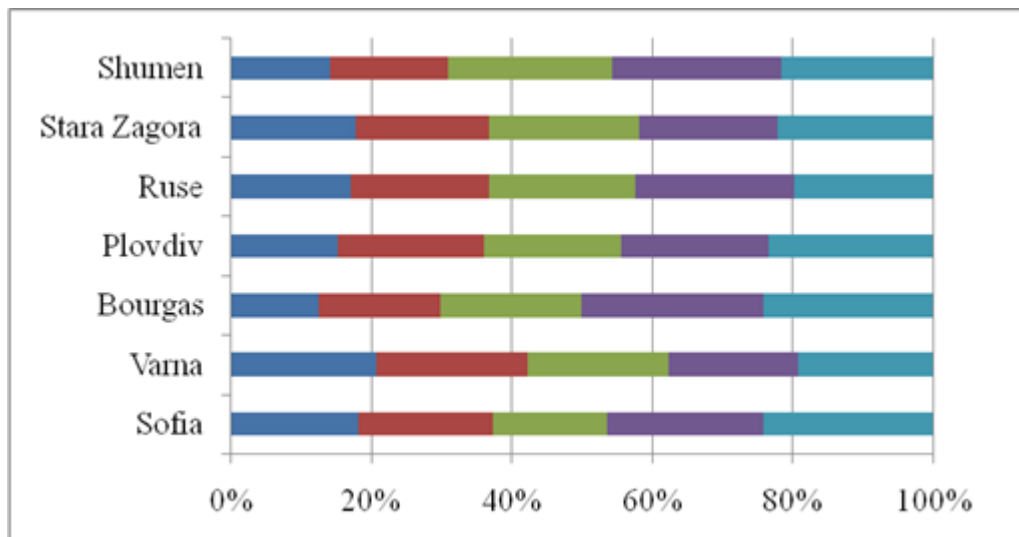


Figure 3. Regional Distribution of FDI [7]

Concentrated in Sofia is a large proportion of heavy industry enterprises (75% of the black or ferrous metallurgy), 50% of the polygraphic industry, 15% of the electrical and electronics industry, 14% of the country's fur clothing and footwear industry. Manufactured, accordingly, are chemical, textile and food products. The economy of Varna is quite balanced in terms of the industrial sector– with the largest share being taken by the chemical industry (25%), followed by the construction industry (17%), tourism (16%) and trade (12%). The economic structure of Bourgas is dominated by the trade industry, food industry, petroleum refining industry, wood processing industry, machine building industry, service industry, tourism and transport. Plovdiv is traditionally associated with highly developed branches of the processing industry, [trade](#), [transport](#), [communications](#) and [tourism](#). Located near Plovdiv is Trakia Economic Zone -one of the largest industrial areas in Eastern Europe that has attracted all significant investments in the region. Predominant in the modern economy of Rouse are the branches of the light industry– [textile](#), garment (tailoring) industry, food industry; [chemical industry](#); machine building and shipbuilding industries. Well-established industries in the region are also metalworking, electronics, military and machine-building. The city is the center of the furniture industry in Bulgaria and is represented by a significant number of woodworking and furniture enterprises. Situated in Stara Zagora is the industrial and energy complex “Maritza Iztok” - the largest energy complex in South Eastern Europe that provides about 40 per cent of the electricity in the country. Built in the territory of the city is a great number of industrial plant and factories: for cast iron casting; textile fibres; tooling and non-standard equipment; technological equipment; metal structures; forging-press plant; machinery for the food industry; furniture enterprises; knitwear; dairy processing; production of livestock fodder and grain mill products; tobacco processing factory and others.

The high concentration of FDI in the capital city and a small number of economically developed areas follows quite logically from the fact that these are precisely the places with a

large accumulation of key institutions, businesses, infrastructure, labour resources with various levels and types of qualifications, and consequently, with a large proportion of the country's population.

3. THE IMPACT OF FDI ON THE ECONOMIC DEVELOPMENT OF BULGARIA

The FDI inflow to Bulgaria over the 2013-2017 period amounts to 760 mln. euro on average per year, which add up to 66,5% of the accumulated fixed capital. One of the main indicators of the impact of FDI on the economic development of Bulgaria is the increase in their relative share in the country's GDP (Figure 4).

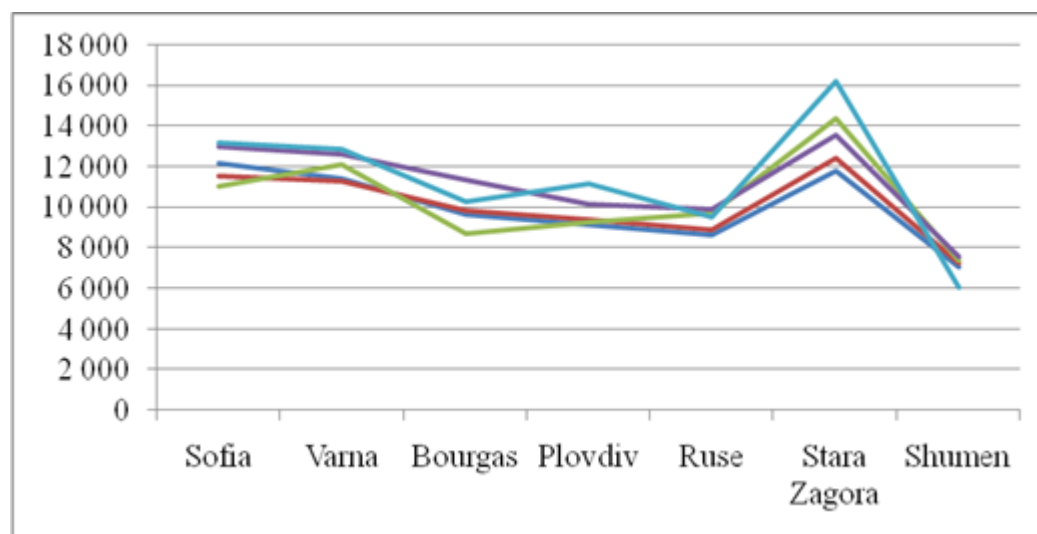


Figure 4. Foreign direct investments as a percentage of GDP [7]

The enhancement of FDI inflows into Bulgaria is due to the combined effect of a number of factors such as privatization, adopting measures to incorporate (transpose) the EU rules and regulations and tax provisions into national rules and regulations, as part of the traditional determinants influencing the behavior of foreign investors. The EU membership of Bulgaria gives the overseas investors strong confidence in the potential of the Bulgarian economy. Nonetheless, foreign investors are still hampered by bureaucratic, licensing and, in some cases, corruption procedures and practices, in addition to outdated infrastructure of the country.

The graphs below (fig.5 and fig. 6), representing the dynamics of FDI inflows and the number of unemployed in the country for the period from 2013 to 2017, show clearly that with falling FDI cash flows the unemployment is increasing in absolute terms, and respectively in the unemployment rate.

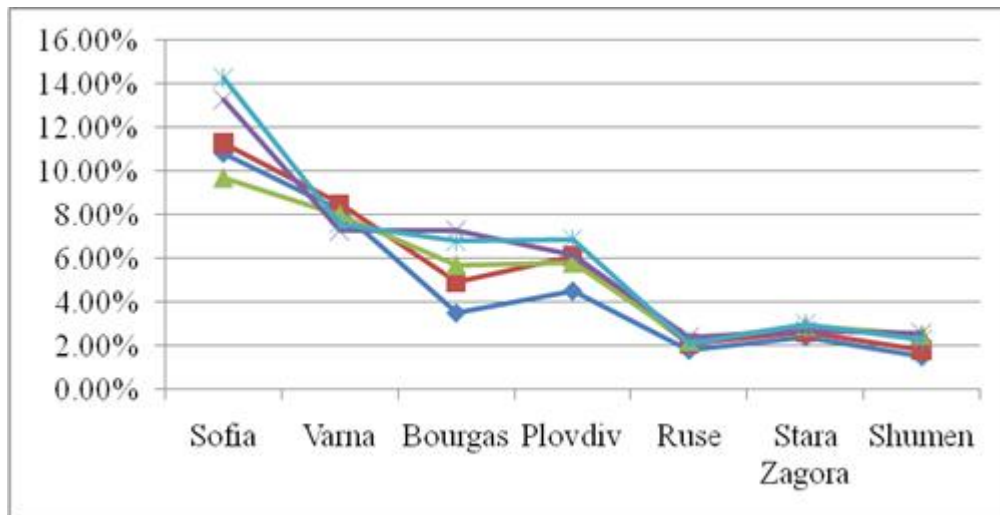


Figure 5. Dynamics of FDI inflows in Bulgaria in mln. euro [7]

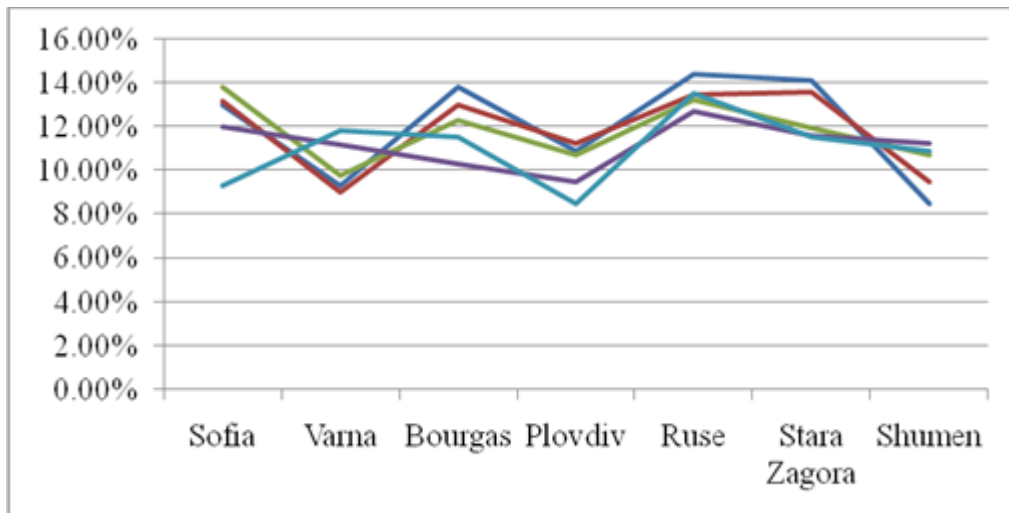


Figure 6. Dynamics of the number of unemployed persons in Bulgaria in relative terms [7]

4. CONCLUSION

In a nutshell, an increase in the production efficiency, including the attraction of FDI into the country's structure-determining branches of industry, should be based on a specific strategy aimed at continuously improving and facilitating the investment climate in Bulgaria. To that effect various economic mechanisms might be employed, part of which are:

- 1) Improving the general administrative and regulatory environment;
- 2) Constructing, promoting and establishing a strategic vision for further development in the field of statutory encouragement of investments;
- 3) Investment promotion policies at regional level;

- 4) Enhancing access to finance for small and medium-sized enterprises by facilitating the development and expansion of their business activities through bank loans and commercial services. This is the way to rivet and sustain the interest of foreign investors to SMEs, which may prove to be the beating heart of the development of production networks and trading communities;
- 5) Tax and customs exemptions or relief for export-oriented enterprises;
- 6) Attracting FDI in higher-value manufacturing activities and high-tech manufacturing industries in order to improve the competitiveness and boost the advancement of export-oriented industries.

REFERENCE:

1. Alfaro, L., Rodriguez-Clare, A., 2004. Multinationals and linkages: evidence from Latin America. *Economia* 4, 113–170.
2. De Gregorio, J., 1992. Economic growth in Latin America. *Journal of Development Economics* 39, 58–84.
3. Farrell R., Japanese Foreign Direct Investment in Real Estate 1985–1994, Australian National University, Australia–Japan Research Centre 1997
4. Javorcik, B.S., 2004. Does foreign direct investment increase the productivity of domestic firms? In search of spill overs through back ward linkages. *American Economic Review* 94, 605–627.
5. OECD Benchmark Definition of Foreign Direct Investment , 2008
6. Rappaport, J. (2000). “How Does Openness to Capital Flows Affect Growth?”. Research Working Paper, RWP 00-11. Federal Reserve Bank of Kansas City, December
7. [National statistical Institute](#)
8. <https://www.imf.org/External/NP/sta/bop/pdf/diteg20.pdf>



MORAL HAZARD AND NATIONAL HEALTH INSURANCE SCHEME PENETRATION IN LAGOS, NIGERIA

Onafalujo, Akinwunmi Kunle

Lagos State University (insurance department), Nigeria

Abstract: This study investigated how moral hazard may constrain the strategic intent of National Health Insurance (NHIS) in promoting access to more effective health care financing. Life expectancy and healthy life expectancy of Nigerians is currently estimated to be below 50 years- a far cry from other countries development index. As at 2015, only five million persons (about three per cent of the population) have enrolled in the NHIS. The degree of penetration of NHIS may have been significantly moderated by the indirect influence of ex-ante moral hazard arising from several factors which may include standards of medical and hospital cares, and exclusions available in the scheme. A survey was carried among out-patients in the two Teaching Hospitals in Lagos State. Using ordinary least square techniques, the study found disincentives to participate based on the scope of exclusions and opaqueness of health services which induces moral hazard of mass non-participation. A review of the exclusion list and operational efficiency of the Health Management Organizations are recommended plus increased public expenditure to improve standard of health care. Contingent claims on social security may also be used to reduce health care burden of chronic diseases.

Keywords: Health care financing, National health insurance, Moral hazard

1. INTRODUCTION

The spiraling cost of health care has increased vulnerability to poverty (Rao, 2004), and has necessitated several nations including Nigeria to seek alternative health care financing and delivery of health care. Several countries have found harbinger in National Health Insurance Scheme (NHIS), and are implementing a nascent one (International Social Security Association, 2005) to deliver universal health care. According to Crocco (2005), the purpose of seeking new models for health care financing is to ensure universal access to health care (health for all), and to activate incentives for health care providers to be more effective which should improve health status. Health insurance provides a unique solution to health care financing drawing from its definition. Specifically, health insurance is a contract to transfer income or wealth from those who buy insurance and remain healthy, to those who buy insurance and become ill (Nyman, 2006). Nigeria introduced and implemented the compulsory NHIS in 2005 on the backdrop of the foregoing health care financing problem, which in the opinion of Ibiwoye & Adedeke, (2007) was because government perceived some citizens will not engage in the scheme. How then will the government be able to enhance the general welfare of all citizens? But does the citizenry perceive NHIS is even more attractive

to the less privilege in view of risk-distribution and income-redistribution content as advance in Kifmann (2005). The government may have overlooked that moral hazard may be the impediment to incentivize mass participation. Economists identified a profit motive in moral hazard, described by Einav, Finkelstein, Ryan, Schrimpf and Cullen (2013) as the slope of health care spending with respect to price. Crocco (2005) suggested that the heightened presence of moral hazard in health insurance will not make voluntary contributions to succeed but may have to be mandatory, that is a form social health insurance. Moral hazard also exists from the perspective of the provider who is unable to show trust that the service promised will be provided (Pearson, 2002). This study aims to unveil the implications of moral hazard in NHIS health providers which has an indirect impartation on general public to go for perceived less costly preventive care as enunciated in (Dave & Kaestner, 2006).

The gravity of health care financing problem in Nigeria can be gleaned through Nigerian low life expectancy averaging around 47 years (see WHO, 2005) and the healthy life expectancy which had been 42 years for several years. Table one below shows national health expenditure per capital and income per capital for several years. The value for Health expenditure per capita (current US\$) in Nigeria was \$117.52 as of 2014. As Figure one below shows, over the past 20 years (1995 -2014), this indicator reached a maximum value of \$117.52 in 2014 rising from a minimum of \$16.26 in 1999 (calculated at the current exchange rate). It is tractable in Figure one that the sudden upswing from 2006 is likely attributable to the implementation of the NHIS. Despite this, it is abysmally lower than other countries that are peers in development status. This could imply the extent to which government performance had been able to push the NHIS agenda to the citizenry in spite of its statutory compulsion. The enrollment in NHIS shows a paltry subscription of 150, 000 persons in 2004 rising to five million in 2014 (about 3% of the population) at an average growth rate of 3.2%. This poses the research question that the gap in health care financing portrayed in Table one should have incentivized the working population to demand participation in the NHIS and for the government to expend more effort on awareness and enforcement. The study therefore conjectures that moral hazard influenced the insipid participations particularly by low income earners in NHIS. The study adds to growing literature on the economics of health insurance and moral hazard as it affects Nigeria.

Table 1. Health Care Expenditure in Nigeria (1995-2014)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Value \$	37.68	53.95	54.64	61.42	16.26	17.22	18.28	17.89	38.50
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
Value \$	44.94	53.09	61.01	81.37	88.52	74.36	80.34	93.23	90.39
Year	2013	2014							
Value \$	110.37	117.52							

Sources: World Bank Indicator 2014

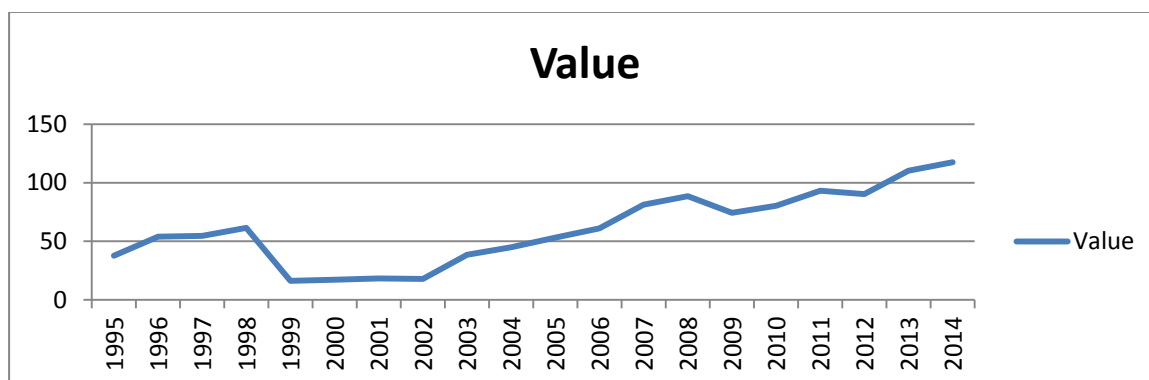


Figure 1. Health Care Expenditure in Nigeria (1995-2014)

2. LITERATURE REVIEW

The NHIS was conceived in 1962, finally proposed in 1997 and established by law in 1999 on the backdrop of formulating a strategy of ‘Universal Coverage’ for health risks for the nation. It finally took off in 2005. 11 years later healthy life expectancy and life expectancy remains in the margins. The literature is reviewed in terms of concepts and theories of health insurance as health care financing concept and the role of moral hazards in the NHIS penetration in Nigeria.

2.1 CONCEPTUAL REVIEW

Health care comprises medical care and hospital care (Jacobs, 1980). Medical care is the process of accessing specialists, consultants and general practitioners, as well as the usage of quality medical equipments and availability of pharmaceuticals for treatment. Hospital care is quality of nursing care and beds per space. To finance such health cost through insurance requires trust, the quintessential of insurance contract in reducing information asymmetry and indeed moral hazard (Pearson, 2002). Health insurance is a contract to transfer income or wealth from those who buy insurance and remain healthy to those who buy insurance and become ill (Nyman, 2006). Social insurance concept in health insurance is a device of social protection for poor or underprivileged so as to prevent destitution (Teriba, 2005). Social health insurance naturally emerged from the developed countries on realization that actuarial pricing for medical and unemployment insurance is not feasible (Barr, 1989), which however does not forbade government failure (see Stigler, 1970); Tullock, 1970 on taxation pricing principle). (Falk (1977) traced the origin of health care financing to the readiness of societal units such as families, neighbours, the Church, and the employer to provide care for their members in the event of injuries and sickness. But it is not equitable (Quadagno, 1984) and will not promote efficiency. Social health insurance primarily has been explored as an alternative to ‘Out of Pocket’ (OOP) health care financing to reduce impoverishment of the poor who have very low resilience to absorb economic shocks (Rao, 2004). World Bank (2002) reported that irrespective of economic class, 58% of per capital expenditure is likely to be spent on a single episode of hospitalization for an acute sickness. No individual can do precautionary saving of this amount in anticipation of health risk. This can push even the

middle class to the poverty level on account of sickness. The growth of health insurance is tractable to the UK's establishment of the Poor's law in 1601 to manage the financial need of the aged and infirm on recognition of disappearing filial obligations and ties (Quadagno, 1984). A more direct political intervention was by Emperor Otto Von Bismarck of Germany who enacted the mandatory legislation on the "sickness funds" for working Germans in 1883 which was to reduce the political risk of spread of socialist mentality in Europe (Falk, 1977). Many countries in Western Europe quickly joined this league of a form of public health insurance possibly on the political legitimacy theory (Cutler & Johnson, 2004). But later found to be a correlation to reduction of moral hazard in health insurance demand

The need for NHIS was premised on similar grounds in Nigeria with the rising cost of medical care and hospital care; the need to protect the less privilege from impoverishment, improve health care facilities, the need to have healthy working population for enhanced national productivity, prevent palpable growing financial bankruptcy amongst private hospitals, reduce brain drain and possibly harness it to a political legitimacy agenda. This insurance-based welfare approach may have ignored the negative influence of moral hazard. The strong filial ties which account for a significant health care financing through OOP even though inequitable (Ogunshola, 1984), is prevalent in Nigeria. This could be veritable source of conjectural indirect ex-ante moral hazard of perceived low health risk that could militate against demand for private health insurance or NHIS.

2.1.1 Theoretical review

Though insurance business is partially built on contract law and statute, it is also theoretically straddled with information asymmetry which gives rise to adverse selection and moral hazard (Seog, 2010). Both adverse selection and moral hazard are deadweight costs to insurance system. It has been established by legal principles of 'Ubrimae Fidei' that parties to an insurance contract must disclose all material facts to enable actuarial fair pricing. This may not be possible in all cases of insurance particularly medical insurance. A person may be feeling sick but without professional medical opinion cannot be guilty of non-disclosure of a disease which may require higher actuarial pricing (Seog, 2010). In theory, moral hazard emanates from information asymmetry and adverse selection since the insured can vary his/her actions or attitudes ex-ante or ex-post insurance contract (Seog, 2010). The basic prediction of adverse selection theory concerns the correlation between insurance coverage and risk. Under this prediction, policyholders who are known to themselves (but not to their insurer) to be high risk will tend to choose higher insurance coverage. This is also relevant to moral hazard theory (Cohen and Siegelman, 2010).

Moral hazard has been defined in several ways. In literary way it is a dangerous or undesirable behavior of an individual in certain circumstances. In insurance context, Moral hazard is the "intangible loss producing propensities of the insured", or the attitude of the insured that increases the risk (Pearson, 2010). This is simply visualized as demand for more benefits by the insured or being more careless or negligent towards risk, but more importantly, due to possession of more private information may or may not seek insurance for high or low risk. In the Nigerian environment, health risks are presumed to be controllable to a good extent which will lower demand of health insurance because of the cost-benefit analysis of risk management. The moral hazard of the insurer is frequently ignored in literature. In other words, the health insurance provider needs to reduce moral hazard by showing that the health care offered is beneficial to the extent of premium paid. The moral hazard ex-ante insurance contract is more relevant to this study because the prospective

insured quite naturally selects actions to minimize loss or maximize gains. It is argued that an individual will want to retain risk if the benefit of insurance is perceived to be inefficient, particularly where there is believe that, he or she cannot suffer acute illness, or selects to manage health through traditional means or self-medication, or can gain benefit from filial support in a health contingency. This study therefore argues the obverse of making effort to reduce medical expenses will result in no incentive to insure or at best result in ‘selection of moral hazard’ Einav, Finkelstein, Ryan, Schrimpf & Cullen (2013) to reduce premium. Actuarial pricing is defeated where there is probability of moral hazard such as in medical insurance.

Actuarial price of insurance of the i^{th} individual is derived as in (Barr, 1989):

$$P_i = \beta_i L + T$$

Where P is premium-price of insurance in a competitive market, β is the probability of loss, L is the loss within a period, and T is the transaction cost (the administrative cost plus profit).

In the presence of moral hazard, ω : actuarial price of insurance becomes;

$$P_i = \beta_i L + T - \omega,$$

because ω is hidden action or private information that is unobservable (Einav, Finkelstein, Ryan, Schrimpf & Cullen, 2013).

The theory of moral hazard in respect of health insurance is that it can result in excessive demand of health care services. This is not in contention in this study. The obverse of this is an indirect implication of moral hazard. The demand of health insurance may be ineffective if ex-ante moral hazard prevails by suspecting inefficient health care is prevalent in the health system. Health insurance generally should treat all acute illness while excluding chronic diseases. But the general public that has low insurance literacy cannot understand why certain diseases are excluded under the NHIS program. Thus the ‘word of mouth’ campaign by beneficiaries and counseling by medical practitioners in promoting NHIS suffers. On the moral hazard question of whether participants would have preferred premium charged to be flat fees or related to income or risk-based, Kifmann (2005) following the political arguments of Usher (1977); Breyer (1995); Epple Romano (1996); Gouveia (1997) in favour of income related premium, using Pareto optimality conditions to prove that even the rich preferred the option of income-related capitation fee. It was only Breyer and Haufler (2000) who argued for the preference of tax-financed against income related in view of the efficiency gains. The NHIS program has sub-optimal insurance mechanism laden with moral hazard by structuring a flat fee for a voluntary-type scheme with benefits linked to higher exclusions. This may further exacerbate negative insurance inducing behavior of the Nigerian worker with the latent background of moral hazard of health care providers.

3. ANALYSIS OF MORAL HAZARD AND PUBLIC HEALTH INSURANCE

Using convenience sampling technique, interviews were carried in the two teaching hospitals in Lagos among the out-patients and medical personnel with the support of the top management. 85 patients and 52 medical personnel were interviewed. It elicited for answers on issues of health care spending. 52% are self employed or unemployed, 23% worked in

private formal sector, 18% worked in public service, and 7% were retired. The responses of 55(9.6%) were not found useful. The high response rate could be attributable to the simplicity of the questions and psychological support that the research will resolve some of the health challenges they are currently facing.

Section B was directed to the patients. The first question asked why most Nigerians attend public hospitals even for minor sickness. The responses show 83% of 85 out patients interviewed in the two teaching hospitals complained of unaffordable high fees in private hospitals lesser quality of medical care but better hospital care. The second question asked the question of problems encountered in public hospitals: 92% agreed that the waiting time before meeting the required specialist and receiving medical treatment range from two weeks to several months in public hospitals, and 98% also are highly dissatisfied with the adequacy of drugs. The third question sought to know why they have not subscribed to NHIS. 78% are of the opinion that they cannot plan for sickness when they are not ill. 86% believed God will protect them from sickness. 32% strongly disagree health insurance run by government can meet up with their health needs.

Section C was directed to medical personnel. 30 middle-ranked medical doctors and 22 nurses were interviewed. The first question addressed the constraints to delivering prompt services. 70% strongly adduced it to poor funding by government and inability of patients to pay, 68.3% inferred it to be lack of government commitment to address health problems and 71.7% inadequacy of personnel. The second question inquired into the extent the exclusion list to benefits obtainable satisfied the health care need of the patients. 64% agreed the exclusion list does not address health care need of the patients; 5% does not agree while 31% do not understand the implications of the exclusion list. In essence the study summarized these findings to be the problems associated with poor health financing, poor understanding of health insurance management using exclusion list. The prevalence of non-willingness to participate in NHIS to the extent that only 3% of population is covered in 11 years of existence despite its distributional effect (Barr, 1989) to the low income is worrisome. The role of moral hazard particularly from the health care provider and NHIS in providing beneficial health care delivery to the insured further aggravates the low penetration in health insurance.

4. DISCUSSION

The level of medical care and hospital care services considered sup-optimal in the analysis described above is also a form of ex-ante moral hazard. This negatively affects the morale of the insuring public as to what benefits are available leading to moral hazard from health providers. This perception of the insuring public of possible moral hazard in health insurance service susceptibly develops into an ex-ante moral hazard not to demand health insurance. This correlates with the responses on adequacy of funding of health care and diseases not treatable under NHIS. This was also the case in Tanzania (Atim, 1999)

It is argued in much of the literature on moral hazard that insurance is antithetical to risk reduction based on the axioms of economics of information that the insured has sub-optimal incentive to reduce risk (Logue & Ben-Shahar (2012). The indirect implication of moral hazard in the above circumstance is the incentive of more self insurance which may be less economical than purchasing insurance. The existence of ex-ante moral hazard, especially among the low income which social health insurance tries to hedge is not understood by this group; otherwise, they should readily embrace NHIS. If compulsory health insurance is used

to resolve moral hazard and low insurance culture, then the benefit package must be equitable and give value for money (Enthoven, 1993) with less exclusion.

5. CONCLUSION

The aim of NHIS is universal access to health care in Nigeria. But mass participation is encumbered from the findings. A very high percentage cannot understand the basic principles of insurance, implying some moral hazard of negative attitude to insurance products. There is a link to ex-ante moral hazard because of the perception of inadequacy of hospital and medical care. This is worsened by the awareness that certain sicknesses are not treated by NHIS because of the exclusion list of diseases. This aligned to moral hazard theory which explains that moral hazard affects actuarial pricing of insurance and hence health insurance was made compulsory. However moral hazard may have dissimulated the high informal sectors to involuntarily participate. The study argued that NHIS strategy and structure for a health care financing model in Nigeria is not yet observable from the quality of medical care and hospital care. This interfaces with providers' moral hazard -not being able to promise some standardized benefits, as well as the weak coverage of some acute diseases through the exclusion list. The implications induce a negative moral hazard for individuals to continue financing health care from OOP.

6. RECOMMENDATIONS

To popularize health insurance in a country with one of the poorest life expectancy of 47-52 years and healthy life expectancy of 47 years require the holistic reduction of moral hazard. The social risk of not wanting to participate in NHIS in view of moral hazard must speedily tackled by ensuring that participants have quick access to health care. This can be achieved by reducing the exclusion list and advertizing the high points of NHIS solution to health problems particularly in diabetes, hypertension, stroke, minor surgeries, accident and emergencies - the emerging scourge of health risks in Nigeria. In the case of accidents and emergencies, financing can be augmented from sales tax of alcohol, wines and beers. Health Management Organizations should be monitored to ensure that capitation is paid regularly and should increase expenditure in equipping hospitals. NHIS should adopt electronic identity management that admits the sick for the secondary and tertiary health institutions. Full benefit should be received for at least one week before demanding the co-payment of 50%.

REFERENCES

1. Akerlof, G. A., Market for insurance. *Quarterly Journal of Economics*, 84, (1970), 488-500.
2. Alma, C., Siegelman P., Testing for adverse selection in insurance markets. *The Journal of Risk and Insurance*, 77 (1) (2010), 39-84.

3. Atim, C. Social movements and health insurance: A critical evaluation of voluntary, none—profit insurance schemes with case studies for Ghana and Cameroon. *Social Science and Medicine*, 7 (1999).
4. Atkinson, A. B., Stiglitz, J. E., *Lectures in public economic*. London & New York: McGraw-Hill, (1980).
5. Barr, N. A., *The economics of the welfare State*. London: Weidenfeld and Nicolson, and Stanford University Press, (1987).
6. Breyer, F., The political economy of rationing in social Health Insurance. *Journal Population Economics*, 8, (1995). 137-149.
7. Cutler, D. M., Johnson R., The birth and growth of the social insurance state: explaining old age and medical insurance across countries. *Public choice*, 120 (1/2) (2004), 87-121.
8. Dave, D., Kaestner, R., Health insurance and ex-ante moral hazard: evidence from medi-care, *Working paper 12764, National bureau of economic research*, (2006).
9. Dembe, A. E., Boden, L. I., Moral hazard: a question of morality? *New Solutions*, 10 (3), (2000). 257-279.
10. Devadasan, K. R., Van Damme W., Bart C., Community health insurance in India: an overview *Economic and Political Weekly*, 39 (28), (2004), 3179-3183.
11. Einav, L., Finkelstein, A., Stephen P. R., Schrimpf P., Mark R. C., Selection on moral hazard in health insurance. *American Economic Review*, 103(1), (2013), 178-219.
12. Enthoven, A., The history and principles of managed competition, *Health Affairs*, 2 (1), (1993), 11-18.
13. Epple, D., Romano, R., Public provision of private goods. *Journal of Political Economy*, 104, (1996), 57-84.
14. Falk, I. S., Proposals for national health insurance in the USA: origins and evolution, and some perceptions for the future. *The Milbank Memorial Fund Quarterly, Health and Society*, 55, (2), (1977), 161-191.
15. Gouveia, M., Majority rule and the public provision of a private good. *Public Choice*, 93, (1997), 221- 244.
16. Ibiwoye, A., Adeleke, A. A., The impact of health insurance on healthcare provision in developing countries. *Ghananian Journal Development Studies*, 4 (21), (2007), 49-58.
17. International Social Security Association, *Scope and objectives. meeting of directors of social security organizations in the English-speaking Carriibbean*: The Press Jacobs, P. (1980), *The economics of health and medical care*. UK: University Park press.

18. Logue, K. D., Ben-Shahar, O., Outsourcing regulation: how insurance reduces moral hazard (Coase-Sand), *Institute for Law & Economics Working Paper*, 593, (2012).
19. Mark V. P., Lemons: qualitative uncertainty and the market mechanism: the economics of moral hazard. *The American Economic Review*, 58(3), (1968), 531-537.
20. Mathias, K., Health insurance in a democracy: why is it public and why are premiums income related? *Public Choice*, 124 (3/4), (2005).283-308.
21. Md Saad, N., Idris, N. E. H., Efficiency of life insurance companies in Malaysia and Brunei: A comparative analysis. *International Journal of Humanities and Social Science*, 1 (3), (2011), 111-122.
22. Mueller, L. *African insurance: A giant awakens*. Retrieved from <https://www.blueprint.ng/2016/01/22/nigeria-re-unveils-insurance-industry-report> retrieved on 05/4/2016.
23. Nicholas B., Social insurance as an efficiency device. *Journal of Public Policy*, 9 (1), (1989), 59-82.
24. Obasi, N., Policies, challenges, reforms and Nigerian disposition to insurance contracts. *The Fronteira Post*, (2010), 1-6.
25. Pearson, R. Moral hazard and the assessment of insurance risk in eighteenth -and early-nineteenth-century Britain. *The business history review*, 76 (1), (2002), 1-35.
26. Quadagno, J. S., From poor laws to pensions: the evolution of economic support for the aged in England and America. *The Milbank Memorial Fund Quarterly, Health and Society*, 62 (3), (1984), 417- 446.
27. Rao, S., *Health insurance: concepts, issues and challenges*. New York: The Press (2004).
28. Sabbir, P., (2002). *Takaful and poverty alleviation*, www.icmif.org/takaful (2002), retrieved on 12th October, 2015.
29. Seog, S. H., *The economics of risk and insurance*, 1st edition. United Kingdom: John Wiley and Sons Ltd, (2010).
30. Shavell, S., On moral hazard and insurance. *The quarterly journal of economics*, 93, (1979). 541-561.
31. Stigler, G., Director's law of public income redistribution. *Journal of Law and Economics*, 13, (1970), 1-10.
32. Thoyts, R., *Insurance theory and practice*. Canada, Routledge (2010).
33. Tullock, G., *Private wants, public means*. New York: Basic Books, (1970).
34. Usher, D., The welfare economics of the socializations of commodities. *Journal of Public Economics*, 8, (1977), 151-168.

35. Usman, O. A., Scale economies and performance evaluation of insurance market in Nigeria. *The Social Sciences*, 4(1), (2009), 1-1.
36. Williams, Jr., Smith, C. A., Young, P. C., *Risk management and insurance*, 7th ed., US: McGraw-Hill, Inc, (1995).
37. World Bank, *Better health systems for India's poor-Analysis, findings and options*, World Bank, (2002).
38. World Bank, @ www.Worldbank/healthexpenditure.com, (2016), retrieved on 15th April, 2016.
39. Zöllner, D., Germany in Kohler, P., Zacher, H., Partington, M., (Eds.), *The evolution of social insurance 1881-1981: Studies of Germany, France, Great Britain, Austria and Switzerland*, New York, St. Martin's press, (1982).



HUMAN RESOURCES AND THE ROLE OF ETHICS IN THE FRAMEWORK OF INDUSTRIAL SECURITY

Dragan Igić¹, Milovan Vuković²

¹Ministry of Defense, Republic of Serbia; ²University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Human resources, ethics and industrial security are interdependent. The human resources function provides conditions for quality selection of individuals, vocational education and high level of security behavior and motivation of employees. This means that employees in the organization give their full contribution from the standpoint of raising security to a higher level. This paper includes a short review of concepts dealing with human resource management and ethics in the aspect of its influence on industrial security. A central part of this study is focused on identifying indicators of human resources and on the role of ethics in terms of their impact on industrial security. The main objective is to identify factors affecting the security culture and climate. During the empirical study, 120 respondents participated. The survey has been conducted using the instrument – a questionnaire – specifically designed for this type of research. Factor analysis technique is used in order to determine the structure of latent factors underlying security behavior of the staff in the organization. It has shown that employees, as the main subjects of human resource management in the organization, make a significant influence on industrial security regarding their moral, ethical and security qualities, which is particularly relevant to the level of security culture and climate.

Keywords: Industrial security, security climate and culture, motivation, selection, education.

1. UVOD

Upravljanje ljudskim resursima (ULjR) je važan segment globalnog menadžmenta koji eksplicitno dokazuje – teorijski i empirijski – da društvene delatnosti (u prvom redu nauka, obrazovanje, kultura i zdravstvo) gube karakter potrošnog dobra iako se njihovi troškovi iskazuju u okviru budžetskih izdataka države ili rashoda javnih fondova. Ulaganja u društvene delatnosti sve se više shvataju kao investicije u ljudski kapital koje dugoročno ostvaruju prinose bez dodatnih ulaganja. Investicije u ljudski kapital tako postaju važan faktor rasta (tržišne vrednosti ljudskog kapitala se ne računavaju u stope prinosa), a vrednost doprinosa društvenih delatnosti često prevazilazi stope prinosa od privrednih investicija. Polazeći od činjenice da ljudski resursi svojim radnim potencijalom (znanjem, iskustvom, sposobnostima i motivisanošću) imaju odlučujuću ulogu u procesu industrijske proizvodnje, može se zaključiti da funkciji upravljanja ljudskim resursima i uloge etike u industriji pripada istaknuto mesto.

Svi zadaci funkcije-delatnosti ULjR u industriji usmereni su na obezbeđenje uslova za nesmetanu realizaciju brojnih funkcija i zadataka, jer zaposleni predstavljaju centralnu nit koja se javlja u svakoj od njenih funkcija. Zadaci funkcije ULjR (profil potrebnih lica, planiranje, prijem i obrazovanje ljudskih resursa, postavljenja, napredovanje, sigurnost prvenstveno u vidu zaštite tehnologije i tajnih podataka i prestanak rada) treba da obezbede nesmetano funkcionisanje i dalji razvoj ostalih funkcija u industriji. Razvoj ostalih funkcija je u uzročno- posledičnoj i povratnoj vezi sa razvojem funkcije ULjR. Kako su zaposlena lica isključivi nosioci procesa razvoja, problemi ljudskih resursa mogu predstavljati „usko grlo“ za dalji razvoj kompanija ukoliko funkcija upravljanja (menadžmenta) ljudskim resursima nije u dovoljnoj meri razvijena.

Obrazovanje zaposlenih lica u preduzeću, politika ULjR i raspored na ključne funkcije prema sposobnostima, kult znanja umesto kulta ličnosti, odlučujuće su pretpostavke uspešnog funkcionisanja industrijske organizacije. Izbor zaposlenih lica i postavljenja na odgovarajuća kadrovska mesta pripada najodgovornijim licima u kompaniji, odnosno onima koji se nalaze na najvišem položaju. Zato su selekcija i regrutovanje, odnosno izbor i postavljenje na odgovarajuću dužnost, izuzetno odgovorni i osetljivi zadaci. Takođe, od kvaliteta ULjR zavisi uspešnost izvršavanja zadataka i funkcionisanja same kompanije. Realizacija principa ULjR ima direktne implikacije na proizvodnju. Izborom adekvatnih lica i postavljenjem svakog pojedinca na pravo mesto stvaraju se mogućnosti za adekvatan i stručan rad u preduzeću, sprovodi se zaštita poslovnih informacija odnosno vrši se razvijanje kvalitetnih međuljudskih odnosa. Zato je značajno da se stalno prikupljaju podaci i realno ocenjuju zaposleni prema svojim sposobnostima i odgovornostima. To se najbolje uočava kada u kompaniji treba izabrati jednog kandidata od više mogućih.

S tim u vezi, istraživački cilj ovog rada je da utvrdi strukturu konstrukta bezbednosti i identifikuje indikatore u industrijskoj bezbednosti sa stanovišta doprinosa zaposlenih u preduzeću na planu podizanja bezbednosti na viši nivo odnosno identifikuje faktore koji negativno deluju na bezbednosnu kulturu i klimu.

2. METODOLOGIJA ISTRAŽIVANJA

Od kvaliteta ljudskih resursa i uloge etike u industrijskoj bezbednosti zavisi kako će biti realizovan princip „pravi čovek na pravom mestu“. Samim tim ljudski resursi i etika u industrijskoj bezbednosti imaju veliki uticaj na uspešno izvršavanje zadataka i funkcionisanje preduzeća. Od konkretnih personalnih rešenja unutar preduzeća zavisi koliko će postojeći sistem ULjR odgovarati zahtevima poslova i zadataka, koliko će zaposleno lice biti zadovoljno svojim statusom, tj. da li će se obezbediti pretpostavke da komponenta ULjR postane uspešan činilac upravljanja preduzeća. Jednostavno, ljudske resurse treba planirati, predviđati, regrutovati, selektirati, obučavati, ocenjivati i nagrađivati, odnosno postavljati na one dužnosti gde će postići najbolje rezultate i pri čemu će od istih biti zastupljena maksimalni nivo bezbednosti za poslove koje obavljaju, jer od njihovog stručnog rada i ponašanja nesumnjivo zavisi i uspešnost preduzeća.

Pored toga, u odlučivanju o kandidatu za postavljenje unutar organizacije na određenu dužnost (radno mesto) treba oceniti sve bezbednosne elemente iz kriterijuma za rangiranje. Od valjanosti izbora zavise: odgovarajuća popuna radnog mesta, iskorišćenost mogućnosti ljudskih resursa, zainteresovanost i motivisanost svakog pojedinca i ukupna „bezbednosna klima“ u organizaciji. Kvalitetnim i dobrim izborom lica za konkretne dužnosti stvaraju se realni uslovi da oni budu prihvaćeni u organizaciji – što je i osnovna pretpostavka da u njoj sve funkcioniše kako je propisano, čime se stvaraju i uslovi za povećanje bezbednosne kulture

i klime. Pogrešan i nekvalitetan izbor ljudi, uslovljen neadekvatnim sistemom ULjR ili subjektivnim postupkom pretpostavljenih, može proizvesti faktore koji mogu negativno da deluju na bezbednosnu kulturu i klimu.

Od konkretnih personalnih rešenja i njihove dosledne realizacije zavisi koliko će postojeći ljudski resursi odgovarati zahtevima poslova i zadataka, koliko će biti zadovoljni svojim statusom, pa samim tim zavisi i njihovo organizaciono ponašanje odnosno ispoljena bezbednosna kultura i klima unutar organizacije.

Tokom istraživanja primenjen je kvantitativni stil istraživanja. Do primarnih podataka došlo se primenom tehnike ispitivanja, odnosno instrumenta - upitnika. Uz deskriptivnu statistiku, korišćene su tehnike inferencijalne statistike u analizi dobijenih podataka. Statistička metoda omogućila je da se sve pojave ULjR i uloge etike u industrijskoj bezbednosti uoče i da se iz njih izvuče ono što je opšte u njima kao i da se identifikuju indikatori ljudskih resursa i uloge etike sa aspekta njihovog uticaja na industrijsku bezbednost. Empirijskom metodom prikupljeni su podaci neophodni za dokazivanje stavova pojedinačnih hipoteza. Iz grupe empirijskih metoda primenjena je metoda ispitivanja, a od istraživačkih tehnika u toku istraživanja primenjena je tehnika anketiranja.

Osnovna struktura istraživanja zasnivala se na varijablama koje su proistekle iz teorijskog određenja predmeta i hipotetičkog okvira istraživanja. U toku realizacije istraživanja ispitivane su sledeće varijable:

1. Nezavisne varijable u istraživanju industrijske bezbednosti odnose se na: (1) motivaciju zaposlenih; (2) kontrolu i konflikte u radnoj organizaciji; (3) proces regrutacije i selekcije kadrova; (4) radno iskustvo zaposlenih; (5) stručnu osposobljenost zaposlenih i (6) radno mesto zaposlenih (hijerarhijska pozicija u preduzeću).

2. Zavisnu varijablu istraživanja predstavlja industrijska bezbednost u proizvodnim organizacijama koje karakteriše relativno visok nivo rizika od akcidenata (hemijska industrija, namenska industrija itd.).

Kako bi se prikupili podaci o ispitanicima po nezavisnim varijablama, sastavljen je upitnik koji se sastoji od ukupno 30 stavki (iskaza). Svaka stavka se od drugih razlikuje na osnovu tri odlike, koje su prikazane u tabeli 1.

Prva se, očekivano, tiče samog sadržaja iskaza o kojem se ispitanik izjašnjava. Druga osobina stavke bitna je za statističku obradu podataka – podaci dobijeni primenom određenog pitanja mogu biti na nominalnom nivou merenja (kada brojevi predstavljaju samo zamenu za nivoe, odnosno kategorije varijable) ili na intervalnom nivou merenja (tada i govorimo o skali procene u užem smislu, jer je ispitanicima dozvoljeno da iznesu stepen slaganja sa tvrdnjom koja je data u pitanju).

Treća odlika tiče se oblasti na koju se stavka odnosi, odnosno elementa – faktora koji ona treba da meri (kolona 3). Srodna pitanja su grupisana unutar iste kategorije (koje su u odeljku koji se bavio varijablama istraživanja označeni kao faktori koji potencijalno utiču na bezbednost).

Tabela 1. Struktura upitnika

	Sadržaj pitanja	Nivo merenja	Grupa pitanja
R.b.	1	2	3
1	Utiče li školska sprema zaposlenih na kvalitet bezbednosti?	Intervalni	Bezbednost
2	Poštuju li se utvrđena bezbednosna pravila i propisane mere bezbednosti?	Intervalni	
3	Da li zaposleni vrše svesne povrede propisanih mera bezbednosti?	Intervalni	
4	Da li zaposleni obaveštavaju rukovodioce o pogrešnim bezbednosnim potezima i nezakonitim radnjama u preduzeću?	Intervalni	
5	Da li stepen samostalnosti i odlučivanja zaposlenih utiče na bezbednost preduzeća?	Intervalni	
6	Zaposleno lice koje odaje sigurnost u radu utiče na povećanje stepena bezbednosti?	Intervalni	
7	Kako na bezbednost utiče lice koje je „po kazni“ postavljeno na radno mesto?	Intervalni	
8	Da li selekcija kandidata za odgovorna radna mesta utiče na bezbednost preduzeća?	Intervalni	
9	Koliko je iznosio poslednji mesečni procenat stimulacije rada u odnosu na platu?	Nominalni	Motivacija
10	Šta deluje motivišuće na rad zaposlenih?	Nominalni	
11	Šta utiče na zadovoljstvo zaposlenih?	Nominalni	
12	Šta utiče na nezadovoljstvo zaposlenih?	Nominalni	
13	Kakva je motivacija zaposlenog koji je raspoređen na radno mesto niže kvalifikacije?	Intervalni	
14	Zbog čega se obavlja posao u preduzeću?	Nominalni	
15	Kojom metodom se kontrolišu zaposleni?	Nominalni	Kontrola i konflikti
16	Ko kontroliše druge u preduzeću?	Nominalni	
17	Kako se rešavaju konflikti?	Nominalni	
18	Da li se poštuju postavljeni kriterijumi selekcije?	Intervalni	Selekcija kandidata
19	Šta najviše utiče na selekciju kandidata?	Nominalni	
20	Da li rukovodilac mora prethodno da prođe kroz sve hijerarhijske nivoe?	Intervalni	
21	Ima li protežiranja prilikom premeštanja i unapređivanja?	Intervalni	
22	Godine starosti	Intervalni	Radno iskustvo
23	Godine ukupnog radnog staža	Intervalni	
24	Godine radnog staža u preduzeću	Intervalni	
25	Radno iskustvo pre dolaska u preduzeće	Nominalni	
26	Uzrast u trenutku zaposlenja	Intervalni	
27	Najviši stepen stručna sprema u procesu formalnog obrazovanja	Intervalni	Obrazovanje
28	Da li koristite stručnu literaturu i pratite savremene sadržaje iz oblasti bezbednosti?	Nominalni	
29	Trenutno radno mesto	Nominalni	Pozicija
30	Stož na trenutnom radnom mestu	Intervalni	

Nacrt obrade dobijenih podataka, dobijenih popunjavanjem anketnog upitnika, urađen je na sledeći način:

1) Nad podacima sa skale bezbednosti izvršene su dodatne analize kako bi se procenila pouzdanost i diskriminativnost date skale. Pouzdanost, operacionalizovana kao interna konzistentnost, procenjena je izračunavanjem Krombahovog alfa koeficijenta. Diskriminativnost je proverena korišćenjem Kolmogorov-Smirnov procedurom (Z-statistika).

2) Eksploratorna faktorska analiza (EFA) je korišćena u cilju utvrđivanja strukture latentnih faktora koji stoje u osnovi bezbednog ponašanja u okviru preduzeća. Nad stavkama skale bezbednosti je sprovedena EFA kako bi se proverilo da li postoji jedan pozadinski faktor ili je, pak, bezbednost potrebno posmatrati kao složeni konstrukt.

3) Pomoću većeg broja jednofaktorskih analiza varijansi (ANOVA, *Analysis of Variance*) ispitano je da li između različitih grupacija ispitanika (na primer, između radnika i menadžera; između onih sa kraćim i dužim radnim stažom; između mlađih i starijih) postoje statistički značajne razlike u pogledu dobijenih skorova na opštem faktoru bezbednosti (ili faktorima bezbednosti).

Empirijsko istraživanje je organizovano i realizovano u preduzeću koje je rangirano kao bezbednosno osetljivo. Ispitano je ukupno 120 zaposlenih lica. U istraživanju se koristio suženi obuhvat i to slučajni i namerni uzorak. Nameran uzorak se koristio radi dobijanja što relevantnijih podataka za predmet istraživanja i to od lica kao što su izvršioци posla, vođe timova, direktori radnih jedinica odnosno direktori sektora. Struktura uzorka prikazana je u tabeli 2.

Tabela 2. Struktura uzoraka

Redni broj	PREDUZEĆE	Broj anketiranih lica
1.	IZVRŠIOCI	80
2.	VOĐE TIMOVA	24
3.	DIREKTOR RADNE JEDINICE	12
4.	DIREKTOR SEKTORA	4
UKUPNO		120

3. REZULTATI ISTRAŽIVANJA

Prilikom analize pitanja razlikuju se dva pristupa u zavisnosti od toga da li podaci potiču sa nominalne ili intervalne merne skale.

3.1. POUZDANOST I DISKRIMINATIVNOST SKALE BEZBEDNOSTI NAKON TRANSFORMACIJE

Rezultati analize pitanja čija je zajednička tema bezbednost ukazuju da vrednost Krombahovog alfa koeficijenta na osam pitanja koji se tiču bezbednosti iznosi $\alpha=0,48$ što je ispod granične vrednosti (0,60). Konstatovano je da skala bezbednosti ne meri precizno pravi skor bezbednosnog ponašanja, a kao razlog tome može biti višedimenzionalnost konstrukta bezbednosti. Ova hipoteza proverena je putem faktorske analize pre same analize, a nakon toga ispitana je diskriminativnost skale bezbednosti.

Diskriminativnost se odnosi na metrijsko svojstvo testa da razlikuje ispitanike po osobini koju meri. Drugim rečima, dobra skala bezbednosti mora biti sposobna da napravi diskriminaciju među ispitanicima po pitanju njihovog bezbedonosnog ponašanja. Primenom Kolmogorov- Smirnov procedure za testiranje nulte hipoteze o nepostojanju razlike između

normalne i raspodele opšteg skora sa skale bezbednosti dobijena je vrednost Z – statistika 1,25, i nivo značajnosti $p=0.09$. Ovi rezultati ukazuju da je skala bezbednosti, i pored snižene pouzdanosti, diskriminativna.

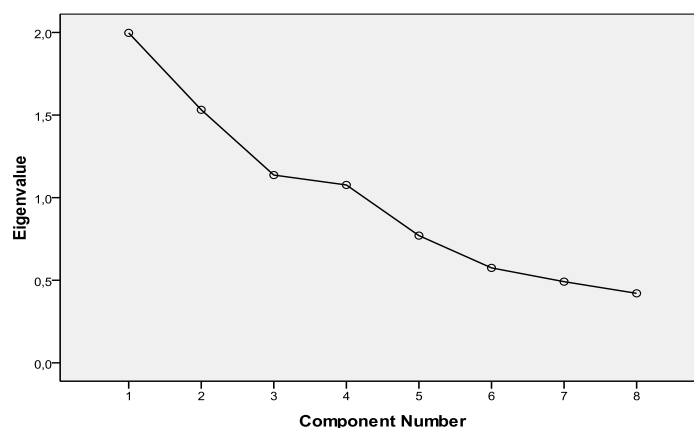
3.2. FAKTORSKA ANALIZA SKALE BEZBEDNOSTI

Primenjena je metoda analize glavnih komponenti. Svih osam glavnih komponenti objašnjavaju celokupnu varijansu manifestnih varijabli (stavki). Zadržane su prve četiri komponente na osnovu kriterijuma za donošenje odluke koji predstavlja kritični nivo svojstvene vrednosti faktora, odnosno $\lambda > 1$. Rezultati su prikazani u tabeli 3.

Tabela 3. Ekstrakcija glavnih komponenti sa skale bezbednosti

Faktori	Svojstvena vrednost faktora (λ)	Procenat objašnjene varijanse manifestnih varijabli	Kumulativni procenat
1	1,997	24,97	24,97
2	1,532	19,15	44,12
3	1,137	14,21	58,33
4	1,077	13,46	71,79
5	0,770	9,63	81,41
6	0,575	7,18	88,60
7	0,491	6,14	94,74
8	0,421	5,26	100

Drugi kriterijum za donošenje odluke o optimalnom broju faktora jeste dijagram koji je predložio Katel (*scree plot*), a na kojem su zapravo grafički predstavljene komponente (na x -osi) sa sopstvenim svojstvenim vrednostima (na y -osi). Zadržana su prva četiri faktora kojim se objašnjava čak 71,79% varijanse manifestnih varijabli.



Slika 1. Katelov scree grafikon za analizu glavnih komponenti skale bezbednosti

U svrhu lakše intepretacije sadržaja ovih faktora, glavne komponente su koso rotirane promaks metodom koja uključuje i Kajzerovu normalizaciju skorova. U tabeli 4 prikazane su matrica sklopa i matrica strukture. U matrici sklopa se nalaze paralelne projekcije varijabli na faktore, koje zapravo predstavljaju faktorske koeficijente, odnosno pondere na osnovu kojih se gradi linearni kompozit faktorskog skora. Ovi ponderi govore o tome sa koliko je potrebno

pomnožiti skorove na manifestnim varijablama (stavkama) kako bi se dobio skor na datom faktoru. Matrica strukture pruža uvid u ortogonalne projekcije varijabli na faktore koje su jednake Pirsonovim koeficijentima linearne korelacije između stavke i faktora.

Tabela 4. Matrica sklopa i strukture (koeficijenti manji od 0,30 nisu prikazani)

	Matrica sklopa				Matrica strukture			
	Faktori				Faktori			
	1	2	3	4	1	2	3	4
B1. Utiče li školska sprema zaposlenih na kvalitet bezbednosti?	0,813				0,823			
B2. Poštuju li se utvrđena bezbednosna pravila i propisane mere bezbednosti?	0,785				0,782			
B3. Da li zaposleni vrše svesne povrede propisanih mera bezbednosti?		0,701				0,689		
B4. Da li zaposleni obaveštavaju rukovodioce o pogrešnim bezbednosnim potezima i nezakonitim radnjama u preduzeću?				0,932	0,331			0,805
B5. Da li stepen samostalnosti i odlučivanja zaposlenih utiče na bezbednost preduzeća?			0,954				0,821	
B6. Da li stručno zaposleno lice koje odaje sigurnost u radu utiče na povećanje stepena bezbednosti?	0,567		0,401		0,508	- 0,303	0,488	0,429
B7. Kako na bezbednost preduzeća utiče lice koje je „po kazni“ postavljeno na radnom mestu?		0,867	0,367	- 0,473		0,766		
B8. Da li selekcija kandidata za odgovorna radna mesta utiče na bezbednost preduzeća?	0,470		- 0,303		0,516	0,337	- 0,524	- 0,600

Uočljivo je da se da matrica sklopa i strukture ne razlikuju mnogo, osim u slučaju B8 – poslednjeg pitanja sa skale bezbednosti. Naime, dok matrica strukture sugerise da ovo pitanje ima veće zasićenje na četvrtom faktoru, u matrici sklopa se primećuje da bi on trebalo da pripadne prvom faktoru.

Prvi faktor, koji objašnjava gotovo 25% varijanse, najveća zasićenja ima na stavkama B1, B2 i B8. Ispitanici koji dobijaju visoke skorove na ovom faktoru smatraju da obrazovanje zaposlenih ima veliki uticaj na bezbednost preduzeća, kao i da se unutar njihovog preduzeća striktno poštuju utvrđena bezbednosna pravila. Oni smatraju da se bezbednost može povećati i učenjem po modelu, odnosno prisustvom zaposlenog koji odaje sigurnost tokom izvršenja radnih zadataka.

Drugi faktor, koji je odgovoran za 19% varijanse individualnih razlika u odgovorima ispitanika na stavke, uključuje B3 i B7. Ispitanici koji smatraju da zaposleni ne vrše namerne i svesne povrede propisa propisanih mera bezbednosti, ali i da na bezbednost ne utiču negativno lica koja su postavljena na radno mesto „po kazni”, a ne na osnovu kvalifikacija ili sposobnosti, dobijaju visoke skorove na drugom faktoru. U osnovi ovog faktora nalazi se *preventivna bezbednost*, te je tako i nazvana.

Treći faktor (odgovoran za 14% varijanse) ima samo jedno primarno zasićenje i to je stavka B5, rekodirana pre nego što je izvršena multivarijantna analiza. Dakle, što ispitanici u većoj meri smatraju da je stepen samostalnosti i odlučivanja zaposlenih relevantan činilac bezbednosti, to oni postižu niže skorove na ovom faktoru, i obratno. Treba primetiti i

negativno sekundarno zasićenje ovog faktora sa stavkom B8. Čini se da ovi ispitanici ne vide zaposlene, njihove veštine i kompetence, kao agense bezbednosti. Otuda je ovaj faktor nazvan *regulisana bezbednost*.

Četvrti faktor, koji objašnjava 13% varijanse, definisan je prvenstveno pitanjima B4 i B8. To su oni radnici koji obavestavaju nadređene o kršenju mera bezbednosti, a istovremeno smatraju da proces profesionalne selekcije kandidata ne doprinosi nivou bezbednosti. Kao i u prethodnom slučaju, kontrola bezbednosnog ponašanja ne nalazi se u samom zaposlenom, već spolja. Za razliku od trećeg faktora, ovde su lokus kontrole nadređeni, odnosno rukovodioci. Sve što radnici treba da rade kako bi osigurali bezbednosno ponašanje jeste da uvažavaju i sprovode direktije menadžera, te zbog toga ovaj faktor nazvan *submisivna bezbednost*.

Zahvaljujući tome što je korišćena kosa rotacija, omogućeno je faktorima da međusobno koreliraju. Najveća povezanost dobijena je između faktora regulisane i submisivne bezbednosti ($r=0,32$), što je i očekivano s obzirom na to da im je zajedničko spoljašnja kontrola bezbednosti (tabela 5).

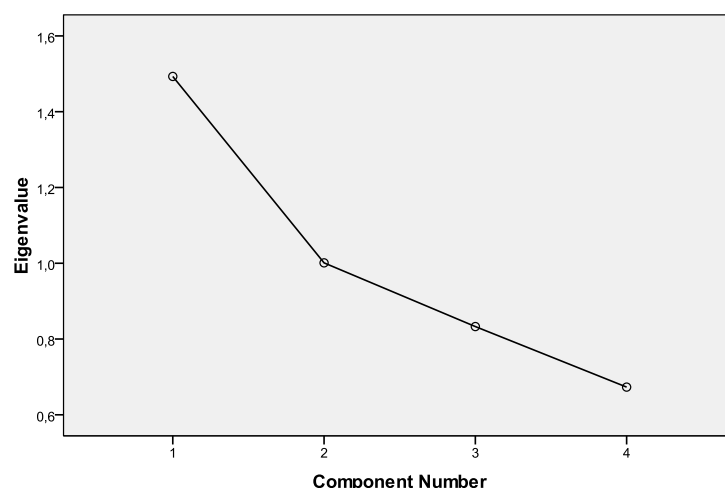
Tabela 5. Korelacije faktora bezbednosti prvog reda

Faktori	1	2	3
1	-		
2	0,096	-	
3	-0,084	-0,214	-
4	-0,013	-0,164	0,316

Nad faktorizovanim skorovima sprovedena je još jedna analiza glavnih komponenti kako bi se utvrdilo da li se može govoriti o jednom, opštem faktoru bezbednosti i, ako može, ispitati šta stoji u njegovoj osnovi. Dodatna analiza će učiniti da se otkrije faktor (ili faktori) drugog reda. Rezultati takve analize prikazani su u tabeli 6 i na slici 2. Iako je svojstvena vrednost drugog ekstrahovanog faktora tek nešto iznad vrednosti jedan, na osnovu uvida u Katelov scree dijagram, odlučeno je da se zadrži samo jedan faktor drugog reda.

Tabela 6. Ekstrakcija glavnih komponenti nad faktorima prvog reda bezbednosti

Faktori	Svojstvena vrednost faktora (λ)	Procenat objašnjene varijanse manifestnih varijabli	Kumulativni procenat
1	1,493	37,33	37,33
2	1,001	25,03	62,35
3	0,833	20,82	83,17
4	0,673	16,83	100



Slika 2. Katelov scree grafikon za analizu glavnih komponenti skale bezbednosti

Faktor bezbednosti drugog reda objašnjava 37,33% varijanse faktora prvog reda (tabela 6). Pozitivna zasićenja imaju F3 i F4, faktori prvog reda koji govore o tome da se bezbednost reguliše spoljašnjim sredstvima (tabela 7). Sve što se od zaposlenih očekuje u cilju postizanja bezbednosti u preduzeću jeste da prate direktije nadređenih, i usmeravaju svoje ponašanje na radnom mestu u skladu sa pravilima i procedurama. Oni faktori prvog reda koji govore o ulozi agensnosti i autonomije zaposlenih za bezbednost, imaju negativne korelacije sa opštim faktorom bezbednosti. Ovde je dobijen jedan dimenzionalni faktor na čijim se polovima nalaze dve suprotnosti. S jedne strane, visoke vrednosti na ovom faktoru tiču se *spolja* regulisane, dok niski odražavaju *iznutra* regulisanu bezbednost. Stoga je ovaj faktor drugog reda nazvan *opšti faktor lokusa (mesta, izvora) bezbednosti*.

Tabela 7. Matrica strukture faktora bezbednosti drugog reda

	Naučena bezbednost (F1)	Preventivna bezbednost (F2)	Regulisana bezbednost (F3)	Submisivna bezbednost (F4)
Opšti faktor bezbednosti	-0,265	-0,610	0,755	0,694

Rezultati analize glavnih komponenti primenjeni na pitanjima koja se odnose na temu bezbednosti pokazuju da u osnovi bezbednosnog ponašanja u preduzeću stoje četiri faktora prvog reda: naučena, preventivna, regulisana i submisivna bezbednost. Opšta dimenzija na osnovu koje je moguće napraviti razliku između ovih faktora tiče se pitanja lokusa kontrole bezbednosnog ponašanja. Ovaj faktor ispostavio se kao najopštiji koncept opisa pitanja bezbednosti u preduzeću, te je u daljim analizama nastojano da se utvrdi od čega zavisi i da li će ponašanje zaposlenih biti regulisano unutrašnjim ili spoljašnjim izvorima. S tim u vezi najpre su utvrđeni korelati opšteg bezbednosnog faktora, a potom i razlike između različitih podgrupa ispitanika koje su definisane različitim distinktnim svojstvima.

Koeficijenti korelacije faktora sposobnosti sa varijablama na kojima se dobijaju podaci sa intervalnog nivoa (to i jeste uslov korišćena ove mere) prikazani su u tabeli 8.

Tabela 8. Koeficijenti korelacije između faktora bezbednosti i varijabli motivacije, procesa selekcije, radnog iskustva i obrazovanja (zatomnjeno su označene korelacije koje su statistički značajne)

	Naučena	Preventivna	Regulisana	Submisivna	Opšti faktor bezbednosti
Poslednji mesečni procenat stimulacije rada?	0,16	0,07	-0,03	-0,11	-0,09
Motivacija za rad zaposlenog lica koje je raspoređeno na radno mesto niže kvalifikacije?	0,03	0,25	0,08	0,07	0,00
Da li se poštuju postavljeni kriterijumi selekcije?	0,39	0,11	-0,16	-0,09	-0,14
Da li rukovodilac mora prethodno da prođe kroz sve hijerarhijske nivoe?	0,27	-0,29	-0,04	-0,28	-0,05
Ima li protežiranja prilikom premestanja i unapređivanja?	-0,17	-0,05	0,05	-0,07	-0,01
Godine starosti?	0,28	0,01	-0,19	-0,02	-0,09
Godine ukupnog radnog staža?	0,23	-0,03	-0,16	0,00	-0,05
Godine radnog staža u preduzeću?	0,22	0,04	-0,14	-0,07	-0,11
Najviša dostignuta sprema u procesu formalnog obrazovanja?	0,31	-0,18	0,05	-0,01	0,11
Stož na trenutnom radnom mestu?	0,04	0,24	-0,06	-0,16	-0,20

Ono što je od primarnog interesa u ovoj tabeli jesu koeficijenti korelacije između pojedinačnih faktora zadovoljstva i drugih varijabli. U zatomljenim ćelijama boldirane su vrednosti Pirsonovog koeficijenta koje su statistički značajne ($p < 0,05$). Iako su vrednosti koeficijenata uglavnom niske, one govore o prirodi faktora bezbednosti.

Naučena bezbednost se visoko i pozitivno korelira sa uzrastom ispitanika ($r=0,28$) i godinama radnog staža (kako ukupnog, $r=0,23$, tako i staža u preduzeću, $r=0,22$), što ukazuje da se bezbednosno ponašanje uči tokom godina ispunjavanja radnih obaveza i boravka u preduzeću. Za očekivati je da iskusniji radnici pokažu veći stepen bezbednosnog ponašanja, posebno onog njegovog dela koji se stiče učenjem. U skladu sa tim je i podatak da su takvi radnici po pravilu i visoko obrazovani ($r=0,31$). Oni se zalažu za poštovanje procedura, na šta ukazuju korelacije sa poštovanjem kriterijuma profesionalne selekcije ($r=0,39$) i slaganje sa iskazom da rukovodilac treba da prođe niže nivoe pre nego što mu se povere upravljački zadaci ($r=0,27$), čime se još jednom ističe značaj učenja i iskustva.

Matrica korelacija daje interesantne informacije o faktoru *preventivne* bezbednosti. Taj faktor obuhvata mišljenje da lica koja su postavljena na radno mesto „po kazni” ne utiču negativno na bezbednost. Vidi se šta može biti razlog takvog stava. Postoji pozitivna povezanost ($r=0,25$) ovog sa stavom da je motivacija zaposlenog koji je postavljen na mesto koje je hijerarhijski niže u odnosu na njegovu poziciju visoka. Dakle, oni koji su na neki način obespravljani pokazaće više truda u svom radu i biće manje skloni rizičnim oblicima ponašanja na radnom mestu. Vidimo da ovakve stavove češće imaju radnici čiji je staž na datom radnom mestu duži ($r=0,24$).

Regulisana bezbednost pokazuje samo jednu značajnu korelaciju, i to negativnu sa uzrastom ispitanika ($r=-0,19$). Ovo sugerise da su mlađi radnici skloniji tome da se pridržavaju propisanih pravila i procedura u izvršavanju svojih radnih obaveza.

Pretpostavljamo da su, u odsustvu unutrašnjih kriterijuma, spoljašnji mehanizmi kontrole adekvatniji i, štaviše, poželjniji u slučaju „novajlija”.

Zanimljivo je i da *submisivna* bezbednost korelira sa stavom da nadređeni ne moraju da prođu sve hijerarhijske nivoe da bi mogli da obavljaju menadžersku ulogu ($r=-0,29$). Ovo iznova govori o poslušnosti ovih ispitanika i njihovom pokornom stavu prema hijerarhijski nadređenim.

Na kraju, imamo i jedan podatak koji nam pomaže da rasvetlimo pozadinu *opšteg faktora bezbednosti*. Viši skorovi odlikuju one zaposlene koji su skloni tome da koriste spoljašnje kriterijume (pravila, procedure, naredbe, direkcije) kako bi regulisali svoje ponašanje koje se tiče bezbednosti. Kako ovaj faktor negativno korelira sa godinama radnog staža ($r=-0,20$) može se zaključiti da se sa iskustvom kotrola ponašanja pomera sa spoljašnjih regulatora ka unutrašnjim. Cenimo da je dugogodišnje iskustvo dovoljno da radnici na sebe preuzmu odgovornost za sopstveno ponašanje na radnom mestu.

3.3. RAZLIKE IZMEĐU PODGRUPA NA FAKTORU OPŠTE BEZBEDNOSTI I PO NIVOIMA VARIJABLI

Kada se ispituje da li se grupe ispitanika (na primer, muškarci i žene; mladi i stari; ispitanici sa srednjom i oni sa visokom stručnom spremom) međusobno razlikuju na nekoj numeričkoj varijabli (što je u ovom slučaju opšti faktor bezbednosti) koristi se analiza varijanse. U ovom istraživanju postoji nekoliko grupa nezavisnih varijabli. S druge strane, pomoću faktorske analize je uspešno ekstrahivan jedan opšti faktor bezbednosti koji u daljim obradama ima ulogu zavisne varijable. Kako je izvršena dvostruka faktorizacija, može se slobodno reći da je zavisna varijabla u maksimalnoj mogućoj meri oslobođena varijanse greške merenja.

Jednofaktorska ANOVA ima za cilj da ponudi odgovori na pitanje da li se podgrupe ispitanika statistički značajno razlikuju po svom prosečnom skor na zavisnoj varijabli. Podgrupe su definisane s obzirom na pitanja koja pripadaju različitim grupama (motivacija, kontrola i konflikti, profesionalna selekcija, radno iskustvo, obrazovanje i pozicija).

Rezultati primenjene jednofaktorske analize po nivoima varijabli *motivacije* govore da sigurnost posla, obezbeđenje sredstava za egzistenciju i mogućnost napredovanja predstavljaju osnovne činioce koji motivišu zaposlene da rade i da pritom poštuju propisane mere bezbednosti. Ispitanici su mišljenja da radna atmosfera utiče na zaposlene i da ih istovremeno čini zadovoljnijim pri realizaciji zadatih radnih obaveza odnosno da materijalni faktor predstavlja osnovu nezadovoljstva zaposlenih lica u preduzeću. Istraživanje ukazuje da se bezbednosno ponašanje, koje se ispoljava od strane zaposlenih, uči tokom godina ispunjavanja radnih obaveza i boravka u preduzeću.

Rezultati primenjene jednofaktorske analize po nivoima varijabli *kontrole i konflikata* govore da se zaposlena lica pridržavaju pravila i procedura prilikom realizacije radnih zadataka i ispunjenja zahteva koji nalažu rukovodioci i sam proces rada, te su shodno tome vrlo pozitivno ocenjeni bezbednosni uslovi rada. Istraživanje ukazuje da se rukovodilac odnosno pretpostavljeno lice na višoj hijerarhijskoj dužnosti, nalazi u nadređenom položaju u odnosu na osnovnog izvršioca. Ispitanici čije je bezbednosno ponašanje regulisano spoljašnjim kriterijumima u većoj meri su skloni tome da kao metod rešavanja konflikata odaberu pravila, procedure i podelu odgovornosti, dok su zaposleni koji sami kontrolišu bezbednosne aspekte svog ponašanja skloniji da kroz „diskusiju interesa i potreba” prevladavaju nastale nesporazume. Takođe, uočljivo je da se sa stečenim godinama radnog

iskustva u preduzeću, bezbednosno ponašanje zaposlenih lica pomera sa spoljašnjih regulatora ka unutrašnjim, odnosno da na osnovu dugogodišnjeg iskustva zaposleni na sebe preuzimaju odgovornost za sopstveno ponašanje na radnom mestu.

Rezultati primenjene jednofaktorske analize po nivoima varijable *proces profesionalne selekcije i regrutacije kandidata* govore da su zaposlena lica sklona tvrdnji da najveći pozitivan uticaj na regrutaciju i selekciju kadrova predstavlja obrazovanje zaposlenih kao i njihove službene ocene o kvalitetu i kvantitetu prethodnog rada. Ispitanici zastupaju tezu da na mesto rukovodioca žele da bude postavljeno lice sa iskustvom koje je u prethodnom periodu bilo raspoređeno i izvršavalo svoje radne obaveze na radnim mestima u hijerarhijskom smislu.

Rezultati primenjene jednofaktorske analize po nivoima varijable *radno iskustvo* ukazuju da zaposlena lica koja su na neki način obespravljena, a čiji je staž na radnom mestu duži, pokazuju više truda i angažovanja u svom radu i manje su sklona rizičnim oblicima ponašanja. Takođe, zaposlena lica sa kraćim radnim stažom u preduzeću, sklonija su pridržavanju propisanih pravila i procedura u izvršavanju svojih radnih obeveza u odnosu na zaposlene koji imaju duži radni staž u preduzeću.

Rezultati primenjene jednofaktorske analize po nivoima varijable *obrazovanje* pokazuju da stepen obrazovanja zaposlenih lica u znatnoj meri utiče na ukupni nivo industrijske bezbednosti u preduzeću. Postoji pozitivna korelacija između stepena obrazovanja, s jedne strane, i opštih sposobnosti zaposlenih lica, s druge strane. Zaposleni su u proseku svesni da dodatna znanja, koja su inače visoko vrednovana, nužna kako bi se povećao kvalitet bezbednosti odnosno generalno su svesni značaja koje formalno obrazovanje ima za razvoj bezbednosnog ponašanja.

Rezultati primenjene jednofaktorske analize po nivoima varijable *pozicija* pokazuju da radno mesto zaposlenih lica utiče na ukupni nivo industrijske bezbednosti u preduzeću. Postoji pozitivna korelacija između radnog mesta – izvršilačkog ili menadžerskog i industrijske bezbednosti.

4. ZAKLJUČAK

Prikupljeni i analizirani rezultati u ovom radu upućuju na to da je postavljena teorijska pretpostavka potvrđena, odnosno da upravljanje ljudskim resursima i etika imaju značajan uticaj na industrijsku bezbednost, a posebno na nivo bezbednosne kulture i klime koji ispoljavaju zaposleni u preduzeću. Rezultati istraživanja potvrđuju da zaposleni svojim kvalitetom, znanjem, bezbednosnom kulturom, pridržavanjem etičkog kodeksa i ispoljenom motivacijom za rad utiču na industrijsku bezbednost. Uticaj ljudskih resursa na industrijsku bezbednost je pre svega, procesna funkcija kojom se obezbeđuju i sprovode propisani nivoi bezbednosti u preduzeću, pri čemu je težište u radu dato na planiranju, regrutovanju, obučavanju, ocenjivanju i nagrađivanju zaposlenih lica. Odgovarajućim i pravilnim postavljenjem na radna mesta, uz ispoljavanje visokog nivoa bezbednosne kulture i klime, postiže se efekat da zaposlena lica pružaju najbolje rezultate u radu i streme održavanju visokog nivoa bezbednosti u okviru preduzeća.

Dobijeni rezultati takođe ukazuju na različitost socijalno-profesionalnog položaja zaposlenih lica, počev od postavljenja na radnom mestu (od izvršioca do direktora sektora), stepena obrazovanja (od osnovne škole do poslediplomskog usavršavanja), poslednjeg mesečnog procenta stimulacije rada u odnosu na platu (od 0 do 100%) do godina provedenih u preduzeću i stečenog radnog iskustva. Navedeni i analizirani činioci imaju različit uticaj na izgrađivanje nivoa opšte bezbednosti i bezbednosne kulture zaposlenih lica u preduzeću.

Svaka kategorija zaposlenih lica ima izdiferenciran položaj i ulogu u njenoj hijerarhijskoj, profesionalnoj i vertikalnoj strukturi.

Zaposlena lica sklona su tvrdnji da najveći pozitivan uticaj na bezbednost predstavlja motivacija i selekcija kandidata koji su predviđeni za postavljenje na odgovorna radna mesta u preduzeću. Sveobuhvatni rezultati ukazuju na pozitivan skor da se zaposlena lica u preduzeću u potpunosti pridržavaju i poštuju propisane mere bezbednosti. Ispitanici su takođe mišljenja da se unutar preduzeća ne pribegava svesno povredama propisanih mera bezbednosti kao i da nekontrolisano i ne propisano ponašanje zaposlenih, pri realizaciji osnovnih radnih zadataka, utiče na njihovu ličnu bezbednost, odnosno bezbednost preduzeća i proizvodnog procesa. Radnik koji je „po kazni“ postavljen na određeno radno mesto unutar preduzeća svojim radom i ponašanjem ne utiče na bezbednost preduzeća.

Najzad, rezultati ovog istraživanja ukazuju na visok stepen međuzavisnosti upravljanja ljudskim resursima i definisanih faktora bezbednosti, a koje se odnose na motivaciju zaposlenih, kontrolu i konflikte u radnoj organizaciji, proces regrutacije i selekcije kadrova, tip radnog mesta i radno iskustvo zaposlenih, te njihovo stručno obrazovanje.

REFERENCE

1. Vuković, M., Kultura komunikacije, Grafomed-trade, Bor, 2006.
2. Glendon I., Šeron G.K., Eugen M., Ljudske bezbednosti i upravljanje rizikom, CRC Pres, Beograd, 2006.
3. Dedijer S., Development & Management by Intelligence, Japan, Lund, 1991.
4. Di Džordž R., Poslovna etika, Filip Višnjić, Beograd, 2003.
5. Drucker F.P., Entrepreneurial Strategies, California Management Review, 1985.
6. Eysenck H.J., Psychotysm as a Dimension of Personality, Hoder & St., London, 1976.
7. Jančićević N., Organizaciona kultura, Ekonomski fakultet, Novi Sad, Ulihes, 1997.
8. Keković Z., Sistemi bezbednosti, Fakultet bezbednosti, Beograd, 2007.
9. Laukman T., Strategisches Management von Human Ressourcen, Strategien der Personalentwicklung, Gabler, Wiesbaden, 1989.
10. Maslov A., Motivacija i ličnost, Beograd, 1982.
11. Mathis R., Jackson J., Human Resource Management – Essential Perspectives, Thomson South-Western, third edition, 2005.
12. Prvulović S., Poslovna etika i upravljanje, Grafopanonija, Bor, 2006.
13. Ristić Ž., Menadžment ljudskih resursa, Čigoja štampa, Ekonomski fakultet, Beograd, 2000.
14. Carmichael S., Drummond J., Good Business – A Guide to Corporate Responsibility

- and Business Ethics, London, Centre Business Books, 1989.
15. Stajić Lj., Osnovi bezbednosti sa osnovama istraživanja bezbednosnih pojava, Fakultet civilne odbrane, Draganić, Beograd, 2005.
 16. Ćamilović S., Kadrovska politika preduzeća, Beograd, 1995.
 17. Hertig A.C., Security Managment, Charting an Academic Course, Alexandria, 2002.



THE ROLE OF A MOBILE PHONE AS A LIFESTYLE ELEMENT OF YOUNG CONSUMERS

Lazar Vukadinović¹, Karolina Perčić²

¹Union Nikola Tesla University, Faculty of Business and Law; ²Belgrade Metropolitan University, Faculty of Management, Serbia

Abstract: Subject of this research is to consider the role of mobile phones in present time, primarily concentrating on gaining knowledge on the innovativeness of young consumers associated with the use of mobile phones and their respective functions as well as to the habits of smart phone consumers. Continuous developments of technology, in particularly in the field of mobile technology, have enabled users to gather all the desired information on products and services by using their mobile phones. The paper will also have an emphasis on the use of mobile phones in the Republic of Serbia along with a research that was conducted amongst students about their mobile phone preferences, with an aim of determining the impact of smart phones on consumer behavior and lifestyle.

Keywords: mobile phones, smart phones, young consumers, students, consumer habits, lifestyle, social media, Serbia

1. UVOD

Razvoj informacionih tehnologija ima značajan uticaj u raznim oblastima pa tako i u primeni mobilnih telefona, i navika njihovih korisnika. Naime, mobilni telefon se po prvi put pojavio sredinom 70-tih godina XX veka, i nije bio ni nalik mobilnim uređajima sadašnjice. Uređaji su bili prilično veliki, skupi i nisu bili dostupni širokom broju korisnika - osim poslovnih ljudi, koji su ujedno bili i prvi korisnici mobilnih telefona [1]. Osnovna uloga mobilnih telefona je u početku bila komunikacija, a razvojem tehnologija i digitalnih sadržaja, to je danas, do te mere promenjeno, da se više obavljaju druge aktivnosti, poput proveravanja mejlova, dopisivanja i fotografisanja, kao i obavljanja poslovnih transakcija [2]. Kontinuirani napredak u oblasti mobilne telefonije doneo je savremene mobilne uređaje (pametne telefone) koji imaju ogroman broj aplikacija i samo jedan klik, na savremenim tač skrini uređajima, korisnike deli od dobijanja potrebnih informacija. U tom smislu može se reći da su mobilni telefoni postali neizostavan deo života savremenih potrošača, a s druge strane, kako bi pratile korak s inovacijama u oblasti razvoja mobilnih uređaja, korporacije koje ih proizvode, preuzele su dalekosežna razmišljanja i počele su s diferenciranjem svojih aplikacija u odnosu na konkurenciju [3], i na taj način pristupile pridobijanju velikog broja korisnika različitih uređaja. Prema Statcounter GlobalStats, iz aprila 2018. godine, Samsung zauzima 31% svetskog tržišnog učešća, a Apple 19% [4].

Korisnici mobilnih telefona su pripadnici svih životnih dobi, premda se može reći da su mlađe generacije privrženije ovim uređajima, kako su uz njih odrastali. Generacija milenijalaca je odrasla uz tehnološke napretke i otuda je njihovo znanje i razumevanje u tehnologiju i mobilne telefone sveprisutno. -Istraživanje sprovedeno od strane SSI na uzorku 8 zemalja u Americi, Evropi, i Aziji [5].

Predmet istraživanja ovog rada je razmatranje uloge koju ima mobilni telefon danas, s ciljem da se dođe do saznanja koliko su mladi potrošači - studenti osnovnih studija u Srbiji, inovativni u pogledu upotrebe mobilnog telefona i na njemu raspoloživih funkcija, i kakve su navike istih u vezi zamene postojećeg telefona. Hipoteze istraživanja su sledeće:

Nulta hipoteza H_0 - Generalno su mladi potrošači – studenti neinovativni, odnosno među studentima osnovnih studija ne postoji razlika u pogledu inovativnog korišćenja mobilnog telefona.

Alternativna hipoteza H_1 – Postoji statistički značajna korelacija između studenata različitih godina starosti i učestalosti upotrebe pametnog telefona na inovativan način.

Alternativna hipoteza H_2 - Postoji statistički značajna razlika između studenata prema polu i učestalosti upotrebe pametnog telefona na inovativan način.

Alternativna hipoteza H_3 - Postoji statistički značajna razlika između studenata različitih fakulteta prema vrsti nauke i učestalosti upotrebe pametnog telefona na inovativan način.

2. ULOGA MOBILNOG TELEFONA KROZ VREME

Tokom 1979. godine, prvi komercijalni mobilni telefonski sistem je počeo sa radom - japanska kompanija NTT u Tokiju [6], i do prve polovine 80-tih godina, došlo je do ekspanzije usluga koje su privukle veliki broj korisnika mobilnih telefona. Pojava mobilnih uređaja je omogućila nesmetanu komunikaciju među korisnicima istoremeno otklanjajući bilo kakva ograničenja u pogledu vremena i mesta komuniciranja koje su do tada postavljali fiksni telefonski uređaji [7]. U Engleskoj su prvu dozvolu za pružanje usluga mobilne telefonije dobile kompanije Cellnet i Vodafon, i u januaru 1985. godine su otpočele sa aktivnostima na nacionalnom nivou baziranom na analognoj tehnologiji [8], i korisnici su mogli da koriste mobilne uređaje koji su bili poprilično glomazni. Tokom 1980-tih dolazi do aktivnosti u poboljšanju standarda mobilne telefonije i standarda 2G mobilnih telekomunikacija i GSM biva primenjen širom Evrope. Analogna tehnologija je bila izbačena tokom 2001. godine [9]. U periodu 2003-2004. na tržištu se pojavljuju mobilni telefoni sa kamerom, što je doprinelo da se proširi dotadašnja osnovna funkcija i na mogućnost fotografisanja. Nakon te revolucionarne ponude počinje sve veće takmičenje kompanija koje proizvode mobilne telefone koje nastoje da svojim dizajnom, aplikacijama i dodatnim sadržajima zauzmu željeno mesto na tržištima, svih nivoa, od lokalnih do globalnog.

U početku, telefoni su imali isključivo funkciju obavljanja poziva, dok se nisu pojavile mogućnosti govorne pošte, SMS-ova i MMS-ova, da bi s vremenom bio proširen spisak dodatnih mogućnosti na mobilnim aparatima, kao što je pristup mejlu, adresaru, društvenim mrežama, odnosno internetu. Mobilni telefoni su postali najbrže prihvaćeni korisnički proizvodi svih vremena, više se mobilnih telefona šalje kompanijama i korisnicima na godišnjem nivou nego automobila i kompjutera zajedno [10]. Vremenom, svrha mobilnog uređaja uznapredovala je od alata za verbalnu komunikaciju do multimedijalnog uređaja.

Od posebnog značaja za razvoj mobilnih telefona je 2007. godina kada je nastao čuveni ajfon, koji je prouzrokovao da se konkurencija okrene kreiranju i konstantnom pospešivanju svojih uređaja najsavremenije generacije - takozvanih smart fone uređaja. Danas pametni uređaji, pored kontinuiranog rasta popularnosti, pružaju i nebrojane mogućnosti korisnicima u različitim aktivnostima poput razmene informacija, obavljanja poslovnih aktivnosti, kao i zabave, u bilo koje vreme i na bilo kojem mestu.

Kako smo korišćenjem mobilnih telefona kontinuirano u pokretu, tako pružanje informacija o našoj lokaciji može biti veoma korisno. Geo označavanje predstavlja dodavanje

informacija o geografskoj poziciji sadržajima, i ove informacije mogu biti vezane za grad u kome se nalazite, poštanski broj, adresu [11]. Kada se ove informacije dodaju sadržajima objava korisnika, porukama, moguće je kreirati različite sadržaje i mogućnosti pružanja različitih usluga shodno trenutnoj lokaciji korisnika pametnog telefona.

Mobilne aplikacije su uznapredovala do te mere da ne pružaju informacije samo o cenama proizvoda, već i informacije o vremenskim uslovima, klimatskim promenama. Primer takve tržišne aplikacije izradila je afrička kompanija koja deluje na teritoriji Gane i Mauricijusa - ESOKO, i koja ima za cilj da korisnicima pruži inovativna rešenja. ESOKO je kreirao mobilnu aplikaciju koja pruža korisnicima veću interaktivnost i transparentnost, u pogledu pretraživanja informacija, slanja upozorenja u vezi klimatskih uslova, deljenja informacija sa ostalim korisnicima, praćenja cena proizvoda na tržištu [12].

Korišćenje interneta će iznositi 26% globalne upotrebe medija tokom 2019. godine (tokom 2016. taj procenat je iznosio 19%) prema predviđanjima agencije Zenith Media. Korisnici širom sveta provode u proseku 122 minuta svakoga dana pristupajući internetu preko svojih mobilnih aparata - pretraživača i aplikacija, i taj trend je znatno povećan ukoliko uzmemo u obzir da je 2010. godine iznosio svega 10 minuta dnevno [13].

3. NAVIKE KORISNIKA PAMETNIH TELEFONA

Američko udruženje za marketing definiše ponašanje potrošača kao, dinamičku interakciju razmišljanja, ponašanja i događaja u okruženju posredstvom kojih ljudska bića upravljaju segmentima razmene u njihovim životima [14]. Na potrošače i njihove navike deluje širok dijapazon faktora, poput ekonomskih, socioloških i psiholoških [15]. Ekonomski faktori koji utiču na ponašanje potrošača mogu biti opšti ekonomski uslovi na tržištu i u okruženju, sklonost ka potrošnji ili štednji, raspoloživi ili diskrecioni dohodak, kao i cenovni i necenovni faktori. Sociološki faktori podrazumevaju kulturu i društvene faktore, dok se psihološki faktori odnose na lične faktore poput godina potrošača, njihovo profesionalno opredeljenje, predstava o sebi samima, njihovom životnom stilu i sistem vrednosti [16].

Veliki broj biheviorističkih istraživanja je prepoznao značaj navika i njihovu direktnu povezanost sa kreiranjem osećaja zadovoljstva kod klijenata. U tom smislu u okolnostima velikog broja ponuđenih usluga i proizvoda, veliki je izazov na strani korisnika ukoliko nemaju stabilne potrošačke navike. U prošlosti su potrošači obavljali kupovine u obližnjim prodavnicama, kupovali omiljene brendove, i ostajali verni brendovima na duži vremenski rok. Razvoj tehnologija, dostupnost informacija u realnom vremenu, uticale su na to da korisnici nisu više predvidljivi kao u prošlosti, i da se kompanije moraju potruditi kako bi zadržale kupce, ali i privukle nove, raznim inventivnim načinima oglašavanja.

Istraživanja koja su sprovedena ukazuju na činjenicu da 90% svih korisnika pregledavaju onlajn komentare o proizvodima pre kupovine, i čak 72% ispitanika ukazuje poverenje brendu ili kompaniji ukoliko pročitaju pozitivne komentare o istim [17]. Danas potrošači istražuju informacije o proizvodu pre, nakon i za vreme kupovine, pregledaju bar četiri izvora pre samog čina kupovine, od kojih su mnogi izvori van kontrole brendova [18].

Korisnicima se preko mobilnih telefona pruža mogućnost da kontinuirano proveravaju svoju elektronsku poštu, obavljaju transakcije preko m-bankinga, kupuju željene proizvode/usluge na internetu, čitaju omiljene časopise, gledaju televizijske sadržaje bez ikakvih ograničenja u pogledu vremena i mesta. U tom smislu, životni stil koji pruža taj vid mobilnosti, olakšava svakodnevnicu korisnika [19]. Povećava se broj korisnika koji na internetu proveravaju sadržaje o proizvodima i prema istraživanju IC iz novembra 2014 [20], 26% korisnika proverava onlajn komentare preko svojih mobilnih uređaja, a 18% preko tablet

uređaja. Prema istom istraživanju, čak preko 59% potrošača proverava onlajn komentare o proizvodima dok iste kupuje u prodavnicama ili šoping centrima.

Društvene mreže, kao jedan veoma kompleksan pojam sa višestrukim značenjem [21], postale su deo svakodnevice većine korisnika interneta. Društvene mreže imaju uticaj na ponašanje potrošača, i korisne su za inicijalno prikupljanje informacija, pa sve do ponašanja nakon samog čina kupovine i eventualnih pritužbi na proizvode, kao i saznavanje njihovih stavova u vezi kompanija ili proizvoda [22]. Osim komunikacije putem društvenih mreža, kojima se pristupa i preko mobilnih telefona, sve je šira primena novih digitalnih servisa poput WhatsApp-a i Vibera, koji nude usluge slanja poruka i obavljanja video poziva ali bez novčane nadoknade, te se veliki broj telekomunikacijskih kompanija susreće sa sve većim problemima.

Prema podacima agencije Zenith Media, tokom 2017. godine, potrošači u proseku provode dnevno 47,4 minuta gledajući video onlajn, što je povećanje u odnosu na 2016. godinu (39,6 minuta). Ovo povećanje je praćeno povećanjem gledanja videa sa mobilnih uređaja (telefona i tableta) od 35%, tj. na 28,8 minuta dnevno, dok je gledanje sa fiksnih uređaja (desktop računara, laptopova) povećano za samo 2%, na 18,6 minuta dnevno [23].

Prema predviđanjima agencije Zenith Media, u 2018. godini će 66% stanovnika iz 52 zemlje, posedovati pametan telefon, što je porast sa 63% iz 2017. godine, i sa 58% u 2016. godini [24].

Istraživanje Ipsos MediaCT iz 2012. godine je utvrdilo da je na teritoriji Republike Srbije bilo 5.540.665 korisnika mobilnih telefona. Veliki broj ispitanika mlađe generacije je istakao da ne bi mogli da zamisle svoju svakodnevnicu bez mobilnih telefona u svim situacijama, uključujući i korišćenje telefona na časovima, tokom razgovora sa prijateljima. Oni su u potpunosti prestali sa korišćenjem stacionarnih telefonskih uređaja, i u permanentnoj su potrazi za besplatnim bežičnim internetom. Čak 42% ispitanika u populaciji između 12 i 29 godina, navelo je da poseduju smart fon uređaje. Skoro polovina ispitanika je istakla da je internet promenio njihove životne navike, dok je svega 6% tvrdilo da korišćenje mobilnih telefona nije dovelo do promena u njihovim životima. Ispitanici s visokim obrazovanjem su istakli da je internet u velikoj meri imao uticaj na njihove živote. Mlađa generacija ispitanika je u većoj meri zainteresovana da koristi internet u svrsi dokolice, dok starije generacije više koriste internet za pretraživanja različitih tema, poput politike, ekonomije i servisnih informacija [25].

Korišćenje društvenih medija takođe pomaže u povećanju uticaja na potrošače, kao i načina posredstvom kojih isti komuniciraju među sobom, i proizvoda/usluga koje biraju. Blogovi, proizvodi, komentari, grupe za diskusiju, kao i rejtinzi proizvoda, veoma su važni izvori informacija koji ukazuju na to kako klijenti dolaze do željenih informacija, kako ih dalje koriste i kako one dalje utiču na njihovo donošenje odluka o kupovini i ponašanje nakon kupovine. Jedan od društvenih medija je Fejsbuk, koji „ima masovnu publiku koja mu svakog dana pristupa preko mobilnih telefona“ [26]. Agencija Sprout Social je u januaru 2017. godine u SAD sprovela istraživanje na temu društvenih mreža i ustanovila da je najpopularnija društvena mreža svih generacija (generacija X, generacija Y – milenijalci, bejbi-bumeri) Facebook, mada kod mlađih generacija nije toliko dominantna kao kod starijih [27].

4. METODOLOGIJA I REZULTATI EMPIRIJSKOG ISTRAŽIVANJA

Empirijsko istraživanje je sprovedeno u Republici Srbiji, primenom metode ispitivanja, i radi se o konfirmativnom istraživanju (za proveru hipoteza). Prilikom obrade podataka i interpretacije rezultata koristio se softver SPSS, a kvantitativne statističke metode

koje su primenjene u analizi su deskriptivna (distribucija frekvencija) i komparativna statistika (χ^2 -test, t-test, ANOVA, regresija i korelacija). Sprovedeno je istraživanje u periodu od 7. do 27. maja 2018. godine. Ciljna grupa su studenti osnovnih studija u Republici Srbiji, kako bi se ispitalo koje su njihove navike i preferencije u pogledu upotrebe mobilnog telefona. Za potrebe istraživanja korišćen je onlajn upitnik, koji je posebno pripremljen za potrebe ovog istraživanja, i link ka istom se slao ispitanicima. Radi se o prostom slučajnom uzorku, koji čini 470 studenata (236 muških i 234 ženskih ispitanika), gde 25% uzorka čine studenti prve godine studija, 35% druge, i po 19% treće i četvrte godine studija. Istraživanjem su obuhvaćeni studenti iz oblasti društveno-humanističkih nauka (26%), tehničko-tehnoloških (47%), prirodno-matematičkih (9%), medicinskih nauka (4%) i umetnosti (14%). Statistička greška iznosi 4,5%, uz interval poverenja od 95%. Prema Statističkom godišnjaku Republike Srbije 2016, Republičkog zavoda za statistiku, bilo je 190.416 studenata upisanih na studije I stepena u Srbiji, školske 2014/15. godine.

Neka pitanja u upitniku su se odnosila na petostepenu Likertovu skalu odgovora u vezi određenih učestalosti u vezi korišćenja mobilnog telefona, pri čemu 1 predstavlja najniži nivo učestalosti, a 5 najviši (5 – skoro uvek, 4 – često, 3 – ponekad, 2 - retko, 1 – nikad). Navedene su okvirne vremenske relacije za ponuđene odgovore (skoro uvek - svaki dan; često - jednom nedeljno; ponekad - jednom u tri meseca; retko - jednom u godinu dana; nikad - ni jednom u proteklih godinu dana), da bi se obezbedila preciznost odgovora, koji se odnose na period od godinu dana.

Prema rezultatima istraživanja, skoro svi studenti koriste pametan telefon (99%), dok izuzetno mali procenat (1%) koristi telefon starije generacije. Što se tiče inovativnosti studenata u pogledu kupovine novog mobilnog telefona, najveći procenat njih (51%) kupuje isti u vremenskom periodu od 2 do 3 godine, zatim slede oni koji menjaju svoj telefon u intervalu od 1 do 2 godine (27%), pa oni koji su privrženiji svom telefonu i menjaju ga u periodu dužem od 3 godine (17%), dok je mali broj onih koji kupuju novi telefon u periodu koji je kraći od 6 meseci (2%) i od godinu dana (3%). Studenti koji sebe smatraju inovatorima (koji prvi postaju korisnici mobilnog telefona, i prate dešavanja u vezi istog koji ih zanima, van granica naše zemlje) čine 17%, zatim, oni koji spadaju u grupu rane većine (kada vide neki telefon prvi put kod drugih, brzo postaju korisnici istog, i vole da daju savete i informacije u vezi telefona) čine 9%; u grupu ranih prihvatilaca (prihvataju nove proizvode i postaju korisnici istih pre velike većine – proseka) spada 27% studenata; u grupu kasnih prihvatilaca (suzdržavaju se od novih proizvoda – postaju korisnici proizvoda tek kada ga većina ljudi oko njih ima) spada 15%; a one zakasnele (koji ne vole da menjaju navike i proizvode kojima su skloni) čini 32%. U tabeli 1 su prikazani rezultati istraživanja u vezi inovativnosti studenata prema vrsti nauke koju studiraju.

Tabela 1. Inovativnost studenata u pogledu kupovine novog mobilnog telefona

Vrsta nauke	Inovatori	Rana većina	Rani prihvatiloci	Kasni prihvatiloci	Zakasneli
Društveno-humanističke nauke	26	12	26	14	46
Tehničko-tehnološke nauke	42	12	70	32	66
Prirodno-matematičke nauke	4	6	12	8	12
Medicinske nauke	2	4	4	6	0
Umetnost	6	10	16	8	26
Ukupno:	80	44	128	68	150

U tabeli 2 su prikazani rezultati istraživanja u vezi učestalosti korišćenja pametnog telefona za određenu namenu, uključujući i upotrebu telefona u obrazovne svrhe i za

pretraživanje informacija u vezi proizvoda/usluga, komunikaciju i naručivanje. Čak 88% ispitanika se izjasnilo da koristi telefon za pretraživanje informacija dok su u radnji, odnosno 72% studenata provede do 5 minuta pretražujući, 12% njih do 15 minuta, a samo 3% njih do pola sata i više od pola sata. Za pretraživanje, dok su u radnji, najveći broj njih (28%) koristi pretraživače, 12% njih posećuje veb sajt kompanije u čijoj se radnji nalazi, 4% njih posećuje veb sajtove konkurentskih kompanija, 2,5% njih stranice kompanije na društvenim mrežama, a samo 0,5% njih stranice konkurentskih kompanija na društvenim mrežama.

Kada se sabere vreme koje studenti dnevno provedu koristeći mobilni telefon za razne aktivnosti, njih 38% koristi isti do 3 sata, 29% njih do 6 sati, 24% njih više od 6 sati, a samo 9% njih ne koristi telefon duže od 1 sata. Postoji statistički značajna razlika ispitanika prema polu (χ^2 -test, Sig.=0,00<0,05), odnosno studentkinje provode više vremena koristeći mobilni telefon za razne aktivnosti.

Tabela 2. Distribucija ispitanika prema učestalosti korišćenja pametnog telefona za određenu namenu navedenu u pitanjima

Pitanja iz upitnika u obliku izjave	Skoro uvek	Često	Ponekad	Retko	Nikad	Srednja vrednost
Koristim aplikaciju za dopisivanje (npr. Viber, WhatsApp, Facebook messenger).	83,4%	9,8%	2,6%	2,1%	2,1%	4,70
Pristupam društvenim medijima na kojima imam profil (Facebook, Instagram, YouTube...) preko mobilnog telefona.	80,9%	8,9%	3,4%	3,0%	3,8%	4,60
Gledam onlajn video snimke preko mobilnog telefona.	66,4%	18,7%	9,8%	0,9%	4,3%	4,42
Proveravam/pišem mejlove preko mobilnog telefona.	43,8%	26,4%	17,0%	8,1%	4,7%	3,97
Koristim pametni telefon u obrazovne svrhe, za pretragu dodatnih izvora literature i čitanje.	46,8%	31,5%	11,5%	6,4%	3,8%	4,11
Koristim telefon da pribeležim zanimljivosti sa časa, u vezi gradiva.	16,2%	17,4%	28,1%	16,2%	22,1%	2,89
Koristim mobilni telefon da uslikam prezentaciju sa časa (neku informaciju).	19,6%	30,6%	25,5%	14,5%	9,8%	3,36
Fizički se odvajam od mobilnog telefona u toku dana (duže od jednog sata).	29,8%	22,1%	21,3%	14,9%	11,9%	3,43
Koristim pametan telefon dok sam u radnji za pretragu dodatnih informacija (proizvoda, cena, popusta, adrese, i sl.).	14,0%	18,3%	26,4%	19,1%	22,1%	2,83
Radije koristim mobilni telefon za pretragu informacija nego da pitam uslužno osoblje.	11,9%	15,3%	21,3%	23,0%	28,5%	2,59
Koristim mobilni telefon za informisanje o proizvodima/uslugama koji se nude preko interneta.	28,9%	36,6%	26,0%	5,1%	3,4%	3,83
Šaljem poruke putem mobilnog telefona radi dodatnog informisanja u vezi proizvoda/usluga.	10,6%	16,2%	30,2%	24,3%	18,7%	2,76
Naručujem proizvode/usluge preko pametnog telefona.	13,2%	18,3%	36,2%	10,6%	21,7%	2,91

Postoji statistički značajna korelacija između varijabli, tj. godina starosti ispitanika i sledećih zavisnih promenljivih:

- učestalosti pristupanja društvenim medijima na kojima ispitanici imaju profil (Facebook, Instagram, YouTube) preko mobilnog telefona (interval poverenja 99%, rizik

greške 1%), i ona je negativna i slaba; Sig.=0,00<0,05; Pearson Correlation= -0,25, što znači da se smanjuje učestalost pristupanja društvenim medijima kako se povećava starost ispitanika.

- *učestalosti gledanja onlajn videa preko mobilnog telefona* (interval poverenja 99%, rizik greške 1%), i ona je negativna i slaba; Sig.=0,001<0,05; Pearson Correlation= -0,16, što znači da se smanjuje učestalost gledanja onlajn videa kako se povećava starost ispitanika.

- *učestalosti korišćenja pametnog telefona u obrazovne svrhe, za pretragu dodatnih izvora literature i čitanje* (interval poverenja 99%, rizik greške 1%), i ona je negativna i slaba; Sig.=0,00<0,05; Pearson Correlation= -0,17, što znači da se smanjuje učestalost korišćenja telefona za pretragu literature i čitanje, kako se povećava starost ispitanika.

- *učestalosti korišćenja telefona za pribeležke zanimljivosti sa časa u vezi gradiva* (interval poverenja 99%, rizik greške 1%), i ona je negativna i slaba; Sig.=0,00<0,05; Pearson Correlation= -0,18, što znači da se smanjuje učestalost korišćenja telefona za beleženje zanimljivosti sa časova kako se povećava starost ispitanika.

- *učestalosti fizičkog odvajanja od mobilnog telefona u toku dana koje je duže od jednog sata* (interval poverenja 95%, rizik greške 5%), i ona je negativna i slaba; Sig.=0,01<0,05; Pearson Correlation= -0,11, što znači da se smanjuje učestalost fizičkog odvajanja od mobilnog telefona kako se povećava starost ispitanika.

- *učestalosti naručivanja proizvoda/usluga preko pametnog telefona* (interval poverenja 99%, rizik greške 1%), i ona je negativna i slaba; Sig.=0,00<0,05; Pearson Correlation= -0,16, što znači da se smanjuje učestalost naručivanja preko telefona kako se povećava starost ispitanika.

U tabeli 3 su prikazane statistički značajne razlike između ispitanika prema polu u odnosu na sledeća pitanja iz upitnika, primenom t-testa.

Tabela 3. Statistički značajne razlike između ispitanika prema polu u odnosu na sledeća pitanja

Pitanja iz upitnika u obliku izjave	t	df	Sig.
Koristim aplikaciju za dopisivanje (npr. Viber, WhatsApp, Facebook messenger).	-3,215	468	0,001
Pristupam društvenim medijima na kojima imam profil (Facebook, Instagram, YouTube...) preko mobilnog telefona.	-3,607	468	0,000
Koristim telefon da pribeležim zanimljivosti sa časa, u vezi gradiva.	-2,097	468	0,037
Koristim mobilni telefon za informisanje o proizvodima/uslugama koji se nude preko interneta.	-2,635	468	0,009
Naručujem proizvode/usluge preko pametnog telefona.	2,006	468	0,045

U tabeli 4 su prikazane statistički značajne razlike između ispitanika prema vrsti nauke u odnosu na sledeća pitanja iz upitnika, primenom ANOVA testa.

Tabela 4. Statistički značajne razlike između ispitanika prema vrsti nauke

Pitanja iz upitnika u obliku izjave	Sum of Squares	df	Mean Square	F	Sig.
Proveravam/pišem mejlove preko mobilnog telefona.	24,012	4	6,003	4,565	0,001
Koristim pametni telefon u obrazovne svrhe, za pretragu dodatnih izvora literature i čitanje.	17,970	4	4,493	3,925	0,004
Koristim telefon da pribeležim zanimljivosti sa časa, u vezi gradiva.	18,726	4	4,682	2,549	0,039
Koristim mobilni telefon da uslikam prezentaciju sa časa (neku informaciju).	22,830	4	5,707	3,896	0,004
Fizički se odvajam od mobilnog telefona u toku dana (duže od jednog sata).	20,988	4	5,247	2,870	0,023
Koristim mobilni telefon za informisanje o proizvodima/uslugama koji se nude preko interneta.	12,600	4	3,150	3,109	0,015
Naručujem proizvode/usluge preko pametnog telefona.	25,256	4	6,314	3,850	0,004

5. ZAKLJUČAK

Mobilni telefoni su zauzeli centralno mesto u životima velikog broja korisnika. Mobilna tehnologija je u napravila pometnju u smislu medijskih navika potrošača u vremenskom periodu kraćem od 10 godina, ali se ističe kako se promene usporavaju - bar dok neka druga uticajna tehnologija ne preuzme primat [13].

Korisnici su se u velikoj meri prilagodili trendovima modernih tehnologija, i to predstavlja nepovratan proces. Sve veći broj proizvođača mobilnih telefona se trudi da ponudi sadržaje korisnicima kako bi ispunili njihova sve zahtevnija očekivanja. Nudi se veliki broj proizvoda, sa sličnim performansama, ali uvek sa nekim dodatnim sadržajem koji diferencira taj određeni proizvod u odnosu na konkurenciju.

Na osnovu prikazanih rezultata empirijskog istraživanja, alternativna hipoteza H_1 je potvrđena – ustanovljeno je da postoji statistički značajna korelacija između studenata različitih godina starosti i učestalosti upotrebe pametnog telefona na inovativan način. Alternativne hipoteze H_2 i H_3 su takođe potvrđene – postoji statistički značajna razlika između studenata prema polu i vrsti nauke koju studiraju u odnosu na učestalost upotrebe pametnog telefona na inovativan način. Na osnovu ovih zaključaka, izvodi se da je nulta hipoteza H_0 opovrgnuta, tj. da su generalno mladi potrošači – studenti neinovativni, da među studentima osnovnih studija ne postoji razlika u pogledu inovativnog korišćenja mobilnog telefona.

Na osnovu rezultata sprovedenih istraživanja u periodu 2010-2012 [25,28,29], može se zaključiti da su mobilni telefoni značajan medij mladih u Srbiji, što potvrđuje i sprovedeno empirijsko istraživanje autora rada, koje dokazuje da su pametni telefoni u izuzetno velikoj meri integrisani u svakodnevicu studenata kao korisnika/potrošača, te određuju njihov životni stil. Vremenom se povećava učestalost komuniciranja preko mobilnog telefona i interneta, dok se smanjuje komunikacija licem u lice, što predstavlja jedan veliki nedostatak uticaja savremenih tehnologija na stil života. S druge strane, na osnovu učestale upotrebe pametnih telefona, u svim sferama života, i društvenih medija preko istih, kompanije moraju prilagođavati svoje marketing strategije, pre svega digitalne, kako bi zadržale i pospešile svoju poziciju na tržištu.

REFERENCE

1. Government Technology, Mobile Phones: Looking Back 40 Years and Into the Future, (2013), <http://www.govtech.com/e-government/Mobile-Phones-Looking-Back-40-Years.html>
2. Kiba-Janiak M., The Use of Mobile Phones by Customers in Retail Stores: a Case of Poland, *Economics & Sociology*, 7 (1), (2014), 116-130. DOI: 10.14254/2071-789X.2014/7-1/11
3. Müller R. M., Kijl B., Martens J. K. J., A Comparison of Inter-Organizational Business Models of Mobile App Stores: There is more than Open vs. Closed, *Journal of Theoretical and Applied Electronic Commerce Research*, 6 (2), (2011), 63-76. DOI: 10.4067/S0718-18762011000200007
4. Mobile Vendor Market Share Worldwide – March 2018, (2018), <http://gs.statcounter.com/vendor-market-share/mobile>
5. Cape P., How Mobile Usage Varies Across Generations, *Survey Sampling*, (2016), <https://www.surveysampling.com/blog/how-mobile-usage-varies-across-generations/>
6. Asai S., Competition in the Japanese Cellular Phone Market, *Keio Communication Review*, 32, (2010)
7. Thought Co., Martin Cooper and the History of Cell Phone, (2017), http://inventors.about.com/cs/inventorsalphabet/a/martin_cooper.htm
8. Valletti T.M., Cave M., Competition in UK mobile communications, *Telecommunications Policy*, 22 (2), (1998), 109-131.
9. Venkata Krishna Kumar S., Poornima T.V., A Study of Wireless Mobile Technology, *International Journal of Advanced Research in Computer Science and Software Engineering*, 4 (1), (2014)
10. Clarke I., Emerging value propositions for M-commerce, *Journal of Business Strategies*, 18 (2), (2001), 133– 149.
11. Jaradat, A., Mohamad N. A., Asadullah A., Ebrahim S., Issues in Location Based Marketing: A Review of Literature, *International Journal of Scientific and Research Publications*, 5 (1), (2015)
12. ESOKO, <https://www.esoko.com/evolution-esoko-keeping-needs-rural-africa/>
13. Zenith Media, 26% of media consumption will be mobile in 2019, (2017), <https://www.zenithmedia.com/26-of-media-consumption-will-be-mobile-in-2019/>
14. American Marketing Association, <https://www.ama.org/resources/Pages/Dictionary.aspx?dLetter=C>
15. Maričić B., Ponašanje potrošača, *Savremena administracija*, Beograd, 2002, 106-107.
16. Aleksić J., Aleksić M., Dojčinović S., Uticaj grupnih internih i eksternih faktora na odluke potrošača o kupovini , *Časopis za ekonomiju i tržišne komunikacije*, broj II, Godina II, 295-307.

17. Saleh K., The Importance of Online Customer Reviews, <https://www.invespro.com/blog/the-importance-of-online-customer-reviews-infographic/>
18. Mrvoš V., Istraživanje navika korisnika interneta u nas: Svaki treći se pokušava spojiti na susjedov wi-fi, <http://www.novilist.hr/Znanost-i-tehnologija/Tehnologija/Istrazivanje-navika-korisnika-interneta-u-nas-Svaki-treci-se-pokusava-spojiti-na-susjedov-wi-fi>
19. Ene S., Özkaya B., The Role of Mobile Advertising on Consumers' Purchase Decisions: A Research on Consumer Attitudes towards Mobile Advertising, *International Journal of Humanities and Social Science*, 5 (1), (2015)
20. E-Commerce Reviews: The Dramatic Impact on Consumers' Path to Purchase, <http://influence-central.com/e-commerce-reviews-the-dramatic-impact-of-online-reviews-on-consumers-purchasing-journey/>
21. Fuchs C., *Social Media a Critical Introduction*, Sage publications Ltd, second edition, (2017)
22. Mangold G., Faulds D., Social media: The new hybrid element of the promotion mix, *Business Horizons*, 52, (2009), 357-365.
23. Zenith Media, Mobile devices to lift online video viewing by 20% in 2017, (2017), <https://www.zenithmedia.com/mobile-devices-lift-online-video-viewing-20-2017/>
24. Zenith Media, Smartphone penetration to reach 66% in 2018, (2017), <https://www.zenithmedia.com/smartphone-penetration-reach-66-2018/>
25. Ipsos MediaCT, Praćenje korišćenja novih medija – 2012. Medija centar, http://www.mc.rs/upload/documents/saopstenja_izvestaji/2012/120712_IPSOS-korisjenje-novih-medija.pdf
26. Krstić A., Đurđević B., Marketing na društvenim mrežama. Časopis za marketing teoriju i praksu *Marketing*, 48 (4), (2017), 254-260.
27. Sprout Social, The Social Generations: Millennials Ask, Gen X Buys & Baby Boomers Observe, (2017), <https://sproutsocial.com/insights/data/q1-2017/>
28. Ipsos Strategic Marketing, Korišćenje novih medija među mladima (2011), Medija centar, www.mc.rs/upload/documents/.../141211Mladi_i_novi_mediji-srp
29. Ipsos Strategic Marketing, Istraživanje o mladima i novim medijima u Srbiji (2010), Medija centar, <http://www.mc.rs/mladi-i-novi-mediji.2024.html?action=print>



AN EMPIRICAL STUDY OF LIFE INSURANCE AGENT'S INFLUENCE ON RURAL CUSTOMER'S LIFE INSURANCE BUYING BEHAVIOR: AN INDIAN PERSPECTIVE

Abhinav Nigam

FMS-WISDOM, Banasthali Vidyapith, India

Abstract: With rapid growth in competition, consumerism, education, disposable income, westernization, etc, urban markets are rapidly growing and reaching saturation levels. Due to these factors organizations are now moving towards rural markets in India.

To further understand rural markets, understanding of what rural areas are, is important. According to Census of India, those areas where the population is below 5000, the population density is less than 400 per square kilometer and where at least 75% of the males of the working population are engaged in agricultural activities is defined as rural area.

It has been observed that the rural demographics are rapidly shifting. Growth in per capita income in rural India is increasing due to modernization of agriculture, better job opportunities, govt. focus, etc. The education level is also increasing which plays a major role in understanding of risk management including life insurance.

In rural India life insurance agents are the primary source of promotion, information and sale of life insurance products. Although other channels of life insurance distribution like banks, post offices, brokers, etc. are available, agents are responsible for major portion of life insurance distribution in rural areas and have a major influence on customers.

The paper aims to explore the impact and influence of life insurance agents on rural customer's life insurance buying behaviour.

Aspects like familiarity with the agent, product knowledge provided by the agent to the customers, agent's convincing power, agent's social status, etc. have been statistically tested for their influence on rural customer's buying behaviour.

Keywords: Rural India markets, rural customer behaviour, life insurance buying, life insurance agent's influence.

1. INTRODUCTION

With rapid growth in competition, consumerism, education, disposable income, westernization, etc., urban markets are rapidly growing and reaching saturation levels. Due to these factors organizations are now moving towards rural markets in India.

To further understand rural markets, understanding of what rural areas are, is important. According to Census of India, those areas where the population is below 5000, the population density is less than 400 per square kilometer and where at least 75% of the males of the working population are engaged in agricultural activities is defined as rural area [1].

Rural India contributes around 50% to gross domestic product (GDP) and constitutes nearly 70 % of the country's population. The market serves around an enormous 850 million

consumer base from around 650,000 villages in India [2]. It has been observed that the rural market demographics are rapidly shifting. Growth in per capita income in rural India is observed due to modernization of agriculture, better job opportunities, govt. focus, etc.

The education level is also increasing which plays a major role in understanding of risk management and of course life insurance [3].

“A meager of 13% of Indian households with per annum income less than Rs 45,000 (these people constitute 76 million) had savings bank accounts with any bank and similar ratio had life insurance.” [4]

Despite all the changes majority of rural India is still uninsured. The penetration is extremely low in rural markets and is in the region of at 2.8% of the GDP as on 2005 [5].

Apart from that most of the rural population has poor financial management knowledge. They are unaware of utility of life insurance and think of it as a risky venue to invest their money. In case of life insurance there is a tendency to defer the decision despite more harsh living conditions and lack of medical facilities in rural India. Other than that rural India has a weak social security and pension system.

The above mentioned fact indicate that role of agents is very crucial as rural people have very little knowledge of life insurance and they consider it a risky avenue. Information and motivation provided by agents is a key driver for life insurance buying by rural people [6-8].

This paper will focus on identifying agent factors that influence buying behavior of rural consumers.

2. LITERATURE REVIEW

[6-8] Authors have studied the role of agents as consumers have limited knowledge about life insurance and are dependent on external sources of information. To form consumer reference agents play an important role and have a major influence on life insurance purchase decision. The authors have also explored that consumers are more or less passive and agents play the role of inducers in life insurance buying.

[9] 52% of customers who bought life insurance find that information and advice provided by agents during pre purchase is very helpful in decision making. Even 34% of non buyers found that agent interaction is helpful. Similarly post purchase, 75% customers found agents helpful (Figure. 1)



Figure 1. Post purchase interaction preference [9]

[10] Author argues that agent’s efforts in life insurance selling are important. They are an important element in life insurance sales process.

[11] Author show that despite the digital and innovative initiatives by life insurance sellers, agents still play a predominant role in life insurance distribution.

[12] The research study conducted on 200 policyholders has concluded that for rural people, agents are the most important source of motivation and information. Rural people almost always buy policies suggested by agents.

[13] For rural areas micro insurance and agents are key components to achieve desired penetration. Smaller premium sizes are best suited for rural markets as their paying capacity is less. Penetration of digital technology is also low, making presence of afents crucial.

[14] India is the second fastest growing economy and fourth largest in terms of PPP (Purchasing Power Parity). She also recorded huge potential for life insurance. A 70% of this population lives in rural markets which provide immense opportunities to insurance agents. The author also explained required traits for insurance agents to succeed in the market.

[15] In the paper published by the importance of agents have been highlighted. As per the paper agents in the modern market needs to know about the customer needs. For the same life insurance companies are looking for educated individuals with marketing flair to cater to the customer’s needs.

[16] In the study, the life insurance buying behaviour of newly married couples was observed. The study revealed that the insurance agents and the wife play an important role in buying decision of life insurance products.

[17] Researchers investigated the factors related to less popularity of life insurance products among Indian population. They also investigated the factors contributing in this matter. Major factors include, company image, trust level, reliability, role of agents among others.

[18] Suggests that adding agents as decoys heavily influences consumer decision. They proposed a model (Figure 2) showing decoy effect on life insurance consumer decision making. As per their research agents (decoys) plays a major role in decision making. Huber, J, et. al. (1982) defines decoy as “an asymmetrically dominated alternative is dominated by one item in the set but not by another. Adding such an alternative to a choice set can increase the probability of choosing the item that dominates it”

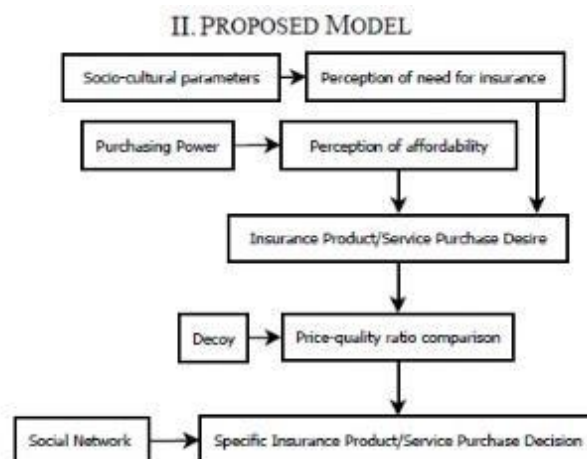


Figure 2. Insurance consumer behavior model including the decoy (agent) effect [18]

[19] Developed a scale to measure relationship between customer and agent. The research indicated that trust and confidence on agent are major influencers followed by agent remembering customer information.

[20] In their research identified that companies need to train sales representatives so as to improve culture compatibility, collective competence, emotional intelligence, communication, problem solving skills, ethics and information technology utilization.

3. OBJECTIVES

To identify the influence of:

- a. Familiarity with agent,
- b. Knowledge given by agent,
- c. Convincing power of agent,
- d. Agent's personality,
- e. Agent's social status,
- f. Commission passed by agents,
- g. Policy as per customer need

On rural customer's life insurance buying decision.

4. RESEARCH METHODOLOGY

Cluster sampling is used for collection of data. Schedules were administered to 400 rural people from selected clusters. Out of these 397 useful schedules were obtained.

Schedule contained 16 questions out of which 8 questions are related to demographic profile of respondents and 8 (on 5 point Likert scale) are for understanding the agent's influence.

Cronbach's Alpha is used to check the reliability of the schedule and the value is found to be .852, which is good [21].

Skewness and Kurtosis were also checked to ensure normality of data and are within suitable range [between -2 to +2 is acceptable (22)].

Data was analyzed using correlation and multiple regression analysis.

Variables are coded as given in table 1:

Table 1. Variable coding

Variable Details	Variable Name	Nature
Q8_Agent_Influence_Decision	D	Dependent
Q9_Agent_Familiarity_Influence	ID1	Independent
Q10_Agent_Give_Knowledge	ID2	Independent
Q11_Agent_Convincing_Influence_Buying	ID3	Independent
Q12_Agent_Personality_Influence_Buying	ID4	Independent
Q13_Agent_Social_Status_Influence	ID5	Independent
Q14_Agent_MOre_Comm_Policy	ID6	Independent
Q15_Agent_Policy_Need_Based	ID7	Independent

5. HYPOTHESES

Based on literature review and personal interaction with life insurance customers following hypotheses were formed to analyze agent's influence on rural customer buying behavior:

- H₀₁: In the presence of the other predictors, there will be no significant prediction of agent's influence on life insurance buying decision by familiarity with agent.
- H₀₂: In the presence of the other predictors, there will be no significant prediction of agent's influence on life insurance buying decision by knowledge given by agent.
- H₀₃: In the presence of the other predictors, there will be no significant prediction of agent's influence on life insurance buying decision by convincing to buy Life Insurance by agent.
- H₀₄: In the presence of the other predictors, there will be no significant prediction of agent's influence on life insurance buying decision by agent's personality.
- H₀₅: In the presence of the other predictors, there will be no significant prediction of agent's influence on life insurance buying decision by agent's social status.
- H₀₆: In the presence of the other predictors, there will be no significant prediction of agent's influence on life insurance buying decision by commission passed by agents.
- H₀₇: In the presence of the other predictors, there will be no significant prediction of agent's influence on life insurance buying decision by agents provide life insurance policy as per customer needs.

6. ANALYSIS AND INTERPRETATION OF RESULTS

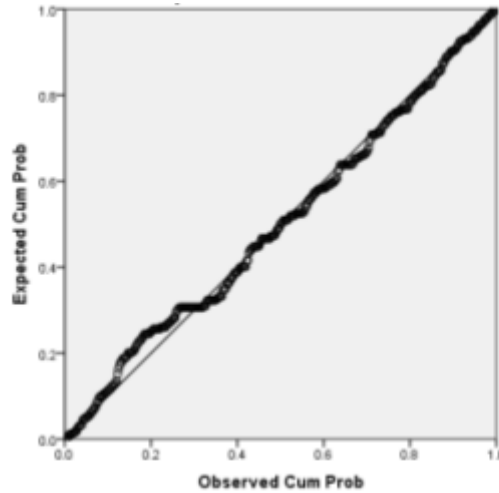
Table 2 presents the Pearson correlation between dependent and independent variables. As can be seen from the table all correlations are strong and significant.

Table 2. Pearson correlation between dependent and independent variables

Pearson Correlation	D	Sig. level
ID1	.619	.000
ID2	.842	.000
ID3	.693	.000
ID4	.630	.000
ID5	.622	.000
ID6	.734	.000
ID7	.509	.000

Hypotheses are analyzed by using multiple regression. Stepwise method of entry is used for analysis of data. This method analyzes the effect of predictors entered at each step. This provides a better picture of influence of each predictor entered in previous step in presence of new predictor.

Residuals are plotted (Plot 1) so as to ensure normality of residuals. As can be seen from plot 1 residuals are approximately normal with no strong deviations, which is one of the important criteria to run multiple regression, hence author can proceed further.



Plot 1. Normal P-P plot of Regression Standardized Residuals

6.1. VARIABLES ENTERED/REMOVED: All the variables were entered in model and none were removed, which indicates that all the predictors are contributing to the model.

Table 3. Model Summary ^h

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.842 ^a	.709	.708	.616
2	.891 ^b	.794	.792	.519
3	.903 ^c	.815	.814	.492
4	.907 ^d	.822	.820	.483
5	.910 ^e	.828	.826	.476
6	.912 ^f	.832	.830	.470
7	.914 ^g	.835	.832	.467

a. Predictors: (Constant), ID2; b. Predictors: (Constant), ID2, ID6; c. Predictors: (Constant), ID2, ID6, ID3; d. Predictors: (Constant), ID2, ID6, ID3, ID4; e. Predictors: (Constant), ID2, ID6, ID3, ID4, ID7; f. Predictors: (Constant), ID2, ID6, ID3, ID4, ID7, ID1; g. Predictors: (Constant), ID2, ID6, ID3, ID4, ID7, ID1, ID5; h. Dependent Variable: D

6.2. MODEL SUMMARY: From table 3 it can be seen that as the variables are being entered into the model the model fit improves (Adjusted R square). The model indicates 83.2% of dependent variable can be explained by the predictors.

Table 4. ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	364.836	1	364.836	961.248	.000 ^b
Residual	149.920	395	.380		
Total	514.756	396			
Regression	408.477	2	204.239	757.162	.000 ^c
Residual	106.278	394	.270		
Total	514.756	396			
Regression	419.602	3	139.867	577.675	.000 ^d
Residual	95.154	393	.242		
Total	514.756	396			
Regression	423.203	4	105.801	453.005	.000 ^e
Residual	91.553	392	.234		
Total	514.756	396			
Regression	426.230	5	85.246	376.512	.000 ^f
Residual	88.526	391	.226		
Total	514.756	396			
Regression	428.528	6	71.421	323.031	.000 ^g
Residual	86.228	390	.221		
Total	514.756	396			
Regression	429.850	7	61.407	281.340	.000 ^h
Residual	84.906	389	.218		
Total	514.756	396			

a. Predictors: (Constant), ID2; b. Predictors: (Constant), ID2, ID6; c. Predictors: (Constant), ID2, ID6, ID3; d. Predictors: (Constant), ID2, ID6, ID3, ID4; e. Predictors: (Constant), ID2, ID6, ID3, ID4, ID7; f. Predictors: (Constant), ID2, ID6, ID3, ID4, ID7, ID1; g. Predictors: (Constant), ID2, ID6, ID3, ID4, ID7, ID1, ID5; h. Dependent Variable: D

6.3. ANOVA: ANOVA is shown in Table 4. It shows that F values are highly significant, which means the model explains a significant amount of variance in agent's influence on rural customer's life insurance buying decision.

Table 5. Coefficients ^a (for clarity only the part of table where all the predictors have been entered is shown)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics
	B	Std. Error	Beta			VIF
(Constant)	-.369	.125		2.961	.003	
ID2	.402	.032	.421	12.566	.000	2.641
ID6	.261	.031	.249	8.462	.000	2.046
ID3	.147	.028	.157	5.322	.000	2.058
ID4	.091	.030	.083	3.016	.003	1.805
ID7	.086	.026	.079	3.245	.001	1.399
ID1	.098	.029	.089	3.310	.001	1.698
ID5	.068	.028	.067	2.461	.014	1.728

a: Dependent Variable: D

6.4. COEFFICIENTS: Table 5 shows multiple linear regression estimates including constant and significance levels. As can be seen all the predictors have a significant impact on dependent variable.

6.5. MULTIPLE REGRESSION EQUATION: Regression equation was made to represent the relation between dependent and independent variables. The general form of equation is as follows:

$$y = \alpha_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_ix_i; \text{ i is } i^{\text{th}} \text{ independent variable.}$$

Here:

1. y is the dependent variable being predicted by the equation.
2. α_0 is the constant or the intercept.
3. $\beta_1, \beta_2, \beta_i$ are the beta coefficients from table 5.
4. x_1, x_2, x_i are independent variables.

Multiple regression equation from table 5 is as follows:

$$D = -.369 + .098*ID1 + .402*ID2 + .147*ID3 + .091*ID4 + .068*ID5 + .261*ID6 + .086*ID7$$

The VIF values (Table 5) are also between 1 and 10, which means there is no problem of multi-collinearity.

Table 6. Hypotheses testing results and Standardized Coefficient values.

Hypotheses	Significance	Null Accepted/ Rejected	Alternate Accepted/ Rejected	Standardized Coefficients	Independent Variables	Variable Name
H ₀₁	.001	Rejected	Accepted	.089	Q9_Agent_Familiarity_Influence	ID1
H ₀₂	.000	Rejected	Accepted	.421	Q10_Agent_Give_Knowledge	ID2*
H ₀₃	.000	Rejected	Accepted	.157	Q11_Agent_Convincing_Influence_Buying	ID3 ^{\$}
H ₀₄	.003	Rejected	Accepted	.083	Q12_Agent_Personality_Influence_Buying	ID4
H ₀₅	.014	Rejected	Accepted	.067	Q13_Agent_Social_Status_Influence	ID5
H ₀₆	.000	Rejected	Accepted	.249	Q14_Agent_More_Comm_Policy	ID6 [#]
H ₀₇	.001	Rejected	Accepted	.079	Q15_Agent_Policy_Need_Based	ID7

As can be seen from table 6 all null hypotheses have been rejected as all the predictors have statistically significant influence on dependent variable (agent's influence rural customer's life insurance buying decision).

6.6. INTERPRETATION: Some interesting interpretations that can be drawn by analyzing table 6.5 are:

1. Rural customer's perception that agent's provide knowledge about the product (*) is the most influencing predictor as one unit change in it results in .421 unit change in agent's influence on life insurance purchase decision. This is an important finding as most of rural customers are less literate and their understanding of life insurance is very limited. Other than that in rural markets agents are considered authentic source of information as they have to pass the exam conducted by IRDA (Insurance Development and Regulatory Authority of India) to act as life insurance agents.
2. Rural customer's perception that agent's sell policy which avail them (agents) more commission (#) is the second most influencing predictor as one unit change in it results in .249 unit change in agent's influence on life insurance purchase decision. This is an interesting outcome as in India it is a common practice that agents pass on certain percentage of their commission earned on policy sale, to customers. This is usually an important part of purchase process and negotiation. It is a selling tactic and usually customers fall for it.
3. Rural customer's perception that agent's convincing power influences their decision (\$) is the second most influencing predictor as one unit change in it results in .157 unit change in agent's influence on life insurance purchase decision. This due to the fact that agents are considered an authentic source of information and are representatives of the organization.
4. Agent's social status, personality, familiarity and need based selling are much less important for rural customers. Majority of rural customers don't understand the concept

of risk management and diversification and hence the factor, need based selling is less relevant for them.

7. CONCLUSION

Indian rural markets have immense potential for life insurance as most of rural India is uninsured. Due to the lack of digital penetration and lesser levels of education life insurance understanding and penetration are very less.

Agents play a key role in life insurance distribution to such markets. Agents being certified by IRDA (Insurance Development and Regulatory Authority of India) are perceived as knowledgeable and rural customers trust agents for their life insurance purchase process. Thus the knowledge provided by agents becomes a key influencer on rural customer's life insurance purchase decision.

Rural customers perceive agents as knowledge bearers about life insurance, which can impart them with required information about life insurance. Due to this rural customers life insurance buying decision is strongly influenced by agent's convincing power.

Another interesting outcome of the research is that agents pass back certain percentage of commission earned on sales, back to customers. This is another important influencing factor on rural customer's life insurance purchase decision.

Other factors like agent's social status, personality, familiarity and need based selling are found to have lesser influence on purchase decision.

From the above discussion it can be safely interpreted that for Indian rural markets agents are a key influencing factor and have the responsibility of majority of life insurance sales.

REFERENCES

1. Office of the Registrar General and Census Commissioner, I. (2010). *Census Terms*. Retrieved 2018, from <http://censusindia.gov.in>: http://censusindia.gov.in/Data_Products/Library/Indian_perceptive_link/Census_Terms_link/censusterm.html
2. Office of the Registrar General and Census Commissioner, I. (2011). *List of Villages/Towns*. Retrieved 2018, from <http://censusindia.gov.in>: <http://censusindia.gov.in/2011census/Listofvillagesandtowns.aspx>
3. Ionică Maria, Petrescu Eva-Cristina, Ionică Diana, Constantinescu Mihaela (2012). The Role of Education on Consumer Behavior on The Insurance Market. WCES 2012, p 4154.
4. Boston Consultancy Group November (2007). *The Next Billion Consumers – A Road Map to Expanding Financial Inclusion in India*.
5. Sadhak H (2009). Life Insurance in India, Opportunities, Challenges and Strategic Perspective. Response Books (Business Books from SAGE), p. 187.
6. Gravelle, H., 1993, Price and Advice Quality: Implications of the Commission System in Life Assurance, Geneva Papers on Risk and Insurance Theory 16: 3-19.

7. Gravelle, H., 1994, Remunerating Information Providers: Commissions versus Fees in Life Insurance, *Journal of Risk and Insurance*, 61: 425-457.
8. Bernheim, B. D., L. Forni, J. Gokhale, and L. Kotlikoff, 2003, The Mismatch Between Life Insurance Holdings and Financial Vulnerabilities: Evidence From the Health and Retirement Study. *American Economic Review*, 93: 354-365
9. Sharps, K., Hitsky, D., Hodgins, S., & Ma, C. (2015). *Life insurance consumer purchase behavior Tailoring consumer engagement for today's middle market*. Deloitte .
10. Morrison, L. S. (1939). Selling Methods in Life Insurance. *Journal of the American Association of University Teachers of Insurance, Proceedings of Sixth Annual Meeting*, (pp. 40-52).
11. Braun, A., H. Schmeiser and F. Schreiber, 2014, On the Willingness to Pay for Term Life Insurance, Working Paper presented in ARIA 2014 Annual Conference, Seattle.
12. Bodla, B., & Rani, S. V. (2007). Life Insurance Policies in Rural Area: Understanding Buyer Behaviour. 18-27.
13. Roth, J., & Athreya, V. (2005). *Micro insurance Good and Bad practices*. CGAP working Group.
14. Nanda, R. (2007). Being an Insurance Agent, The pride and the prejudice. *Journal of the Insurance Regulatory and Development Authority* .
15. Singh, M. P., Chakraborty, A., & G., R. (2011). Contemporary Issues in Marketing of Life Insurance. *International Journal of Multidisciplinary Research* , 47-61.
16. Ulbinaitė, Aurelija, Kučinskienė, Marija, & Moullec, Yannick Le (2011). *Conceptualising and Simulating Insurance Consumer Behaviour: an Agent-Based-Model Approach*. *International Journal of Modeling and Optimization*. vol. 1, no. 3, p 252.
17. Sahu Praveen, Jaiswal Gaurav and Pandey Vijay Kumar (2009). *A Study of Buying Behaviour of Consumers Towards Life Insurance Policies*, Volume 3, Issue 3/4.
18. Anderson, D. R., and Nevin, J. R. (1975). *Determinants of Young Married Life Insurance Purchasing Behavior: An Empirical Investigation*. *Journal of Risk and Insurance*, vol. 42, p. 375-387.
19. Durvasula, C.Lobo, A., Sons, S. K., & Mehta, S. (2005). *Impact of relationship quality on values, satisfaction and behavioural intension in the life insurance industry*. *Journal of Financial Services Marketing*, 10(3), 244-259.
20. Fan, C., & Chen-Liang, C. (2006). *A study to identify the training needs of life insurance sales representatives in Taiwan using the Delphi approach*. *International Journal of Training and Development*, 10, 212-226.
21. Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of applied psychology*, 78(1), 98.
22. George, D., & Mallery, M. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference*, 17.0 update (10a ed.) Boston: Pearson.



DIGITAL TECHNOLOGIES IN AGRO-FOOD SPHERE

Yulia Syaglova

*The Russian Presidential Academy of national economy and public administration, Moscow,
Russia*

Abstract: The agro-food sphere in the modern period of time is the sphere whose main goal is the coordination and integration of the actions of various levels of its participants.

The agro-food sphere includes three levels of participants: producers of food products, wholesale and retail trade enterprises, and final consumers of food products.

Producers of food products, in turn, set themselves the goal of establishing effective logistics channels and further delivery their goods to the retail network through wholesale enterprises of various forms.

Wholesale enterprises, using their own distribution centers or using integrated logistic formats with retail trade networks, organize the delivery of the received goods from manufacturers to retail companies of various formats.

Retail companies are stationary and non-stationary, accumulating the required assortment of goods on the shelves of stores, meet the needs of key customers who need quality and safe goods at the best prices.

These participants in the agro-food sector, in order to increase the efficiency of production and trade activities, and taking into account the interests of end users, form agrological chains that are integrated and have a pronounced synergistic effect.

All three levels of participants in the agro-food sphere, due to the active development of both production and trade technologies, require new solutions and tools to improve overall effectiveness. These new tools include digital technologies, which to date reflect the realities and requirements of the concept of the digital economy of Russia as a whole.

The publication examines the modern experience of using digital technologies in the activities of participants in all three levels in the agro-food sphere, as well as the possible positive and negative consequences from their implementation in the activities of agro-food sector participants.

Keywords: Agro-food sphere, digital technologies, agrologistic, innovations

1. INTRODUCTION

The existing understanding of the essence of the agro-industrial complex is not capable of reflecting the current state and trends of the functioning of its participants. In this regard, the expert and scientific community have come to the conclusion that it is necessary to transform this concept into the agrofood sphere. The agrofood sphere is currently an economically and socially significant area which, on the one hand, involves the inclusion in its structure of various categories of participants that provides regular, uninterrupted supplies of agricultural and other food products to its channel distribution by making an efficient

commodity distribution chain. Through distribution channels, these products appear in stores in various formats. On the other hand, satisfaction of consumer needs is a socially significant process that has an important impact on the life and health of the nation due to the opportunity for buyers to purchase quality and safe food at competitive prices. In this case the main objective of the study is to conduct a system analysis of all levels of participants in the commodity distribution chain for the agrofood sphere and identify further trends in the development, including digitalization in order to increase the effectiveness of the economic and socially significant activities.

2. MATERIAL AND METHODS

The modern understanding of the nature of the agro-industrial complex presupposes its gradual transformation into the agro-food sphere which is a special economic field and its important goal is to meet the population's needs for quality and safe food supporting vital life sustenance, social and cultural development.

In this regard, the main goal of effective functioning of the modern agrofood sphere is the integration and coordination of efforts of the three levels of participants in production and trade activities: agricultural and other manufacturing enterprises (first-tier participants), distribution companies, including wholesale distribution centers and complexes, wholesale food markets, retail enterprises of various store and off-store formats (second-tier participants). In addition, end users are also important participants in the agrofood sphere which needs and requirements ultimately amount to obtaining the opportunity to purchase high-quality and safe food products in the right amount, at the best prices (third-tier participants) [5].

Thus, an integrated commodity distribution chain is formed in the agrofood sphere which necessarily includes a complex of operations to organize the movement of food products through various intermediary channels creating a variety of logistical communications between them. The modern interpretation of this logistic complex is based on the introduction of a new term in the agricultural and food field - agrologistics which, in the author's opinion, is fully described as an entire integrated set of logistic communications among participants in the commodity chain of all three levels in order to achieve integration and partnership between them and obtain a synergistic effect that allows us to evaluate the effectiveness of the agrological chain in a comprehensive manner, rather than using the analysis of some sectors of its components. The modern integrated agrologistics' chains are associated with the active implementation of new digital technologies and tools, which, on the one hand, can significantly increase the speed of logistics' processes, and on the other hand - are able to influence the quality of products that end consumers receive on store shelves. We are talking about the blockchain technology which elements include accumulated and systematized product information and at each stage the required information is monitored on the quality and quantity standards by the blockchain participants and, if necessary, the participants of the distribution chain can change the conditions of logistics or even exclude a portion of goods from the chain in case of a discrepancy in quality required standards. It is also important to point out that such of these digital informational systems are practically ready to be implemented in Russian distribution chain practice. We are talking about the unified state automated information system for controlling the movement of alcohol products and the automated information system "Mercury" which is intended for electronic certification and ensuring traceability of cargoes under surveillance to the state veterinary supervision during their production, turnover and movement on the territory of the Russian

Federation in order to create a unified information environment for veterinary medicine, improve biological and food safety [1].

The modern interpretation of the agrofood sphere with its digital tools is fully correlated with the food security requirements of the Russian Federation, as outlined in the Food Security Doctrine and moreover, in the author's opinion, realizing the principles of multifunctionality contributes to the achievement of effective interaction among its participants at all levels, beneficially affects the efficiency of their production, commercial and trading activity and also affects the increase in the purchasing power of the final customer which today is at a fairly low level [2].

A more detailed analysis of participants in the agrofood sphere of the above said three levels should be carried out:

The first level concerns the producers of agricultural and other food products and food. The main goal of such enterprises is to achieve the state of efficiency of production activities, guaranteed volumes of future sales of manufactured products via a system of wholesale and retail enterprises, various in terms of their trading activity, the existing range of goods, the level of specialization and other parameters.

The system analysis of the industrial and trade sphere of agrofood enterprises, carried out by the author, shows the presence of three options to form an integrated commodity distribution chain:

1. Production partnership. In order to increase the efficiency of production activities, the formation of long-term partnerships is needed by commodity producers based on strategic contracts for the organization of production activities with distribution companies, for example, with large retail chains that involve mutually beneficial production of certain products and guaranteed further sales to this retail network. A systematic analysis of the activities of participants in the agrofood sphere has shown that such examples of a more or less mutually beneficial trade-and-production partnership already exists in Russia but it is currently only at the initial stage of its development. Thus, only a few food producers were able to produce to meet the needs of a particular trading network. Successful examples of such a production partnership includes signing contracts for the cultivation and direct supply of trout from Karelia (the water area of the Vkusa River) between the federal retail chain "Lenta" and the Russian fish producer "Rybstandart". It should be noted that such a type of production partnership was first introduced into the trade and production activities of both enterprises and is extremely beneficial for both parties. The manufacturer in this case has the opportunity to implement and achieve production parameters within its production program and ensure further sales of products to the trading network. The trading network also gets the opportunity to get rid of the search and establishment of a complex system of relationships with numerous producers and intermediaries of fish products. In addition, the trading network at the stage of signing of production contracts can, to some extent, "dictate" the conditions in terms of the required parameters of the quality of future manufactured products, its appearance and other aspects, in advance of setting a certain level of retail price in the trade network and the needs of its consumers. An important parameter of the pricing policy in this case is the fact of not overstating the price, as it happens when a standard chain of relations between the trading network and intermediaries takes place each of which influences its increase but, on the contrary, the possibility of achieving the criterion of price optimality, as there is a production partnership, no additional intermediaries, no parameters influencing the price growth. End consumers get the opportunity to purchase fresh fish products that have a high level of quality, which does not pass through numerous logistic links and at the time of

its appearance on the shelf does not lose its usefulness. In the above example of the production partnership, fresh trout appears on the shelves of the "Lenta" trading network the very next day after the catch and is very popular among buyers who value this product highly. Among other things, in this example of the production partnership, the aspect of import substitution is traced since 2014, due to the ban on deliveries to Russia of chilled fish from the countries of the European Union, Canada, Norway, Australia and the USA, Russia received trout only from Chile and the Faroe Islands in the frozen form. The production partnership contributed to the emergence of Russian cooled fish due to the availability of an optimal integrated agrological system, which in this case contributes to the achievement of parity between the costs of participants and the effect obtained for all the three levels of participants in the agro-food sphere.

2. *Investing retail trade companies in the organization of production capacities.* In addition to the trade and production partnership with manufacturing companies, Russian retail chains are trying to enter the production segment independently in attempts to supply their trading needs with the supplies of the required range of products producing them independently. The analysis of participants of retail trade in food products in Russia showed that the national trade network "Magnit" provides itself with 2/3 of the total demand for food supplies, that is, it produces a rather wide range of products in its production complexes, for example, growing fruit and berry products, mushrooms and other produce on agricultural lands of the Krasnodar Territory and other southern regions of Russia. Investing own funds in the organization of production certainly is not specialized for the commercial enterprise, however, given sufficient financial and organizational capabilities, as well as specific, different from other Russian retail chains, organic growth strategies from the regional Krasnodar chain of stores "At Home" up to the national Russian network is quite understandable, reasonable and relevant. It should be noted that expert opinions on such diversification of commercial activities with a view to withdrawing from the sphere of trade into the sphere of production differs in the interpretation of its achievable positive effect. Similar expert judgments confirm the conducted analysis of the company's performance indicators for 2017, the dynamics of which indicates a decrease in marginality which, in particular, may be due to the manifestation of elements of diversification of the dispersion of financial resources on the company's non-core activities. However, "Magnit" currently ranks as second in Russia among federal trade networks in terms of sales revenue and number of enterprises and demonstrates additional opportunities for integrating production and trade. The organization of its own production at the same time allows you to manage costs in the direction of their decline, which provides a formed system of agrology. The optimal number of links in agro-logistics also contributes to the emergence of the additional possibility of establishing a minimum price in the retail network for self-produced goods which is extremely important for the enterprise and its customers, as the company carries out its trading activities through the format of the "At Home" stores, the main competitive advantage of which is the minimum price for the optimal quality of products. In this case, it is food products produced or grown in Russia, which is also a favorable fact in terms of achieving import substitution.

3. *Establishment of a branded trading network.* Formation of own trading network on the basis of creation of shops of trade in this case assumes integration of efforts of manufacture and sale at the expense of investment of own means opening a network of specialized shops which realize the production made for the given trading network by the commodity producers. The analysis of participants in the agrofood sphere demonstrates that in

Russia, the Moscow region in particular, similar enterprises already exist which gives additional competitive advantages over other companies that are similar in the structure of the range of goods. For example, the "Miratorg" trade and sales network carries out a simultaneous production of a big variety of meat products, and also conducts a trading activity in the supermarket format in Moscow and the Moscow Region where it sells its own meat products in a wide range at the best prices for consumers. In this example, the integrated synergetic effect is also traced which is caused by the creation of such a chain of agrolistics and it allows the company to supply the whole volume of the production of a guaranteed level of quality to the counters of its own stores and sell to consumers in a short time. It should be noted that consumers demonstrate a significant increase in consumer activity at the same time and are ready to purchase meat products produced in Russia at the best prices, which certainly affects their quality of life, as they begin to consume fresh domestic meat that has a short storage time. In order to maintain the required sales revenues, "Miratorg's" trading facilities supplement their trade range of produce with the accompanying products of other food producers in order to match the format of the supermarket store, thus, they provide the population with an opportunity to make an integrated purchase of food products.

The second level of participants in the agrofood sphere is the distribution companies. In the agrofood sphere these enterprises are represented by a wholesale link, to modern representatives of which are wholesale distribution centers that supply the necessary range of food products or a specific trading network, or implement the needs of several trade networks, accumulating the required range of food products. The analysis of participants in the agrofood sphere showed that such large federal retail chains as "X5 Retail Group", "Dixy", and "Magnit" in their structure have similar agrolistics complexes that fully meet the needs of the retail network in terms of the range of food products. However, it should be noted that the availability of such agro-logical structures is a characteristic mainly for large federal and regional networks, which are due to organizational and financial opportunities to ensure their effective functioning. Smaller participants in the agrofood sphere, such as regional or local retail chains, as well as independent medium and small enterprises, mainly purchase through the wholesale food markets and complexes. For example, in the Moscow region such trading activities are actively implemented through the food and food market "Food City" which provides the needs of small and medium-sized agro-food enterprises using a full agrolistics cycle until the delivery of goods to the stores. It should be specially noted that these agrolistics complexes have a high level of equipping with various technical and technological digital elements, such as biometric identification of the employee working in the complex, automatic loaders, automatic tools for manning and assembling orders, voice commands for ordering, robotization of technological processes and so on.

The retail chain of the agro-food sphere is represented by the network trade enterprises of international (global), national (federal), regional (local) levels of activity coverage [4]. In general, the analysis of participants in the agro-food sphere has shown that the main influence on the retail trade in Russia today both on the volume of sales revenues and on the number of enterprises is exercised by enterprises of national or federal level of coverage that are represented by such federal trade operators as "X5 Retail Group", "Dixy", "Magnit", "Lenta". It should also be noted that in order to fully meet the current level of consumer demand, federal operators use a multi-format trading model of the business, selling food products through such formats as hyper-, supermarket and neighborhood shops. In the current period of time the format "neighborhood shops" is the most widespread and preferred format for buyers and all trading networks use it. In addition to federal trade operators in the agro-food sphere, global operators such as "Metro", "Auchan", and "Zelgros" operate, too, which also adhere to

the multi-format model but, in contrast to national operators, they use larger formats of trade - "Hypermarket" and "Cash&Carry", focused not only on satisfying the needs of retail but also small wholesale consumers. It should be noted that global operators in the agro-food sphere, although they are present in Russia, however, do not make such a significant contribution to the formation of retail turnover. Smaller, in terms of coverage, enterprises of the agrofood sphere include retail networks of regional or local level of coverage which focus on meeting the needs of end-users in the area of their trading activities in one city or region. Successful examples of participants of this level in the Moscow region include the regional network "Vkusvil" whose activities focus on the sale of fresh and ultra-fresh dairy products and other perishable food products and the company "Azbukka Vkusa" which serves the needs of consumers with a medium and high level of income and implements a fairly wide range of food products consisting of goods from both Russian and foreign manufacturers. A very small share in the formation of trade in the agro-food sphere is occupied by independent shops that do not belong to commercial networks and systems, as well as semi-stationary food enterprises, which include retail food markets and fairs. It should be noted that these participants in the agro-food sphere could take a more significant share of the food market in Russia, as they relate to participants in agro-logistics chains associated with the possibilities of forming distribution channels for small, local agricultural producers which due to lack of organizational capabilities and resources can get into large trading systems. Therefore, the effective organization of food markets and fairs in the agro-food sphere is extremely important and useful and requires special attention and study, as further noted in the "Strategy for Trade Development in The Russian Federation from 2015 to 2016 and for the period until 2020" [3].

The third level of the participants of the commodity distribution chain includes final consumers of food products whose needs should be ensured by the availability of the opportunity to purchase fresh, high-quality and safe food at the right prices in the right quantity in different formats and levels of coverage of retail trade enterprises in the agro-food sphere. This fact is also prescribed in the "Doctrine of Food Security of Russia". It should be noted that the achievement of growth parameters of the low level of consumer activity in Russia is possible, among other things, through the formation of various options for partnership between the producers participating in the first level of the commodity distribution chain and distribution companies - second-tier participants, which will allow the end user to purchase the domestic product which has passed the minimum number of links in the chain of agrolology and has a high quality and an optimal price.

3. RESULTS AND DISCUSSION

The agrofood sector of the Russian Federation includes three levels of participants: agricultural and other food production enterprises, wholesale and retail trade enterprises of various trade formats, and end users of food products. These participants in the agrofood sphere of the Russian Federation should form an integrated commodity distribution chain that has a synergistic effect that constantly accumulates during the functioning of the chain. In the process of functioning of the distribution chain, innovative digital technologies must be involved that can improve the efficiency of the chain of participants. Digital technologies in the commodity distribution chain are implemented both in the operational cycle of managing the activities of various participants, and are supported at the legislative level in the Russian Federation.

4. CONCLUSION

The use of digital technologies in the agrofood sphere of the Russian Federation can positively influence the efficiency of the integrated commodity distribution chain, which includes three levels of participants. The realization of this opportunity will give the opportunity to all participants of the agrofood sphere to improve the level of Russia's food security, an important parameter of which is to raise the level and quality of life of the population of Russia by guaranteeing high living standards.

REFERENCES

1. On Amending the Law of the Russian Federation" On Veterinary Medicine", Federal Law of the Russian Federation 243, (2018).
2. The Doctrine of Food Security of the Russian Federation, Decree of the President of the Russian Federation 120, (2010).
3. The Strategy of Trade Development in the Russian Federation for 2015-2016 and for the Period to 2020, Order of the Ministry of Industry and Trade of the Russian Federation, 2733, (2014).
4. Pesavento, I., Joufflas I. Trade What You See. How To Profit from Pattern Recognition., John Wiley & Sons Limited, New Jersey, 2007.
5. Syaglova Yu.V. Agri-Food Sector: the Way of Strategic Partnership in Agribusiness, Economy of agricultural and processing enterprises, 4(12), (2018), 12-15



THE IMPACT OF CULTURE ON GLOBAL MANAGEMENT

Marija Stojanova, Katerina Dukoska, Stojan Dukoski

PVPU "Euro College" - Kumanovo, Macedonia

Abstract: Every company must have a proper culture for its successful operation. Culture to different authors has different types of definition so we can say that there is no universal definition of culture. Schneider and Barsoux (1997) identify 164 different definitions made by anthropologists. More relevant broad definitions of culture include ‘a shared pattern of behavior’ (Margaret Mead, 1953), or a ‘system of shared meaning or understanding’ (Claude Levi-Strauss, 1971; Clifford Geertz, 1973). All these definitions have one thing in common, that the culture is as set of values, beliefs, attitudes and expectations and that culture is ‘shared’, and implies an implicit decoding of an underlying pattern of cause and effect relationships (Gibson, 2000: 7). Instead of a definition, some authors have attempted to describe the content of culture. The other important thing is that culture is very important part of making decisions by managers and employees in a company. Each strategy must have its own culture. All companies differ from each other to the culture they have in the company. This is due to the different values, beliefs and expectations that every company has. So we can say that culture affect the identity of the organization and employees, creation of commitment, stability of the company and socialization.

Keywords: Culture, impact, management, cross-culture, economy

1. INTRODUCTION

For successful business activities we must take in consideration the impact of culture on the organization. The impact of culture is especially important for global companies that operates in international markets and have employees that import different cultures during their work. Also we must mention that on global market, there is increase of business alliances that also increase the cultural differences. We can say that there is no aspect of corporate life that is not impacted by culture. Six aspects of corporate life are particularly strongly influenced by cultural differences [5]:

- Marketing
- Human resources
- Partnerships
- Multicultural team
- Negotiations
- Business practices.

Each of these aspects must be managed properly for achieving competitive advantage. Failure to manage cultural differences that affect the mentioned aspects can cause serious problems in every company, either big or small.

1.1. THE IMPORTANCE OF ELEMENTS

For better understanding the importance of culture on global companies, we must start from the basic elements of culture. According to Needle [6], organizational culture represents the collective values, beliefs and principles of organizational members and is a product of factors such as history, market, technology, strategy, type of employees, management style, and national culture; culture includes the organization's vision, values, norms, systems, symbols, language, assumptions, environment, location, beliefs and habits .

Values, beliefs and preferences are from great importance because can provide some sort of ethical and normative governance mechanisms for different social groups. They can be changed by new situations, new environment or new information. Behavior unlike values is the visible part of culture. Also it can be changed or modified by the environment or some conditions, but that change does not imply a modification of beliefs or assumptions. In the management field that, by nature, is concerned with economic achievement of social groups (companies), culture will be manifest in four key dimensions [3]:

- Corporate culture: values, beliefs and behavioral norms that appear as a result of historical situations in the company, the influence of the leadership or the structure of the ownership
- Industry culture: any practices that come from the professional norms of an industry
- Professional culture: that come from professional trainings and practices or norms from different function in the company
- National culture: that comes from the national, religious or ethnic origin of citizens.

Culture as we can see, infect not only the individual in the company but also the global companies are exposed to a corporate, industrial and professional cultural diversity. In the global market, international companies must incorporate and managed properly the individual cultural diversity that affects them with the cultural diversity that affects the company by itself.

2. THE IMPACT OF CULTURE AND CROSS-CULTURAL TEAMS

For connecting the cultural diversity in the companies, most companies create cross-cultural teams, where the teams already incorporate its differences in the culture and imbed it with the corporate culture. Many companies have managers from different nationalities and we can say that in many departments, global companies create cross-cultural team. Those team can be very effective and sometimes can work better then mono-cultural team but sometimes can work significantly worse. According to Berger, the performance of the multicultural teams is a function of three factors [1]:

- Multiplicity of experiences and different viewpoints that comes from different culture can increases the richness of information

- Loss of cohesion because of differences in communication and existing of stereotypes
- The ability of team leaders to achieve synergy in the group by combination of the perspectives that group members have.

For successful operation on global markets it is very important to connect proper communication with culture and its differences.

Table 1. Common types of multi-cultural teams (Schneider and Barsoux (1997) [8]).

Business development	Members of different nationalities working on development/ launch of new products
Regional headquarters	Different functions occupied by different nationals for regional co-ordination
Corporate headquarters	Permanent or temporary assignment of executives and staffs of different nationalities having global responsibilities
Joint ventures and alliances	Managers and employees assigned from different partners, or an employees' pool
Task forces	Multi-function, multi-country teams in charge of a particular project

Building Cross-cultural team largely depends from communication strategy that is build and properly shared in the group. The leader of the group should have right expectation at the very beginning, to pay attention on details and to respect the culture of all members. International company need a lot of proper information in a proper time that in global world can be influenced by the information technology which helps companies in their operations. Some companies are building virtual cross-cultural teams instead of regular helping to overcome the problems with time and environment but the human contact sometimes is very valuable so according to different authors there are still argues is it better to have cross-cultural teams inside organization or building a virtual one.

For building a powerful cross-culture team each leader should take in consideration some factors:

1. Respect cultural differences

First step of building a good team and powerful cultural environment is to acknowledge the cultural differences and to respect them. Those cultural differences as we previously mention can manifest in different ways: communication, behaviour, values, norms etc. So for better management each leader should explain those cultural differences in front of the whole group, so each of the members can be aware of it and pay respect to culture of the members. Very useful model for understanding cultural differences is Geert Hofstede's cultural dimension model [4] that describes the effects of a society's culture and explains how the values relate to behaviour of the group. The model highlights six dimensions of value perspectives between national cultures: Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty Avoidance, Long Term vs. Short Term Orientation and Indulgence vs. Restraint [4]. With this model each leader in a company can understand the culture, value and behavior of their employees and adapt its communication style for better productivity [9].

2. Establishing procedures and policies

Establishing working procedures and policy that should be followed by each member is a key to better contribution of all the employees that can lead to successful performance and avoid cultural conflict in the groups. Employees are more secure following procedures that are adapted according to the culture of the company and misunderstanding in communication are decreased

3. Defining team responsibilities

Each cross-cultural team should share a common goal and have outlined properly the identity of the team, where should include all the cultural differences. Defining the member responsibility reduces misunderstanding and lead to clear action from which the company can have positive results. Every member of the group knows the vision and mission toward its action should aims. With clear definition of responsibilities each member can easily unite and have successful work.

4. Building trust

Creation of proper culture and avoiding cultural differences on a company work demand a lot of effort. First thing that is the hardest thing is to build a trust between the cross-cultural group members and between the company leaders too. For building trust, each company should create environment where the employees can feel secure and can collaborate accepting the cultural differences.

5. Embrace the cultural diversity

With expansion of global market, almost all companies learn how to navigate cultural diversity. But in global world, navigation is not enough. Each leader should embrace the cultural diversity, not just in workplace, where it is easier, because of existing policy and procedures, but also in the real life. Working in an environment with cultural differences increase creativity and innovation that enhance the company to increase its successful working results.

Culture has an extensive effect on a competitive behavior on a global management. About the influence of the culture on the economy, Max Weber, a German sociologist explained in his famous work *The Protestant Ethic and the Spirit of Capitalism* the most important connection between culture and economy. A lot of author after Weber stated the importance of the connectivity of the economy with the culture [7]. According to Gordon Redding culture is composed of three important components: Rationale, authority and identity, which connects power with formal system and identity as guidance to a successful economic system.

3. CONCLUSION

Culture is a vital part of company's successful performance. Each leader must understand that it is very important to create environment where all culture can find its place, to build cross-cultural teams and a business strategy that can reinforced the creativity from the

cultures in the company. If the company cannot align with the existing culture inside and outside it, then success can easily turn into failure. Good communication, creative culture and business strategy can lead each company toward achieving business goals.

REFERENCES

1. Berger, Suzanne and Ronald Dore (eds), National Diversity and Global Capitalism. Ithaca, NY: Cornell University Press, 1996
2. Brake, Terence, Danielle Medina and Thomas Walker, Doing Business Internationally: Guide to Cross Cultural Success. New York: McGraw-Hill, 1994
3. Enderwick P., (2006). Globalization and Labor, Chelsea House publications;
4. Geert Hofstede, Gert Jan Hofstede and Michael Minkov, Cultures and Organizations: Software of the Mind. Revised and expanded 3rd Edition, New York: McGraw-Hill USA, 2010
5. Philippe Lasserre, Global Strategic Management , Palgrave, 2018
6. Needle, David (2004). Business in Context: An Introduction to Business and Its Environment.
7. Weber, M., The Protestant Ethic and the Spirit of Capitalism, Courier Corporation, 2012
8. Schneider C.S, Barsoux L.J, Managing across cultures Financial Times Prentice Hall, 2003
9. Henman M., From Conflict to Cooperation: Building Stronger Cross Cultural Teams, Business.com , 2017



APPLICATION OF STATISTICAL MODELS FOR FORECASTING THE FINANCIAL CRISIS IN THE ENTERPRISES

Frosina Nikolovska, Mila Zibak Dimkovska, Marija Stojanova

PVPU "Euro College" - Kumanovo, Macedonia

Abstract: The financial crisis in the enterprise occurs when the company is losing or has lost the ability to pay, i.e. it is becoming over-indebted. In fact, insolvency occurs when cash outflows grow faster than cash flows. Business success decline and operating loss further limiting the chance of funding from creditors. Thus, the company falls into a serious crisis for a very short period of time, which can compromise not only the continuity of the company's operation, but also its survival. Because the exit from this situation is difficult, the intentions of the work of the enterprise should be directed towards preventive action and avoiding crisis situations, if possible. The most important thing is to prevent the emergence and escalation of the crisis on time for long and continuous operation of the company. Therefore, forecasting the financial crisis in modern economic conditions is becoming increasingly important, and the application of models to forecast the financial crisis in enterprises contribute to minimize the negative effects of the financial crisis in operations.

Keywords: Financial crisis, accounting data, statistical models, forecasting, Beaver model

1. MODELS OF CREDIT RISK BASED ON ACCOUNTING DATA FOR FORECASTING THE FINANCIAL CRISIS IN THE ENTERPRISE

This document is a template. In the last thirty years in the banking practice certain statistical models are increasingly developed and applied that serves to predict financial success or failure of companies which also is the basis for assessment of credit risk and the basis for approving or rejecting the loan application. These so-called credit scoring models based on accounting data of the company could be also applied by the financial management to forecast ability of successful company payment in the future, practically speaking, make it possible to predict the probability of occurrence of the financial crisis. Realizing that getting into financial crisis is a reality, this model gives opportunity to the company within time to take certain measures and actions to prevent the crisis or to mitigate the consequences.

Typically, models to forecast the crisis in the company based on accounting data are grouped as [1]:

- Univariate models
- Multivariate models.

Univariate models are based on comparing the various financial indicators of the company with industry norms, or the norms of the industry that belongs to the company. Such a statistical model to forecast financial failure is the model of Beaver [2].

When using multivariate models, key accounting variables are combined to obtain a likelihood of delay in the company to settle the obligations. In current practice the mostly applied is discrimination analysis, and the first model that applied this approach was Altman z-score [3] created by Heldman and Narayanan, Springat, Klaricek etc.

Characteristic of all models is that forecasting the financial crisis is made on the basis of variables calculated using accounting data. Although it is a credit risk models used in banking, their application is desirable in the companies because the accuracy of the predictions of the financial crisis is relatively high.

1.1. BEAVER MODEL FOR FORECASTING THE FINANCIAL CRISIS IN ENTERPRISES

The first statistical model to forecast financial failure of the company was presented by W. Beaver in 1966. Beaver first performed usability testing of financial indicators for predicting financial failure. Moreover, as financial failure it was considered the "inability of the company to meet maturing obligations." [2]. This failure leads to business difficulties that the author of this model defines as "bankruptcy, unpaid preferred dividends, raising loans on current accounts and so on." and financial indicators that could predict business problems and financial failure as the "odds of two numbers that are items in the financial statements [2]". Beaver has done empirical research on a sample of 158 manufacturing companies whose shares have been subject to trading.

According to Beaver, the financial failure of the company can be forecasted through the following three indicators [2]:

- **cash flow / total assets**
- **net income / total debts**
- **cash flow / total debt**

For each indicator Beaver calculated the limit value. Enterprises whose indicators are above the limit values are put in the group of potentially successful, companies whose indicators are below the limit values are potentially unsuccessful.

Lack of this research is, that are included only companies that ended in bankruptcy, but not those who, according to the indicators should enter into bankruptcy, and escaped the same as the management duly spotted the problems and take measures to overcome them.

1.1.1 Altman Z - score model for forecasting of financial crisis in enterprises

Multivariate approach for forecasting the crisis was first applied in Z-score model of Altman Haldeman. Through combining of indicators and categorial values he receives a new indicator called credit risk score. As expected unsuccessful companies have financial indicators that differ from the ratios of stable financial enterprises, **Z - score** is used as a limit value based on which the company is categorized as a failure if its financial performance are under **Z - score** or as successful if are over **Z -score**. The calculation of the Altman **Z-score** is performed based on the following indicators [3]:

$X1 = \text{working capital} / \text{total assets}$

This indicator is considered because enterprises with an operating loss indicate decreasing in the current assets in relation to total assets.

b) $X2 = \text{retained earnings} / \text{total assets}$

c) $X3 = \text{income} / \text{total assets}$

This indicator is particularly suitable for drawing conclusions about the possibility of bankruptcy, because the existence of the company is based primarily on the possibility that the company with its assets to be profitable.

d) $X4 = \text{market value of equity} / \text{book value of liabilities}$

This indicator shows how the company's assets lose their value before obligations become greater than the property and the company becomes insolvent.

e) $X5 = \text{sales} / \text{total assets}$

Based on these five financial indicators Altman sets for calculation of **Z-score**. In this feature each of the financial indicators has adequate weight which is determined based on empirical experience and assessment of the authors of the model. Below is listed the function that Altman staged based on financial indicators:

$$Z = 1,2X1 + 1,4X2 + 3,3X3 + 0,6X4 + X5$$

The lower limit is 1.81. That means the company which Z -score is below that limit will go bankrupt. The upper limit is 2.99 and the company over that amount would not go bankrupt. The precision with which this model separates the successful from the unsuccessful companies within one year prior to bankrupt companies is 95%, and two years before bankruptcy is 82%. In 1993 Altman review the original model so that the market value in calculating the X4 is replaced by the book value. The result is getting a new Z -score:

$$Z = 0,717X1 + 0,847X2 + 3,107X3 + 0,420X4 + 0,998X5$$

The lower limit of Z is 1.23. Enterprises that are under that limit are considered to fail. The upper limit is 2.90 and enterprises above the limit are considered successful. Enterprises between 1.23 and 2.9 are in so called gray area [3].

2. OTHER CREDIT SCORING MODELS FOR FORECASTING THE FINANCIAL CRISIS IN ENTERPRISES

The other elements that banks are using for forecasting of poor performance of enterprises in this paper would emphasize Springat model and Klaricek Quick test. Springat model was developed following the example of Altman model but adapted to the Canadian market values.

In this model is used *step-wise multiple discriminate analysis*. This model uses four variables as follows [9]:

- X1 = working capital / total assets
- X2 = profit before tax / total assets
- X3 = profit before tax / short-term liabilities
- X4 = sales revenue / total assets

Based on the calculated variables Spring formulates the following model [9]:

$$Z = 1,03 X1 + 3,07 X2 + 0,66 X3 + 0,4 X4$$

If $Z < 0,862$, then the company is threatened with a financial failure. The accuracy of this model in assessing the financial condition of the company is with 92.5% confidence.

Unlike Altman model based mainly on static indicators Klaricek *Quick test* equally rely on static and dynamic performance. The creator of this financial analytical test is Klaricek Peter and practical application of this test is more limited to the countries of Central Europe. The purpose of the model is to evaluate the financial performance of the company and profitability of assets. The assessment of financial stability is based on function:

- DF = 1.5 X1 + 0.08 X2 + 10 X3 + 5X4 + 0.3 X5 + 0.1 X6 wherein
- DF - value of discriminatory function
- X1 - net cash flow / total liabilities
- X2 - total assets / total liabilities
- X3 - Earnings before interest and taxes / total assets
- X4 - Earnings before interest and taxes / total income
- X5 - stocks / Total Revenue
- X6 – Business income / total assets

Klaricek function may take positive and negative values, where negative values indicate insolvency and positive values indicate solvency. Financial stability (as shown in table. 1-3), according to this model are estimated in the range of -1 to + 3 as follows [7]:

Table 1. Rating of financial stability through the value of the Klaricek function

Value of indicator	Assessment of financial stability
> 3.0	excellent
> 2.2	very good
> 1.5	good
> 1.0	average
> 0.3	bad
≤ 0.3	beginning of insolvency
≤ 0.0	moderate insolvency
≤ -1.0	expressed insolvency

Using four different relationships which measure the riskiness of funding, liquidity, profitability and success, *Quick test* provides a simple assessment of the performance of 1 to 5, where 1 is the largest assessment.

3. APPLICABILITY OF CREDIT SCORING MODELS FOR FORECASTING THE FINANCIAL CRISIS IN ENTERPRISES

Systems of early warning of crisis represent a special kind of information systems that signalize to its customers about the existence of latent (hidden) crisis. Their task is to provide the necessary management information for a possible crisis, and with it the crisis lose “ the character of surprise ”and creates an opportunity for timely implementation of measures to address the problems and minimizing the risk of crisis. By applying credit scoring models company can get answers to the questions about company work.

Answers to all these questions can be obtained based on numerical data from financial reports that reflect performance in the past. "But, the overall assessment of the state of the company covers various aspects of operations that may affect the future business of the enterprise or its ability to repay debts. Therefore, in addition to quantitative data from financial statements with equal weight are the qualitative data. [11]" The quantitative and qualitative data should be considered synthetic in order to properly identify the strengths and weaknesses of the company, and thus to anticipate the possibilities of the occurrence of the crisis on the one hand and the potential to overcome the weaknesses of other. Right here is the weakness of the models for forecasting. They are quantitative models in which all calculations and conclusions are made based on data from financial statements, thus undermines the qualitative performance of the enterprise that can be crucial for the success of actions taken to prevent the crisis in the company. Also, studies [12] show that the number of enterprises for which the models forecast that will go under bankruptcy is much higher than the number of companies that really fail, primarily because some of them manage to overcome the crisis and to maintain continuity of business operations . It follows that the models do not take into account the possibility that companies, if they are successfully managed, can make a turnaround in operations and avoid bankruptcy, which is another major weakness of the models to forecast the crisis. The existence of the weaknesses of the models suggest the need of the management to have a comprehensive approach when planning the strategy for prevention of crisis that would allow him to decide not only on the basis of information obtained from the variables that are based on accounting data, but to take into account and qualitative characteristics of the enterprise and all the potentials of enterprise important to the success of its operations. Thus models for forecasting the crisis will have adequate application in decision-making, and the information that managers receive from them will be of great importance to successfully manage any crisis and maintain the continuity of operations of the company.

4. RESEARCH: APPLICATION OF MODELS FOR FORECASTING THE FINANCIAL CRISIS IN ENTERPRISES IN MACEDONIA

To see if applicable, to what extent and which models to forecast the financial crisis can apply to enterprises in the Republic of Macedonia, are surveyed 41 enterprises in the Republic of Macedonia [11]. Enterprises belongs to different industries such as: industry for drinks, food industry, textile industry, shoe industry, construction, metallurgy, manufacturing, retail, wholesale, print, insurance, transport, accounting, financial activities, catering.

Of the surveyed companies, thirteen (32%) are in the category of up to 9 employees, seventeen (41%) in the category to 49 employees, eight (20%) in the category to 250

employees, one (2%) in the category over 250 employees in company and two companies did not answer this question from the questionnaire (see table no.2).

Table 2. Surveyed enterprises by number of employees

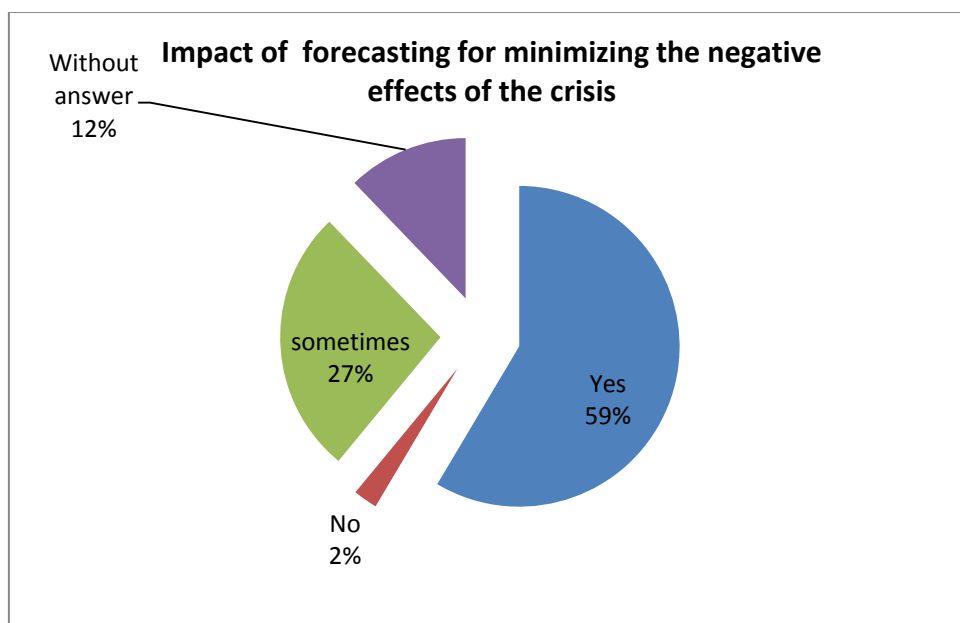
Intervals	Number of employees	Percentage
0 - 9	13	32%
10 - 49	17	41%
50 - 249	8	20%
over 250	1	2%
Without answer	2	5%
Total	41	100%

On a question about what is the willingness of the company to deal with any financial crisis, only 17% of the surveyed companies said that they are fully prepared to act in a crisis, 56% said that are only partly ready for action in a crisis, and even 20 % that they are prepared to deal with the crisis (see table attached br.5-2 and annex 2). This result of the survey indicated that a very high percentage of companies in the country (even 76%), are at risk that they will not be able to mobilize its resources in real time and in a way that will pull them out of a possible crisis, which only by itself indicates that a number of enterprises would be in danger of bankruptcy or liquidation if incurred financial crisis in their operations.

Table 3. Willingness of enterprises in the country to deal with financial crisis

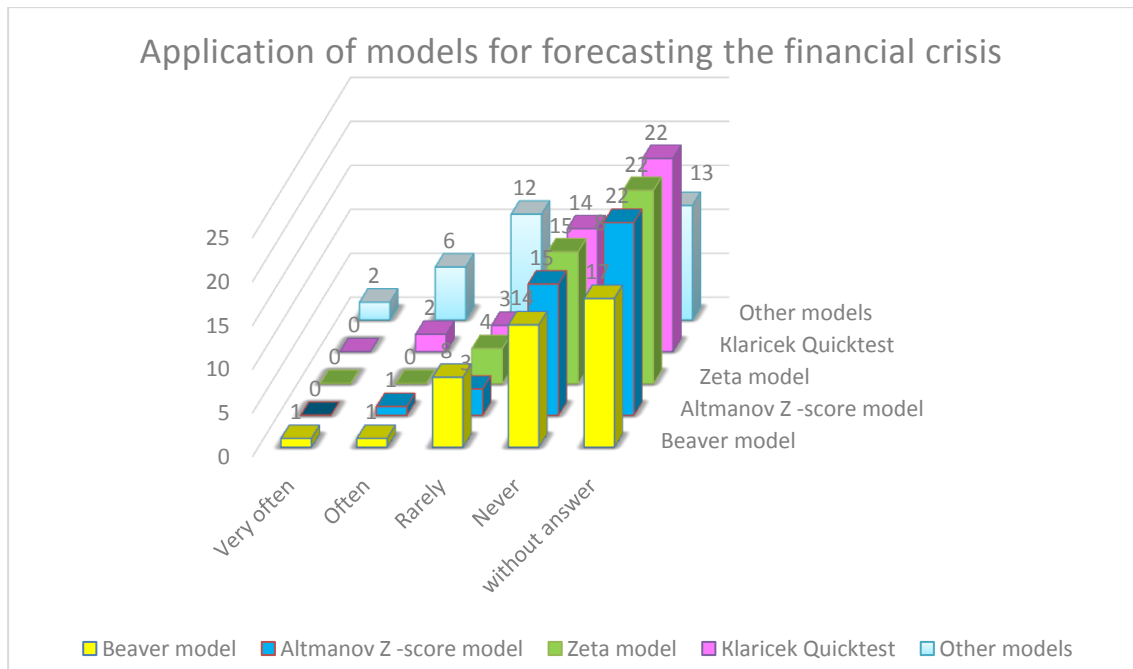
Willingness of company	Num.of answers	Procentage
Fully prepared	7	17%
Partly prepared	23	56%
Not ready	8	20%
Without answer	3	7%
Total	41	100%

In answering the question „ Whether forecasting the financial crisis contributes to minimize the negative effects of the crisis in the enterprise, "the majority of the surveyed companies (59%) think that forecasting the crisis can minimize negative effects, 27% that sometimes contributes to it and only 2% that with forecasting the crisis cannot be minimized its negative consequences.



Graph 1. Impact of forecasting the crisis on minimizing the negative effects of the crisis

From the survey results shown in the graph br.5-2, it can be concluded that the majority of enterprise managers in the Republic of Macedonia perceive the contribution of forecasting the crisis might have to minimize the negative effects of the crisis. However, despite the attitude of the managers of the importance of forecasting the crisis, most of them rarely apply, or almost never apply models to forecast the crisis. The answers to the question of the application of models to forecast the crisis shows that: 65% of surveyed companies that answered this question, said they never applied Beaver model, 88% had never used Altman Z - score model, 88% have never applied Zeta - model, 81% never used Klaricek *Quick test*, 41% rarely used another model of forecasting the crisis and even very high 32% of enterprises that nor apply statistical models to forecast the crisis, nor any other model or method for forecasting the crisis (see chart 5-3 and Annex 2). If these findings link with findings from previous question survey, we can draw the conclusion that although managers are familiar with the significance of the information by forecasting the crisis, yet they rarely or never perform forecasting of the crisis, and with that, they not only reduce the possibility of avoiding the crisis, but because of lack of information, their business decisions lead the company in a position that cannot overcome the crisis. This is also one reason for the large number of bankruptcies in the Republic of Macedonia



Graph 2. Application of models for forecasting the financial crisis in the Republic Macedonia

5. CONCLUSION

The application of anticipated crisis models allows companies to respond in a timely manner to the signals of the crisis that is, reacting at the moment when the company still has the potential to deal with the crisis quickly and react to the crisis to cause big negative consequences for the operation of the enterprise. In fact, the crisis prediction models should be used as instruments by which the crisis can be recognized, prevented and managed in a timely manner, which leads to the conclusion that in conditions of dynamic change, the application of prediction models is imperative for the successful operation of the company. The advantage of the early warning of the so-called latent (hidden) crisis is that the warning initiates the timely undertaking of adequate measures to solve the problems in the enterprise, which makes the crises in these enterprises less frequent, longer and the consequences are smaller. Therefore, the company's management should not ignore the first signals of the crisis and the information obtained from the application of anticipated crisis models. This information announces the emergence of the crisis by which it loses the "nature of surprise" and leaves room for management to take measures to avoid it. If we take into account the fact that every crisis has significant economic and social implications, then in any case management should not treat the early signals as insufficiently serious. In doing so, management should keep in mind that a completely reliable and accurate model for predicting the crisis has not yet been found and that the models that an enterprise uses to anticipate the crisis should adapt to the specifics of the enterprise and the conditions dictated by the environment in which the company operates.

REFERENCES

1. Hand DJ, Henley WE.: “Statistical Classification Methods in Consumer Credit Scoring: a Review”, *Journal of Royal Statistical Society A* 160, 1997.
2. Beaver, W., *Financial Ratios as Predictors of Failure*, Empirical Research in Accounting, 1993.
3. Altman, E.I., *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*, *Journal of Finance* 23, Berlin, October 2001.
4. Altman, E.I., Haldeman, R.G., Narayanan, P., *ZETA Analysis*, *Journal of Banking and Finance*, Berlin, 1977.
5. Scott, J., *The Probability of Bankruptcy*, *Journal of Banking and Finance* 5, New Jersey, 1981.
6. Efrim, J.B., Kennedy, D.B., Sun J.Y.: *Predicting Business Failures in Canada*, School of Accountancy, University of Waterloo, Canada, January 2007.
7. Koban, R., *Betriebswirtschaft für die Praxis*, OWV, 1978.
8. Altman, E.I., *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*, *Journal of Finance* 23, 1984.
9. Sands, Earl G., Gordon L.V. Springate, and Turgut Var.: *Predicting Business Failures*, *CGA Magazine*, May 1983.
10. Knezevic G. Stanishikj N. “Analysis of the financial reports” Educational faculty, Belgrade, 2013 (Кнежевиќ Г. Станишиќ Н. „Анализа финансиских извештаја“, Пословни факултет, Београд, 2013).
11. Madzova V., *Models for assessment of the creditworthiness of the clients in the banks*, Banking and Finance Center, Skopje, 2010 (Мацова В., Модели за оценка на кредитната способност на комитентите во банките, Центар за банкарство и финансии, Скопје, 2010).
12. Novak B, *Forecasting of Bank Business Challenges in the Republic of Croatia Based on Publicly Available Financial Indicators*, *Economic Review* 54 (11-12), 2003 (Novak, B.: Predviđanje poslovnih teškoća banaka u Republici Hrvatskoj na osnovi javno dostupnih financijskih pokazatelja, *Ekonomski pregled* 54 (11-12), 2003).



ANALYSIS OF THE ROLE PROFILE OF STUDENTS INVOLVED IN VOLUNTEER ACTIVITIES

Alexey Urubkov, Natalia Safronova, Natalia Minajeva, Tatiana Maslevich

*Russian Presidential Academy of National Economy and Public Administration (RANEPA),
Russia*

Abstract: The results of research of impact personal and social-demographic factors, which influence to participation of students in volunteer activity are presented in this article.

The study based on statistics datas of social - demographic and profile's role indicators (in accordance to R.M. Belbin classification) on RANEPA students, including those participating in volunteer activity, which are collected in 2017.

The aim of the study was to verify the hypothesis about the existence correlation between profile's role of the individual, his social characteristics and his participation in volunteer activity. Statistical data of students - volunteers were compared with data obtained throughout the sample array. The data obtained in this research can be used in programs to attract young people to volunteering.

Keywords: volunteering, team roles (R.M. Belbin classification), social-demographic factors, statistical (correlation) analysis

1. INTRODUCTION

Modern Russia is undergoing a series of social and economic changes, in connection with which the citizens of the country there is an inevitable change of values. An increasing number of people, especially young people, are becoming involved in social projects and volunteer movement, which in Russia has been actively developing only in recent years.

Volunteering as a form of social employment has long existed in the world, and its impact on the social and economic development of countries cannot be overemphasized. According to the survey done by Johns Hopkins University USA, in 2010, 971 million people took part in volunteer activities around the world, and their contribution to the global economy is estimated at 1.348 trillion US dollars. (Trokhina, 2012). Volunteer movement is not limited by borders of different countries and territories. In 2014 globally 1 billion people over 18 years of age volunteered in the non-profit sector (21%), and 2.2 billion people provided assistance to strangers (48.9%). Among Russians 23 million (19%) people at least once a year worked on voluntary basis in NGOs of various types, and every third (32%) provided free assistance to those in need. (Pevnaya, 2016).

Since volunteering emerged and developed primarily in Western countries, Western scientists were the first to study it as a socio-psychological phenomenon. For example, studies of P. Dwyer, J. Bono, M. Snyder (Dwyer p. C., Bono J. E, Snyder M., 2013) show how personal motives influence the results of volunteer activities and development of leadership

qualities in the course of volunteer activities. T. Vantilburg., D. Bidee, R. Pepermans, G. Huybrechts, (Bidee J., Vantilborgh T., Pepermans R., Huybrechts G. 2013) examined autonomous motivation of participants of the volunteer movement and methods of its stimulation. Of great interest are the studies of L. Kulik, (2017) in which the author explores the impact of volunteering on self-esteem of people with disabilities, as well as features of volunteering in emergency situations.

The specific features of volunteering are presented in the publications of such authors as S.P. Agibrov (Agibrov, 2014), A. B. Barkhaev (Barkhaev, 2017), M. A. Novikov (Novikov, 2011), A. V. Sudorgina (Sudorgina. 2012) N.V. Tarasova (Tarasova 2012), P. V. Shevchenko (Shevchenko, 2013), etc. The authors note that the development of volunteering in Russia under current conditions is faced with problems that are caused by the lack of a regulatory framework governing the relationship of subjects, government programs, stimulating members of the movement, effective technology of the organization of activities and the promotion of humanistic ideas among young people. With the development of the volunteer movement in Russia, the attention of a growing number of scientists, for example, such researchers as V. D. Ponomarev (Ponomarev 2014), E. E. Repeshko (Repeshko 2012), was focused on studying the social and psychological prerequisites for the involvement of students in volunteer activities. It is very important to know what motivates young people to volunteer, what expectations they have from volunteering, how they will interact with other volunteers, etc.

In our opinion, the motivation of volunteers can be divided into several groups:

- religious,
- personal (direct connection, for self-realization, acquisition of skills, etc.),
- social (finding a circle of communication),
- corporate (at work, study, to find business connections),
- altruistic (desire to be useful, to improve people's lives).

The main motives of young people taking part in the volunteer movement are:

- the need for being useful to other people. Volunteering allows one to feel needed by other people, and such perception has an undoubted value for a person who is at the stage of self-determination;
- the need for communication. It is known that for teenagers and students' communication is one of the leading types of activity. As a rule, youth volunteer actions and projects are mass events, in which effective communication is a key factor in the success of the project. By the end of the project, each volunteer has made contacts with at least a dozen people, including not only other volunteers, but also representatives of government and business. The new experience of communication with representatives of the older generation, people from other social and professional groups is a strong motive for participation in the volunteer movement;
- the need for creativity. As a rule, volunteer projects include representatives of different spheres – students, young professionals, mothers and housewives, businessmen. Regardless of the profession and place of work, volunteers are involved in the creative process of preparing speeches to the audience, scenarios, development of promotional materials,

design projects. The skills of individual and collective creative work of volunteers have a positive impact on the choice of an additional profession.

- the need for self-realization and career building. Participation in the volunteer movement allows young people to establish new business and personal relationships, to gain respect among teachers and students, which can subsequently have a positive impact on career development
- the need to acquire social experience. It is known that a person develops into a personality in the process of acquiring a certain social experience. And the more experience a volunteer gains, the more developed his personality becomes, including his capacity for reflection;
- the need of young people to confirm their independence and adulthood. Solving urgent social problems, young volunteers demonstrate personal maturity and independence to the society.

The implementation of volunteer activities is possible in the framework of a number of humanitarian, socio-cultural, consulting, environmental and other projects. Volunteer activity has a number of advantages, which include:

- development of project culture and project thinking;
- development of communication skills;
- developing the skills of delegation of authority;
- developing a sense of responsibility for team collaboration;
- development of leadership and teamwork skills;
- development of initiative and tolerance.

The listed personal qualities of participants of the volunteer movement are formed in a social group which is self-organized for specific purposes and tasks. As a rule, the formation of the group is based mainly on the previous experience of volunteers. Psychological peculiarities of the group members and their compatibility are rarely taken into account. Nevertheless, the volunteer movement assumes a high level of rotation of team members, at any time they are free for various reasons to decide to leave the team. In our opinion, the formation of the team must consider not only such socio-psychological qualities of the volunteers as temperament, character, feature of occurrence of emotional processes, but the type of role behavior, which is inherent in the individual. In addition, there is currently no clear understanding of who exactly is or can potentially be a volunteer, what qualities of an individual contribute to his / her participation in the volunteer movement, or the tendency to volunteering is formed under the influence of established patterns of behavior in society, existing systems of motivation and on the basis of personal experience of the participant.

2. HYPOTHESIS AND ARGUMENTATION.

In order to identify the factors determining the propensity of individuals to participate in the work as a volunteer, in 2017 the authors of the work conducted a quantitative study of the distinctive characteristics of a volunteer on the group of undergraduate and graduate students studying at the Russian Academy of National Economy and Public Administration under the President of the Russian Federation. The total number of participants, whose data

formed the statistical base of the study, was 185 people, out of which 105 (57%) people have experience of volunteer work (volunteers) and 80 (43%) have no experience of volunteer work (non-volunteers).

The conducted research was based on the following hypotheses:

- the formation of a tendency to volunteering is influenced by personal characteristics inherent in the individual, the formation of which is not influenced by environmental factors;
- participation in volunteering is determined by the socio-demographic characteristics of the individual, formed in particular by the motivation system and environmental factors, among which the presence of work experience, practice of social interaction, participation in team activities should be noted in the first place.

Role (team) profiles of the participant determined by the concept of team roles of R. M. Belbin (R. Belbin, 2003) were considered as personal characteristics of the individual. In the early published works of the authors (Maslevich, Minaeva, Safronova, Urubkov 2017) investigated the dependence of the intensity of team roles from the influence of various factors external and internal environment and came to the conclusion that the command role of the individual is its inherent characteristics, independent from the influence of any external factors (**link to reports in Belgrade and Bor in the past year**). Consequently, the inherent command role of the individual can be regarded as his exclusive personal characteristic.

If the first hypothesis is confirmed, it should be concluded that the tendency to volunteering is a personal characteristic of a person who is not amenable to formation or development. In this case, it is necessary to identify the relationship between a certain team role of the individual and his tendency to participate in the volunteer movement, and to involve in volunteering on the basis of questioning and studying the personal qualities of each potential volunteer participant.

3. METHOD OF RESEARCH

The methods of testing, questioning and statistical methods of data processing are used as the methods of research. The study was conducted in four stages. At the first stage, the participants were tested and interviewed in order to identify their personal characteristics (team role by R. M. Belbin) and the presence of socio-demographic characteristics. The participants were divided into two groups – a group of participants with and without experience of volunteering. At the second stage each participant was rated for the intensity of his team roles (in points) and evaluated for his social and demographic characteristics inherent. At the third stage, statistical correlation was examined between personal and socio-demographic characteristics of the individual and the presence of his experience in volunteer work. The fourth stage was devoted to evaluating the effectiveness of teamwork with and without the participation of team members with and without volunteer experience.

4. RESEARCH MATERIALS AND DATA ANALYSIS

The study was conducted on the basis of data obtained as a result of testing and questioning. Testing, conducted on the bases of R. M. Belbin methodology, identified the

team role of each participant by distributing 10 points between the response options in each of the 7 groups of questions and determined the tendency of the following team roles in an individual: Coordinator, Shaper, Plant, Monitor Evaluator, Implementer, Resource Investigator, Team Worker, Finisher. In order to identify the correlation between these personal characteristics of an individual and the inclination to volunteering, the analysis of the distribution of these data by a group of volunteer participants and those students who have no experience of volunteering was carried out. Scores on each team role based on the arithmetic average of the points scored by each of the members of the group. The data obtained are presented in Fig. 1.

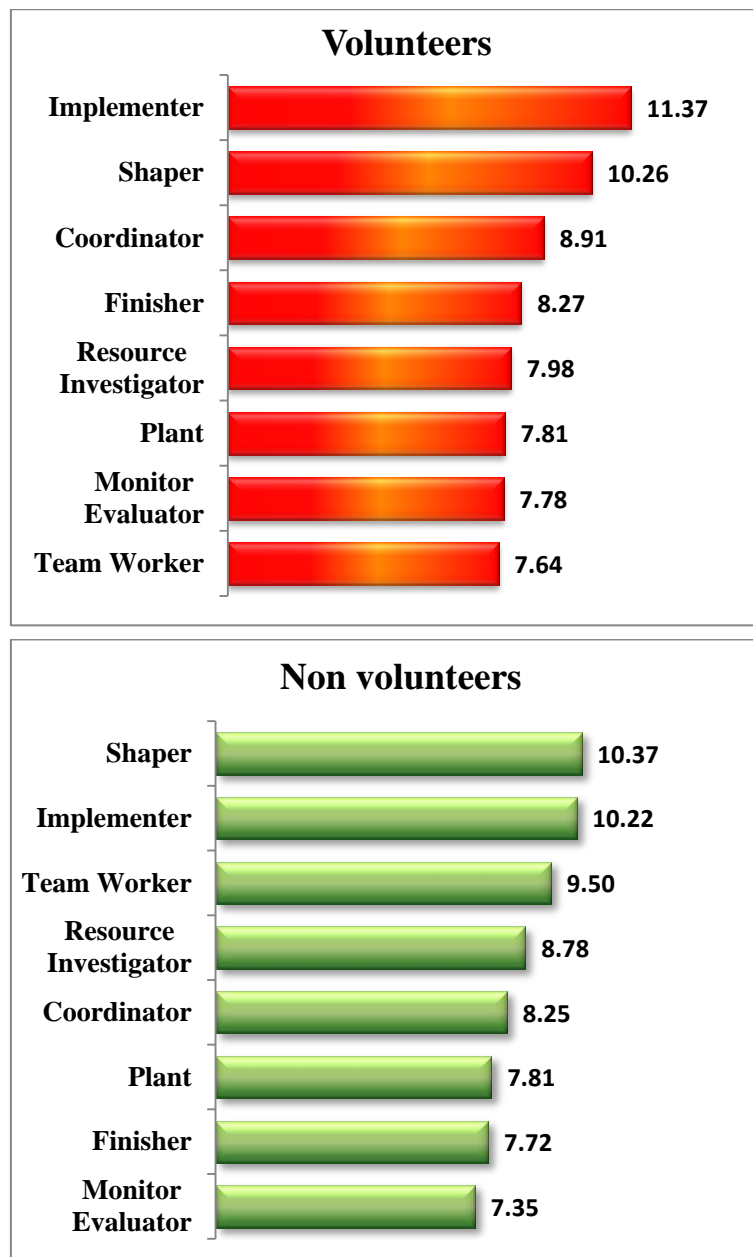


Figure 1. The final result of the distribution of team roles (in points) in groups of students – volunteers and non-volunteers.

The analysis shows that team roles are distributed differently across groups of volunteer and non - volunteer students. Among the three most important team roles of the volunteers were " Implementer ", " Shaper ", " Coordinator ", while for group of non-volunteers team roles of " Shaper ", " Implementer", " Team Worker » prevailed.

The divergence in 2 tested groups was revealed while measuring the tensity of team role " Implementer". The average value for a group of volunteers is 11.37 points, as opposed to 10.22 points in the second group. As it seems, the obtained result can be considered natural, owing to those characteristics which are inherent to these command roles (R. Belbin, 2003). According to the author of the concept of team roles, the distinctive qualities of the role of "Implementer" are self-control and discipline, conflict-free and the ability to thoughtfully and accurately perform the functions assigned to him, including those associated with a significant amount of work, which in turn should distinguish the work of a volunteer in the performance of his assigned duties. Students with such qualities do not experience great difficulties in fulfilling the duties imposed on them by volunteering.

The greatest difference between the two groups was in the tensity of team role "Team Worker" For non-volunteers, this role is the third highest rated at 9.5 points, while for volunteers it is the last in the list of team roles rated at 7.64 points. One of the most significant advantages of volunteering, as noted in the literature, is the possibility of socialization, emotional involvement, empathy. The weak expression of these individual qualities in volunteers is an important motive for them to participate in the volunteer movement, allowing them to participate in the formation of the team and the maintenance of a moral climate in the team, the manifestation of the individual's personal reaction to the feelings and emotions of other people, which is a distinctive feature of the «sole team». The presence of these qualities in the majority of students who are not engaged in volunteer activities allows them to actively participate in various forms of team interaction, outside volunteering. A comparative analysis of the distribution of team roles in the two sample groups is shown in Fig. 2.

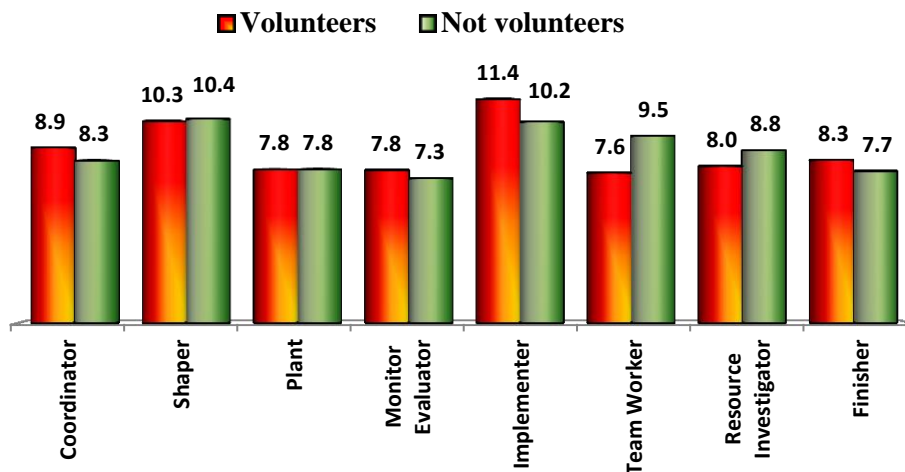


Figure 2. The comparative analysis of the distribution of team roles in the two sample groups.

It should be noted that the difference in the score of the tensity of other team roles is not significant in the two tested groups. Thus the predominance of any personal characteristics, except for the qualities of the personality "Implementer" among students participating in volunteering, can not be attested to. The average role profile of a volunteer and a non - volunteer is shown in Fig. 3.

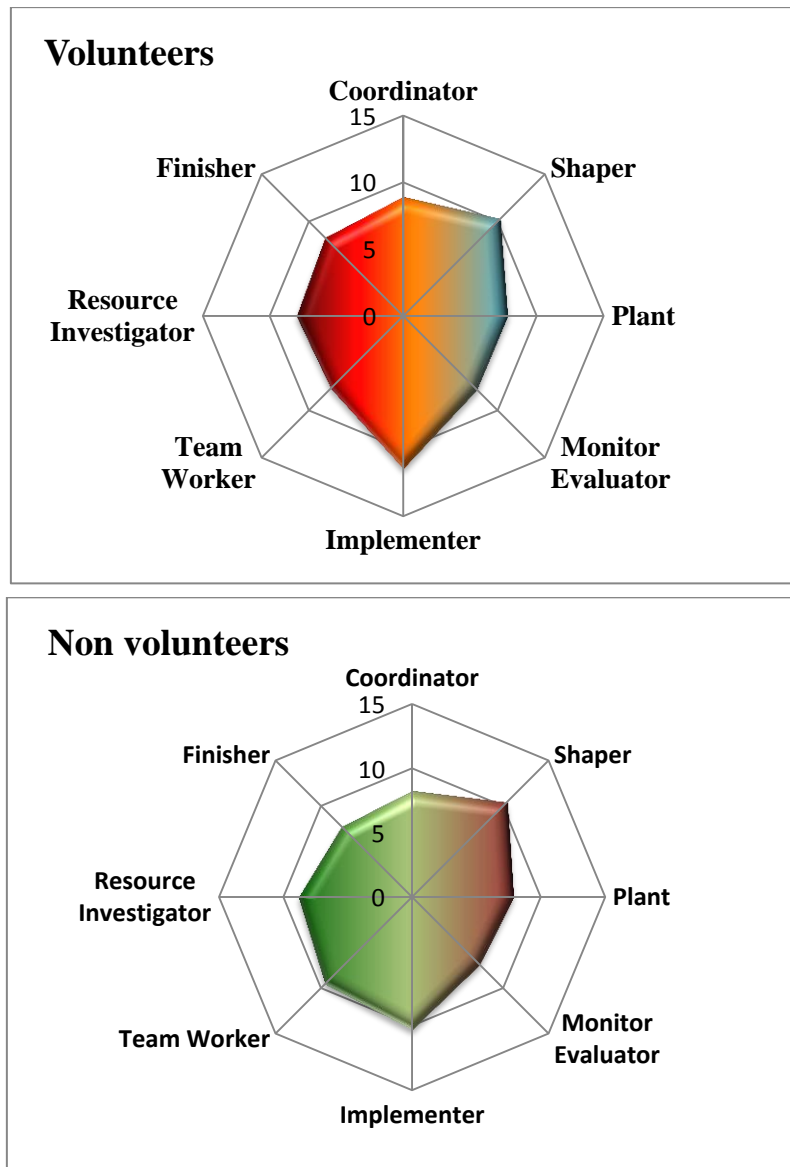


Figure 3. The average role profile of a volunteer and a non - volunteer.

In order to identify the correlation between the socio-demographic characteristics of the individual and his tendency to participate in volunteering, a survey of participants was conducted. The participants of the two groups were asked to fill out a questionnaire and specify their inherent socio-demographic characteristics – gender, age, presence of siblings (brothers and sisters in the family), the desire to become a leader, experience. According to the presented hypothesis, the following social and demographic characteristics of the individual – sex, the presence of siblings, existing experience can influence the formation of a tendency to volunteering. The results of the survey showed that there were no gender differences between the two groups of participants (in both groups of women there were more men (60-65% against 40-35%) and siblings (brothers and sisters have about half of the participants of each group).

The distribution of participants with experience of volunteering by age shows that among volunteers most of all eighteen (35%) and persons aged 20-22 years (36% of respondents). The age distribution of volunteer non-volunteer participants is shown in Fig. 4.

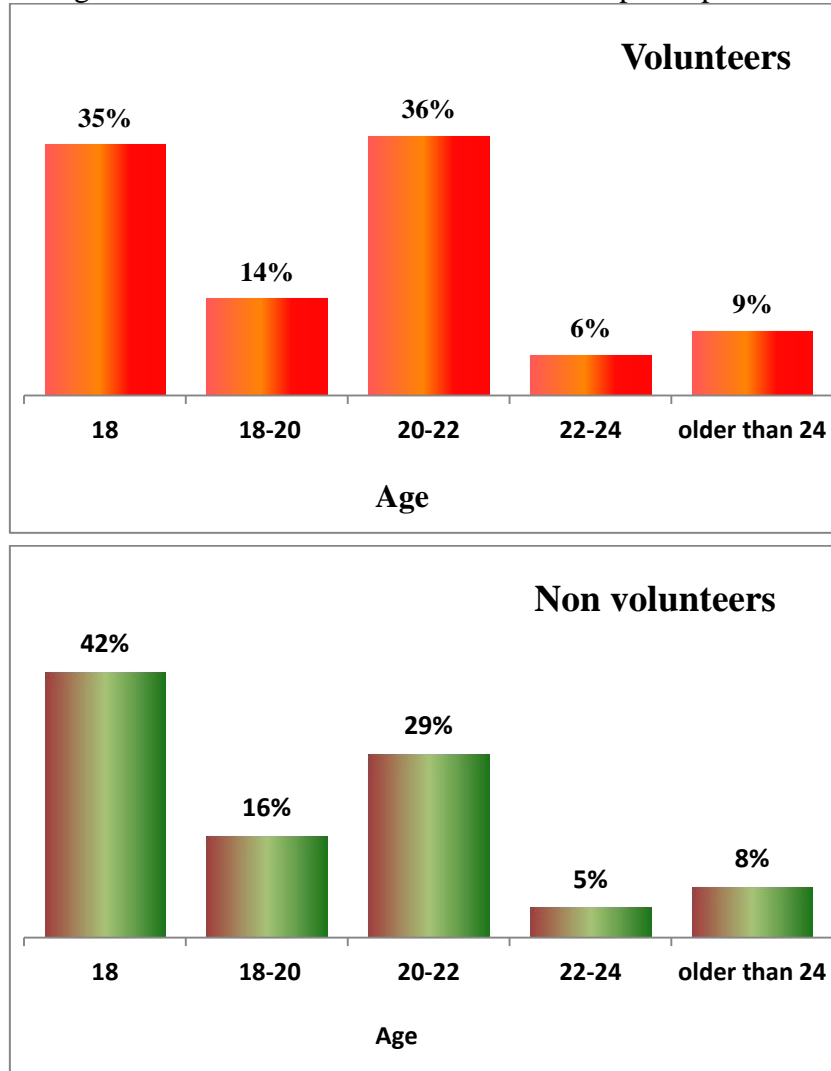


Figure 4. The age distribution of volunteer participants.

These surveys show that among volunteers there are more those who have experience (60% against 39% among non-volunteers). Taking into account that 35% of volunteer students are under 18 years of age who have no work experience in most cases by age (they entered 40% with no work experience), we can conclude that among volunteers over 18 years of age, the majority of those with work experience also have experience in volunteering, which allows considering volunteering as a "school of life" providing applicants with more successful starting conditions for starting a professional career. Distribution of participants – volunteers and non-volunteers on the basis of availability of work experience is presented in Fig. 5.

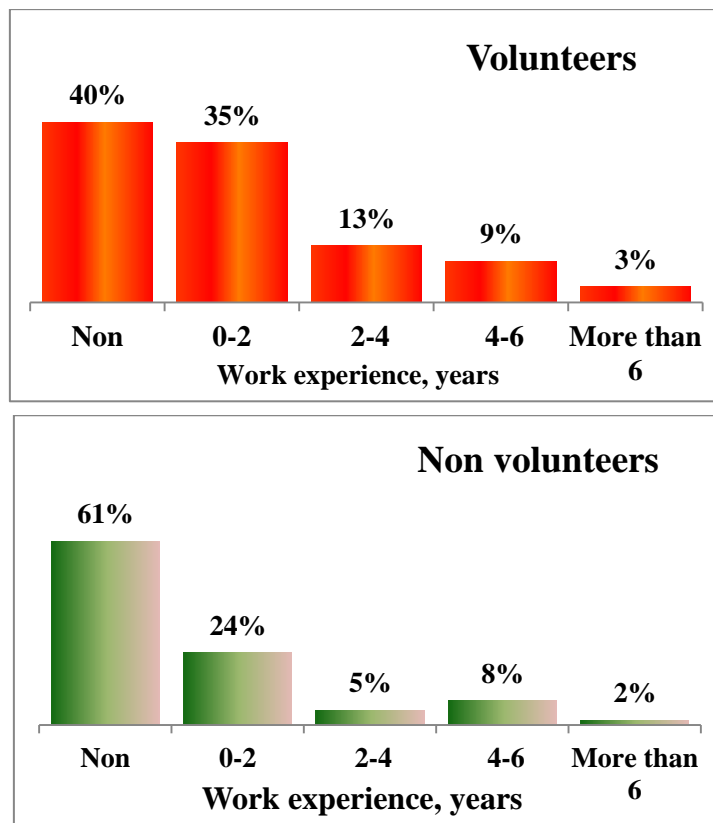


Figure 5. Distribution of participants – volunteers and non-volunteers on the basis of availability of work experience.

In the questionnaire, participants were also asked about their intention to become a leader in the future. The majority of volunteer participants answered this question positively (82% of respondents volunteers versus 73% of participants with no volunteer experience). It should be concluded that students who have a desire to become a leader in the future, seek to realize their intentions at a fairly early age, both by starting work, and by participating in the implementation of volunteer projects that give experience of performing work and the opportunity to try themselves in leadership positions. The distribution of participants – volunteers and non-volunteers on the basis of the intention to become a leader is presented in Fig. 6.

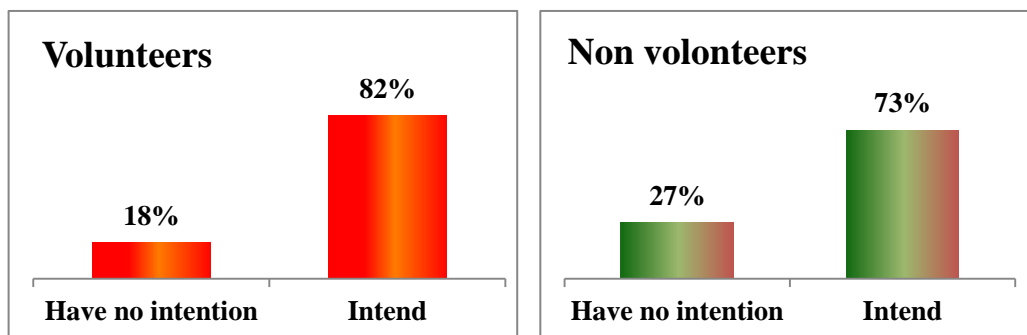


Figure 6. The distribution of participants – volunteers and non-volunteers on the basis of the intention to become a leader.

The fourth group of issues addressed in this study were the presence of the impact of volunteer experience on the effectiveness of the project team. In accordance with the methodology described in (**our work in Bor last year**), the projected effectiveness of the project teams formed of students with and without experience in volunteer work was calculated. The results confirmed that participation in volunteer activities improves team performance. The level of performance for teams formed from students with experience of volunteering is 57% , teams formed from students who did not participate in volunteering can provide performance not higher than 51% of the specified parameters.

The results thus lead to the formulation of conclusions and recommendations.

5. CONCLUSIONS AND RECOMMENDATIONS

The data of comparative analysis of the levels of severity of role characteristics and the presence of socio-demographic characteristics of the two groups of the sample of students who are volunteers and do not take part in volunteering allow us to draw the following conclusions:

1. The inclination to work as a volunteer is to a lesser extent determined by the internal personal characteristics of the individual, and to a greater extent formed under the influence of external factors.
2. Volunteers to a greater extent than other participants in the study formed a personal characteristic "performer", which is expressed in the ability to perform tasks, a high level of self-control and discipline. To the least extent, volunteers are inherent characteristics of the role trait "soul team", which forms the need for participation in the common cause and participation in collective work to achieve a common result.
3. To a greater extent than the personal qualities of an individual, his desire to become a volunteer is influenced by external factors. Therefore, the number of volunteers in the society depends on the propaganda and popularity and approval of altruistic forms of personality manifestation in the social environment.
4. The largest number of volunteers is represented by persons under the age of 18 years and in the period of 20-22 years, that is, the first volunteer activities that are spontaneous and subsequent more conscious behavior are statistically traced.
5. The system of motivation of young people, established in the society models of behavior and experience of individuals can be considered as external motivating factors for participation in volunteering. The gender of the participant and the family structure are of no decisive importance when deciding to participate in volunteering.
6. Most of the volunteers intend to take a leading position in the future. Therefore, the system of motivation of young people to participate in volunteering should include the justification of the possibility of developing competencies that in the future will contribute to building an individual's career.

The statistics obtained by the authors of the research allow to determine the volunteer profile, the age group, which the policy of promoting the volunteer movement should be

addressed to, and the elements that a system of motivation of individuals to participate in the work as a volunteer should contain.

The results of the research can be used in practice by various state and public structures in the promotion of humanistic ideas of volunteering, the development of the ecosystem of volunteering, the formation of volunteer groups and the organization of work to attract young people and students to volunteer work.

REFERENCES

1. Trokhina A.V. Employment of volunteers in Russia: formation and regulation. Abstract. Diss.Ph. D., 2011
2. Pevnaya M.V. Volunteering as a social phenomenon: a managerial approach. Abstract. Diss.D. SOC.n., 2016.
3. Agirbov S. R., Skazko A.S. Volunteering: ethical aspect / S. R. Agirbov, A.S. Skazko // research paper. 2014. ? 4, Pp. 68-73.
4. Dwyer P. C., Bono J. E, Snyder M., Nov O., Berson Y. Sources of Volunteer. Motivation Transformational Leadership and Personal Motives Influence Volunteer Outcomes // Nonprofit Management & Leadership. – 2013.
5. Bidee J., Vantilborgh T., Pepermans R., Huybrechts G., Willems J., Jegers M., Hofmans J. Autonomous motivation stimulates volunteers' work effort: a self-determination theory approach to volunteerism // International Society for ThirdSector Research, Voluntas. – 2013
6. L.Kulik. Volunteering During an Emergency: A Life Stage Perspective. – 2017.
7. Barkhaev A. B. Socio-psychological prerequisites of student youth involvement in volunteer activities // Scientific notes of the Pedagogical Institute of SSU. H. G. Chernyshevsky. Series: Psychology. Pedagogy. - 2010. Vol.3. - ? 1. - S. 51-58.
8. Novikov M. A. History, problems and prospects of youth volunteering development in Russia // Historical, philological, political and legal Sciences, cultural studies and art history. Questions of theory and practice. - 2011. - ? 6 – P. 141-144.
9. Pevnaya M. V. Volunteering as a sociological problem / M. V. Pevnaya // Sotsiol. research. 2013. ? 2. C. 110-119.
10. Ponomarev V. D., Vasilkovskaya M. I. Institute of volunteering in the activities of youth associations // 2014. - ? 29-1. – P. 141-148.
11. Repeshko E. E. Volunteering in Russia: the main problems and ways to solve them // Scientific notes of the Russian State Social University. - 2012. - ?10 (110). – P. 106-109.
12. Sudorgina A.V. Volunteering as a strategy // Psychology and pedagogics: methods and problems of practical application. - 2012. - ?26. - P. 49-53.

13. Tarasov N. V. Volunteer activity as a historical and pedagogical phenomenon // Pedagogical education in Russia. - 2012. - ? 4. - P. 46-52.
14. Chagin A. E., Kuimova M. V. on the role of volunteering in the student environment // Young scientist. - 2015 ?10. - Pp. 27-29.
15. Shevchenko P. V. Social role of the Moscow volunteering / P. V. Shevchenko // Sociological research. 2013. ?8, Pp. 60-71
16. P. Meredith Belbin. Types of roles in teams of managers. Moscow: Hippo, 2003. C. 232.
17. Maslevich, T. P., Minaeva N. L., Safronova N. B., Urubkov A. R. Quantitative assessment of the impact of team roles on the result of work social groups/ Economic system in 2017 ? 6 p. 47 - 52



THE CHANGING DYNAMICS OF CUSTOMER RELATIONSHIP MANAGEMENT IN INDIAN BANKING WITH THE ADVENT OF TECHONOLGY

Nishtha Pareek

FMS-WISDOM, Banasthali Vidyapith, Newai, Rajasthan, India

Abstract: The Indian economy has been dominantly a savings economy. The Indian banking industry plays a major role in this case. Banking in India has a very different form as compared to the world over. Here the relation of a banker does not limit itself to the banks. Rather the bankers are an important part of the social setup. We can say that the bankers are so strategically involved in the society of India that they rather than being a banker become the family members of the customers. Here in this paper the researcher has tried to study the changing dynamics of the relationship of the bankers with the customers due to the advent of technology. Though we cannot avoid the use of technology as we have to move ahead with the world but the same is affecting the banking in India. The researcher here has tried to study what is the effect of the use of technology in the Indian banking sector and how it has changed the banking of India. To do the study the researcher has collected the primary data from various customers and Bankers. The number of people considered in the study is 600 in combination of bankers and customers. The researcher has taken views of both to compare and understand the view point of the both the groups in relation to Customer Relationship Management in Indian banking. If we see the Indian banking some years back it was mainly based on relationship with the bankers. Where the banks and the services offered by the banks mattered much lesser than the relationship with the banker. Today the things have changed and the paper studies these changing dynamics.

Keywords: Banking, Indian banking, Customer relationship Management, Technology, Changing Dynamics

1. INTRODUCTION

Banking is an essential part of the economy of the world, the changing scenario of the banking affects the business and economy world over. It may be a change in the credit policy or the working of the banking system, it creates a ripple effect on the overall economy of the country. With the passage of time this has been evidently seen that, with the changing banking system the economy has taken a boost, but this may not be true always. Indian banking industry is one of its kind in the world. It has been repeatedly said that the Indian economy is basically a savings economy and Indian banking industry plays a crucial role in nurturing and developing the same. The Indian banking industry has been a regular promoter of saving habits amongst the people of India. With the change in the time the banking industry in India has undergone a tremendous change. The advent of technology has

changed the dynamics of banking in India. In the last decade the banking of India has grown much faster due to the advent of technology, but the same technology has some where hampered the basic relationship of Banker and Customer. There was a time that the banker was so strategically placed in the society of India that it became an essential part of the society. The banker used to be a friend, philosopher, a financial guide and above all an important part of the society or the must precisely say the family of the customer. [2-5]

With the advent of technology this basic relation of banker and customer has changed in India. The researcher is not against the use of technology, but the main purpose of the paper is to bring out the reason why the customer is not related to the bank in the same manner as it used to be associated in the past decade. The paper studies the impact of technology on the customer relationship management of the bank. While there can be many factors that can be studied while studying the impact of advent of technology such as effect on the cost of the bank, profit of the banks etc. , but the most essential part of the banking is the customer of the banks. As it's rightly said that without the customer no bank can prevail. Here the paper focuses on the concept of banker customer relationship and tries to study the preference of the customer amongst banker and technology.

It is not a hidden fact that to march with the world we need to adopt the latest technology, but Indian society is mainly based on relations. We Indians value our relation more than anything thus the paper focuses on how the relation has changed and what the customer feels about the same. It is to be noted that with the change in this relation, the concept of banking in India has undergone a tremendous change. While on one hand the new technology has reduced the cost and increased the profits of the banks, the same technology has distanced the banker from the customer and thus has affected the deposit books of the banks. [6-7] There was a time when the customers in India use to keep all their relationship with one bank but today as this basic relationship has changed the customer loyalty has also reduced. Thus the paper ahead covers the concept that how the advent of technology in the banking system has strategically changed the banker customer relationship in the banking in India and how the customer feels about the same. [8] The researcher here has tried to understand the view point of both the banker and customer, and how it differs in the case of technology and branch banking. Thus the paper studies the concept of “The Changing Dynamics of Customer Relationship Management in Indian Banking due to the advent of Technology.”

2. REVIEW OF LITERATURE

[9] The technology has made the life easy and simple for both the customer and banker. For the customer the bank is now 24 hours available and thus no time boundation is there, also it has increased the customer convenience. While technology has changed and made the work easy for the banker. On one hand it has reduced the cost of operation for the banks on the other it is adding profit to the kitty of the bank. Technology has changed the relationship scenario of banking and now the customers don't feel that contacting a banker is an essential part.

[10] The Indian banking industry is full of same kind of banks and same kind of services. The banks have adopted the technology almost at the same level, but what they have missed is the proper integration of technology and customer requirement. It has been observed that the customer is using technology to meet its requirement, while there are observations that say that they are doing so as they are not left with any option. Somewhere the customer is feeling that the bankers are directing them to use the technology to reduce the cost and also to

reduce their work. Customer relationship management must be given proper importance and must be integrated in the system with the use of technology.

[11] The banks are shifting from mass banking to class banking and from conventional banking to convenience banking. But it is to be noted that IT will be able to achieve its motive only if rural customers are also trained. It is also to be seen that the IT and cyber laws are made more stringent to make direct banking channels more effective.

[12-14] The higher authorities in the banking industry is focusing more and more on the technology. Today they are expecting to give all solution to the customer problems through technology, but what they are missing to see amidst this is the fact that the bank, bankers and customers are still not completely ready to accept this change. The problem is not in the mindset but is with the supporting infrastructure and knowledge base for the same. These things are still not ready to completely support the digital banking structure of India.

[15] The service quality of the bank matters with the customers. If the customers are satisfied they will be loyal to the bank. In alternate case if the customer feels that the banker is not treating them well the chance of customer leaving the current bank and moving to another bank is very high. With the advent of technology the banks are shifting their focus from customer to cost centers. Banks need to adopt customer relationship management along with the technology for the holistic development of the banks. As just the movement towards technology will just add to cost if the customer is not made familiar to the same.

[16] It has been seen that there is a relationship between the uses of the technology enables services and its impact on the relationship of the banker and customer. It is seen that better the banker and customer relationship higher are the chances of enhancement of the better usage of advanced technology enabled services. The author here has shown that the adoption of technology is affected by various factors such as age, type of account, etc. The author had concluded that the better customer education and better customer relation can help in boosting the banking relations of the customers.

[17] The author in this paper has emphasized on the CRM in the banking sector to improve the customer loyalty with the bank. But along with it the author has also said that CRM and technology when brought together can help in better management of customer relationship. With the changing age to move separately is not a solution for both the CRM and technology.

3. RESEARCH GAP

There are various researches done on the aspect of CRM, Technology in CRM, Direct banking channels and it reducing cost, etc. while very few studies were found where the customer reasons for acceptance of technology and reason for not using branch banking has been done. The researcher has found a research gap on the fact that there are almost no studies in relation to the impact on the customer relationship of the bank due to the use of technology. While everyone is of view that it builds the relation better, very few have actually studied the customer perspective.

4. PROBLEM STATEMENT:

The problem to be studied here is that how the advent of technology has changed the concept of relationship in the Indian banking System. The problem lies that whether the customers have opted the technology as an option or forced to accept the same.

5. RESEARCH METHODOLOGY

Research Design

The researcher has used the combination of Exploratory, Empirical and Descriptive methods of study. Where in the researcher has used the literature available to understand the aspect. The researcher has made various observations and thus has used the empirical and descriptive method of study. The researcher has developed a questioner to understand the effect of the technology on the banker customer relationship, and has conducted a survey over 600 individual to gather the data and use the Empirical method of research.

Pilot study

The researcher had conducted a pilot study to check the reliability of the questionnaire which was conducted on a sample of 50 respondents. The Cronbach alpha for the same came to be 0.79 which is higher than the minimum range of acceptance. Thus the questionnaire was deemed fit for the study.

Sampling Method

Simple random method of sampling was adopted to collect the data. Wherein each and every unit of the population had the equal chance to be part of the sample. But as the population of the country like India is very large the researcher also used the stratified random sampling where in various groups which can give a perfect idea of the population were contacted to seek the information. Thus the sampling method is a combination of stratified random sampling and in that simple random sampling.

Sample Size

At the initial stage a total of 1000 respondents were contacted through questionnaires for the collection of data. From this only 734 respondents replied, while from them only 600 samples can be taken as the remaining were incomplete and thus were not fit for the study.

Data Analysis Procedure

The researcher has used various statistical method to analysis and simulate the data available. On one part the data is analysed by using the method of Chi Square, here the age was taken as a variable to determine that how much heterogeneous or homogenous the responses are. Further the researcher has used the method of regression to determine that what exactly is the customer perspective towards the advent of technology in the banking sector of India and how is it changing the dynamics of relationship in the banking in India. In this for further simplification linear regression was used. All the tests were conducted using SPSS 23 for the simplification and summation of the data.

6. OBJECTIVE OF STUDY:

The researcher has conducted this study with the following objectives:

- To ascertain whether age has any role in acceptance of technology by the customer.
- To check whether the customer is feeling connected to the banker
- To ascertain whether technology is changing the relationship of the banker and customer
- To see whether technology in form of direct banking channel is used as an option by the customer or whether they are diverted to it by the bankers,
- To check whether the customer relies on all the information given by the means of technology.
- Lastly to check how the advent of technology has changed the dynamics of relationship of banker customer in India.

7. HYPOTHESES OF THE STUDY:

H_{0a}: Age has no relation with the use of technology in banking by the customer.

H_{0b}: Use of technology is not related to feeling connected to banker

H_{0c}: Use of Technology is not changing the relationship of the banker and customer.

H_{0d}: There is no significant relation between the use of direct banking channel as an option over branch banking.

H_{0e}: The advent of technology has not changed the dynamics of relationship of banker customer in India.

8. DATA ANALYSIS AND INTERPRETATION

The raw data is of no use till it is systematically presented and interpreted the section deals with analysis and interpretation of the same. Table 1 deal with the relationship between age and various aspects of relationship of banker and customer.

Table 1. Calculation of Chi Square of Age in relation to various aspects of branch banking

	The use of direct banking channels has distanced you from your bank	You prefer technology over personal contact	Branch banking or relationship banking is very time consuming	Branch banking or relationship banking is highly reliable	It is very informative	It can help in better management of money	Cross selling by the bankers is the reason for you to avoid this banking	You feel you are not treated properly in this kind of banking thus you use direct banking channel	Discriminating behavior of the bankers makes you avoid this kind of banking	Bankers direct you to direct banking channels for all your query	You don't get proper answer to your queries from the bankers	You can get better information and do better financial planning through these channels	You can rely on any information provided by the banker	You feel more connected to your bank by using this channel
Chi-Square	38.000 ^a	95.225 ^a	18.375 ^a	260.900 ^a	204.275 ^a	65.700 ^a	83.575 ^a	188.775 ^a	175.850 ^a	72.375 ^a	23.500 ^a	80.800 ^a	145.975 ^a	59.500 ^a
df	4	4	4	4	4	4	4	4	4	4	4	4	4	4

It can be seen from Table 1 that the composite Chi square calculation of age with various aspects of banking can be seen that in normally all the case the reaction of the customer to the services of the bank remains same it is to be noted that the calculated value of Chi Square is higher than that of the table value. Thus the null hypothesis H_{0a} gets rejected that there is no significant relation between the age and the various variables of branch banking. It is to be noted that the customer reaction to the various aspects of branch banking differs with that of age. We can see that the people in the lower age group rely on the technology as compared to the senior citizen or middle aged people. Though the table given is not giving the perfect age and criteria difference for each and every aspect, it can be seen that the computed value is lowest in the cases as mentioned below:

- The use of direct banking channels has distanced you from the bank.
- Branch banking or Relationship banking is very time consuming.
- You don't get proper answer to your queries from the bankers

Thus it can be said that in these cases there is much similarity in the views of all the age groups as compared to the other aspects. In these aspects the null hypothesis is some what true that age is not an aspect. It is also to be noted that people agree to this concept that actually they are distanced from the bank due to technology and all age group people feel same. While they also agree that one major reason that is driving all of them away is the time required and the attitude of the bankers to the queries of the customers many a time.

Regression analysis:

To test various aspects of branch banking in relation to the customers views the regression analysis was carried out. The main independent variable of the study is The use of direct banking channels has distanced you from your bank, in relation to this various aspects related to branch banking were tested using the linear regression to ascertain whether the customers prefer technology or branch banking.

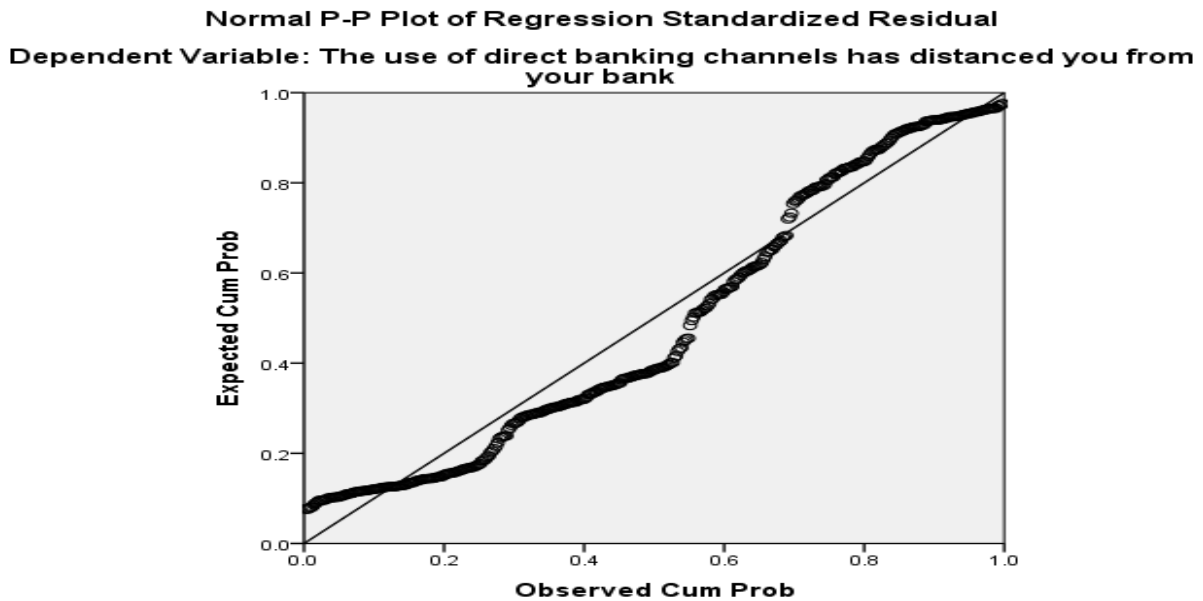
Table 2. ANOVA calculation for the analysis

ANOVAa						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.834	13	1.603	.774	.688b
	Residual	799.326	386	2.071		
	Total	820.160	399			

Table 3. Regression analysis of various aspects.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.273	.447		5.079	.000
1.2	You prefer technology over personal contact	-.051	.047	-.056	-1.094	.275
1.3	Branch banking or relationship banking is very time consuming	.109	.052	.108	2.090	.037
1.4	Branch banking or relationship banking is highly reliable	.086	.060	.074	1.436	.152
1.5	It is very informative	.036	.055	.034	.647	.518
1.6	It can help in better management of money	-.029	.051	-.030	-.568	.570
1.7	Cross selling by the bankers is the reason for you to avoid this banking	.001	.049	.001	.018	.986
1.8	You feel you are not treated properly in this kind of banking thus you use direct banking channel	.002	.057	.002	.037	.970
1.9	Discriminating behaviour of the bankers makes you avoid this kind of banking	-.001	.056	-.001	-.015	.988
1.10	Bankers direct you to direct banking channels for all your query	.005	.053	.005	.097	.923
1.11	You don't get proper answer to your queries from the bankers	.027	.050	.028	.536	.592
1.12	You can get better information and do better financial planning through these channels	-.071	.054	-.069	-1.305	.193
1.13	You can rely on any information provided by the banker	-.004	.051	-.004	-.081	.936
1.14	You feel more connected to your bank by using this channel	.020	.054	.020	.376	.707

a. Dependent Variable: The use of direct banking channels has distanced you from your bank



We can see from the table three that various factors gave different value of t and beta. It is said that in regression analysis beta signifies that how much change in the dependent variable will affect the independent variable. Here the researcher has taken dependent variable that the technology is driving away the customer from the bank. To this it can be seen that the beta value is negative for the variables 1.2, 1.6, 1.9, 1.12, 1.13. thus it can be said that as the value of dependent will increase these independent variables will go more on negative side. While in the remaining cases the Beta value is positive which means that increase in one will lead to increase in another. It can be seen that the t-value of the variables with the negative beta is also negative which means that they fall on the left hand side of the bell curve. Also it can be seen that the dependent variable has a direct relation with the independent variable thus the null hypothesis H_{0b} gets rejected. Along with it can be seen that mostly respondents are of the view that the technology is changing their relationship with the banker thus hypothesis H_{0c} also gets rejected. The customers feels that the use of direct banking channel has a significant relation with the use of branch banking as an option thus rejection H_{0d} . Finally it can be seen that the advent of technology is affecting the relationship of the bankers and customer.

9. FINDINGS

Sr. No	Objective of the Study	Findings
1.	To ascertain whether age has any role in acceptance of technology by the customer.	It was found in the process of study through Chi Square that there is no significant relation between the age and use of technology. It was found that the factors that are diverting the youngsters towards technology are some what same as those in the case of middle age or senior citizen. It can also be seen that all the age groups feel more comfortable with the banker as compared to technology and feel it is more reliable.
2.	To check whether the customer is feeling connected to the banker	For this the regression analysis was done on various aspects of branch banking and it was found that the customer somewhere feels disconnected to the banker as they prefer technology over personal contact and they also feel that due to cross selling target many a times banker may give wrong financial advice.
3.	To ascertain whether technology is changing the relationship of the banker and customer	It was found through various aspects that customers prefer branch banking but are diverted to direct banking as can be seen in 1.8, 1.9 and 1.10
4.	To see whether technology in form of direct banking channel is used as an option by the customer or whether they are diverted to it by the bankers,	1.10 proves that the customers feel that they are diverted to it by the bankers to reduce their work or through 1.9 that when bankers discriminate amongst customers due to various reasons.
5.	To check whether the customer relies on all the information given by the means of technology.	Through point 1.4, 1.6 and 1.13 it was tested it was found that the beta of 1.6 and 1.13 is negative which means that there are chances that they may not rely on all information provided by the banker as compared to technology
6.	Lastly to check how the advent of technology has changed the dynamics of relationship of banker customer in India.	The various factors show that how technology is driving away the customer from the bank on one hand they find it more convenient and reliable as can be seen from 1.2, 1.4, 1.6, 1.12 & 1.13. on the other hand the customers also feel that bankers are themselves diverting the customers towards technology as can be seen in 1.3, 1.7 to 1.10.

10. CONCLUSION

The researcher thus can draw the conclusion from the study that it is not only the convenience of the customer that is drawing the customer away from branch banking and closer to technology. Many a time the reason is the banker. No doubt with the advent of the technology the bankers work has become easy and it has also provided convenience to the customer, but if a proper mix of the same will not be given to the customer the day is not far when the customers will lose their trust on the banks in India. Like in the case of cross sell many customers agreed that due to high cross selling by the bankers they don't feel like going to bank. Thus it can be said that if the bankers want that their customer must remain loyal to the bank than in that case they must motivate the customers to use branch banking along with direct banking, as the customers have already started to feel neglected and discriminated. The day is not far when the customer will not prefer to meet the banker for anything and would prefer to do all work through direct banking channels. The trend of the same can be observed in the age group of below 25 and 26-35. Thus yes it can be concluded that the advent of technology has changed the dynamics of customer relationship management in the banks in India.

REFERENCES

1. <http://www.azquotes.com/quote/376284>, *retrieved on 28th April 2018*
2. <https://www.rbi.org.in/scripts/PublicationReportDetails.aspx?UrlPage=&ID=243>, *retrieved on 28th April 2018*
3. <http://rdmodernresearch.org/wp-content/uploads/2015/10/49.pdf>, *retrieved on 29th April 2018*.
4. <https://www.moneylife.in/article/indian-banking-scenario-and-rbirsquos-new-avatar/34893.html>, *retrieved on 29th April 2018*.
5. Mahajan Jyoti, M. R. (2016). Changed Scenario of Banking Sector in India. GE-International Journal of Management Research, 83-88.
6. Shastri, R.V. (2003), "Recent Trends in Banking Industry: IT Emergence", Analyst,(March), pp. 45-46.
7. Shekhar K C, Shekhar Lekshmy (2013) "Banking: Theory and Practice" Noida, Vikas Publishing House Pvt. Ltd
8. Agarwal R, V Sambamurthy, R.M.Stair (2000). Research report: the evolving relationship between general and specific computer self-efficacy: an empirical assessment. Information Systems Research, Vol. 11, No. 4, pp. 418-30.
9. Kumar, T. R. (2012). Information technology in banking sector. ASIA PACIFIC JOURNAL OF MARKETING AND MANAGEMENT REVIEW , 25-33.
10. Mallick, S. J. (2006). The Impact of Information Technology on the banking industry. Retrieved from Researchgate.

11. Das, S.K (2012). Customer Relationship Management In Banking Sector: A Comparative Study Of Sbi And Other Nationalised Commercial Banks In India, Arth Prabandhan: A Journal of Economics and Management, 68-82
12. Alavudeen, R, Rosa, K.D. (2015) Impact Of Technological Advancements In The Banking Sector, PEZZOTTAITE JOURNALS , 1621-1629
13. Babu, S.P, Choudary, Y.L, (2013), Impact of Banker Customer Relationship on the Effective Usage of the Technology Enabled Services in Banks: An Empirical Evidence, IOSR Journal of Business and Management , 15-21
14. <https://www.ijsr.net/archive/v5i8/ART2016786.pdf>, Retrieved on 3rd May 2018
15. Raju, T. (2016), Impact Of Information Technology (It) On The Banking Sector, International Journal of Current Advanced Research, 1106-1111
16. Dangolani, S.K. (2011), The Impact of Information Technology in Banking System, Procedia Social and Behavioural Sciences, 13-16
17. Sharma, A & Kansal, A. (2014) Technological Innovations in Banking Sector : Impact, Behaviour and Services, International Journal of Information & Computation Technology, 885-890



PLANNING APPROACH FOR LOGISTICS

Polina Arshinina, Albina Kiseleva

F.M. Dostoevsky Omsk State University, Omsk, Russia

Abstract: The appreciation of the scope and importance of logistics and supply chain has led to a more scientific approach. The effective supply chain management, as a component of strategic management, is an important aspect of company's functioning and is responsible for the optimizing of the whole system's operation and the competitiveness on the rapidly developing market. Logistics plays a significant role in the region economic management and includes the material, information, financial and labor management. Initially there is a review of the scope of logistics, supply chain and distribution systems. Next is an examination of the need of the logistics planning. Some key strategic considerations are introduced. Moreover, the corporate strategic planning, which is linked to the logistics design strategy, is outlined. In addition a number of fundamental influences on the logistic network planning and design, such as product' characteristics, the product life cycle, and etc., are described. Finally, the importance of the integration of the logistic function into the business has been emphasized. Also, the necessity of the connection between the logistics planning framework and the company's corporate and comparative strategies is noted. The research explains various organizational aspects of the effective logistics strategy and the applicability and relevance of the planning to distribution and supply chain systems. A number of real effective examples of company's logistics planning is provided.

Keywords: logistics, supply chain, management, planning, strategy

1. INTRODUCTION

Over the past decade, there has been an increasing emphasis on logistics and supply chain management as a vehicle through which firms can achieve competitive advantage on markets. Thus, the relevance of this topic is quite clear. There are just very few researchers in this area in Russia, but this topic is sufficiently studied in Europe and Asia.

Recently, the necessarily of understanding the role of the logistics for a company's and regional policies is clear in parallel with the growing of the importance of distribution processes, the movement of products and supply chains. Supply chain network includes suppliers, manufacturers, warehouses, distributors and customers in order to convert raw material to final products, deliver them to consumers by meeting their needs and minimizing (maximising) cost (profit) of the whole distribution network [1]. Thus, the necessarily for the implementation of the planning approach for logistics has to be explored.

2. RESEARCH AND DISCUSSION

In the modern world strategy planning plays an important role in the success of a smoothly running business. Planning can be identified as an important approach at every stage of business and at every level of its lifecycle. The formulating of company's strategy is a complicated process, which includes a number of stages (Figure 1). The strategy's formulating includes strategic planning that is concerned with setting out how company's strategic objectives can be achieved.

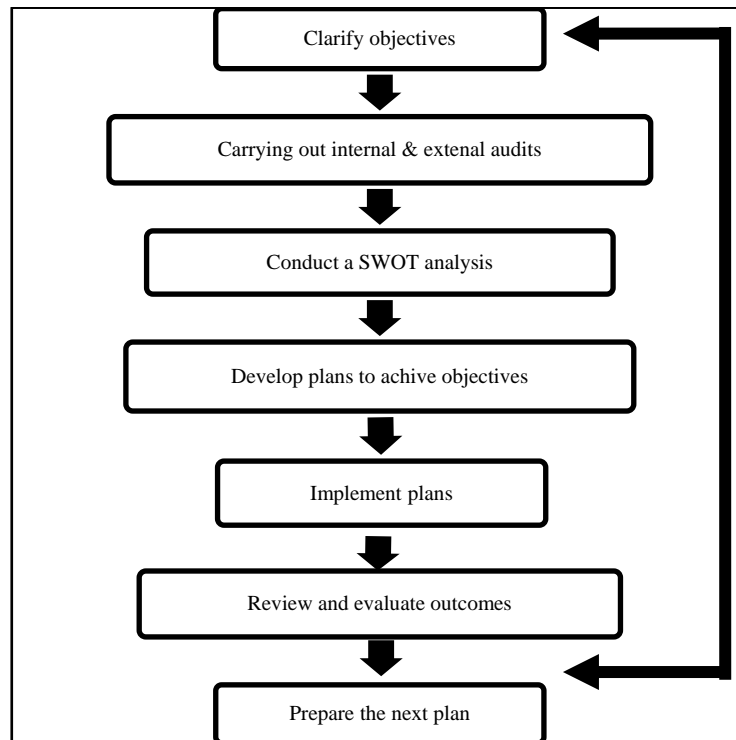


Figure 1. Formulating a strategy of a company [2]

Historically, many companies have adopted a piecemeal and incomplete approach to their strategic planning system, that is absolutely true for the logistic and supply chain systems, where individual logistics functions have often been sub-optimized to the detriment of the whole logistics system. This is due to the number of facts, which includes significant improvements in communication systems and information technology, regular economic changes, increasing customer service requirements, the product's life cycles, the development of new players with new roles in channel distribution and the need of the adaptation of a wider supply chain perspective when planning and redesigning logistics operation [3].

According to Titus, “Businesses can get customers to walk into their door, but they can just as easily send them right back to their competitors” [4]. In order to have a successful distribution network, the company needs to pay attention to service relationship, which mainly drives the fulfilment of customer service promises, and to the logistic network planning and design [5].

The logistics design is related to the design of logistics processes, logistics information systems and logistics organizational structures). The key elements of the logistics design are presented at Table 1 below.

Table 1. Elements of the logistics design [3]

№	Element	Description
1.	Logistics process design	The business methods are organized and operated across the traditional company's functions and become supply-chain oriented. A typical logistics process includes order's fulfillment, customer's order satisfaction, the time minimization, and the maximization of accuracy.
2.	Logistics network design	These include aspects related to the physical flow of the product through a company's operation (the manufacturing location; the inventory that should be held; depots; the final product delivery). The appropriate physical design includes the trade-offs usage between logistics components and different company's functions.
3.	Information system design	This element includes all information-related factors, that provide the process support and the physical operation of the structure.
4.	Logistics organizational structure	These include issues such as sub-optimization whereby functions tend to concentrate on their own operations in isolation from the rest of the company.

The company has to organise proper communication with their suppliers and retailers, which are able to provide appropriate service in order to satisfy end customer's needs and requirements. Additionally, the company can survey their customers in order to understand their needs, determinate the significance of each service element for them and identify service requirements for development of specific service packages for customers.

The main content of planning approach considers a number of important elements such as the key flows, cost relationships, facilities of distribution centres and their locations. Some of the majorpoints that need to be taken into account are the role of the distribution centres and warehouses, a methodology for planning a physical distribution structure, an overview of different modelling techniques and qualitative assessment [3].

A logistics planning framework is presented at Figure 2 and can be used for the implementation of company's business strategy and competitive strategic plan.

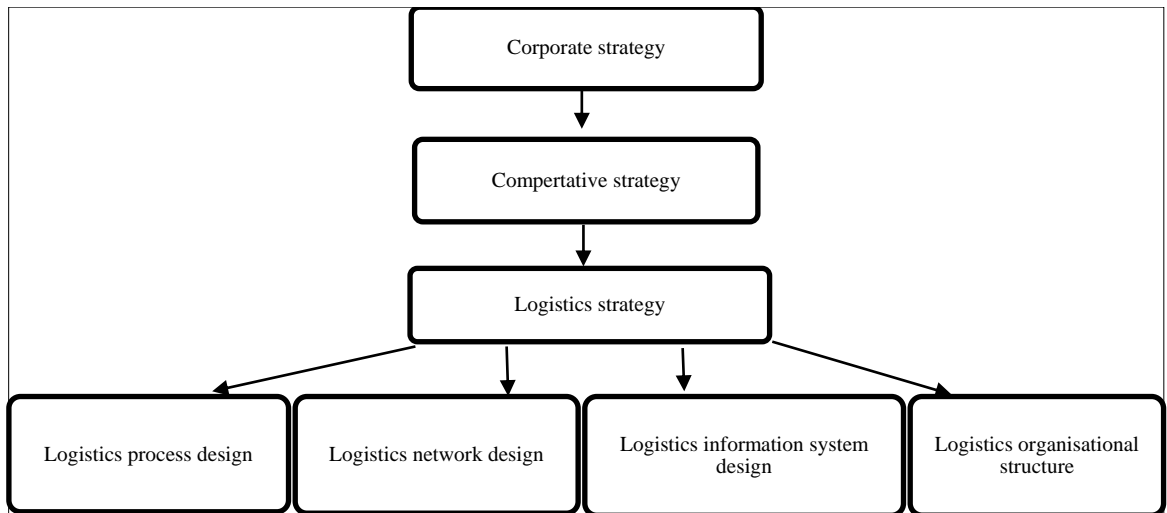


Figure 2. A framework for the logistic network design [3]

The different products characteristic should be taken into account for the effective implementation of logistics design tools and techniques. There is a variety of product characteristics which have a direct impact on the development and operation of company's distribution system. The major product categories are sustainability, high-risk products, the product life cycle, packaging and units loads [3].

An approach to logistics strategy planning is outlined in Figure 3 and describes the practical steps that need to be taken for the logistics strategy's implementation.

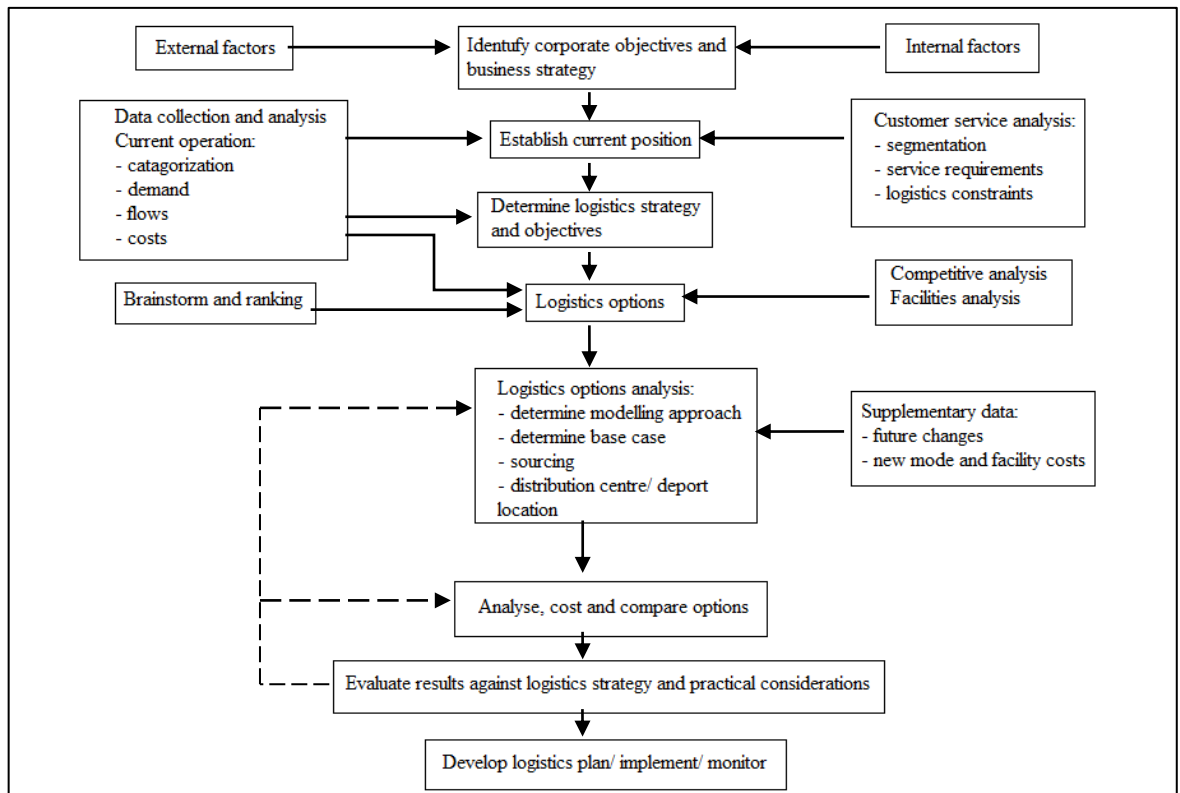


Figure 3. An approach to logistics strategy planning [3]

This approach requires the collection, collation and analysis of the data and also qualitative assessment. The approach has to suit particular industries and business situations. Also, the business and logistics issues and the combination of the conceptual and quantitative evaluation techniques have to be implemented. The right product must be produced at the right time, be available at the right place and at the right price in order to meet customer's needs and create a flourishing business [6]. Thus, businesses have to have logistics capabilities in order to achieve desirable success on market.

Each warehouse has its own policy related to customer's service and relationship regulation. For customer's promise analysis, a company records the value of orders customer requests, changes in demand and the number of orders to customers in any location per week, per month, per year [7]. Logistic components of customer service are presented in Table 2 below. Thus, the customer service promise has a strong effect on the whole logistic system and its design, because business operations are directly related to customer's needs satisfaction, growth of sales and the total number of regular customers.

Table 2. Logistic customer service elements [3]

Categories	Elements
Pre-transaction	<ul style="list-style-type: none"> • Written customers service policy • Accessibility of order personnel • Single order contact point • Organizational structure • Method of ordering • Order size constraints • System flexibility
Transaction	<ul style="list-style-type: none"> • Order cycle time • Order preparation • Inventory availability • Delivery alternatives • Delivery time • Delivery reliability • Delivery of complete order • Condition of goods • Order status information
Post-transaction	<ul style="list-style-type: none"> • Availability of spares • Call-out time • Invoicing procedures • Invoicing accuracy • Product warranty • Returns policy • Customers complains and procedures • Claims procedures

According to the logistic customer service elements, customer service promise impacts the whole distribution network system design and determinates different aspects of its operations [3]. All three groups (pre-transaction, transaction, post-transaction) being equally important for a company provide the whole picture of customer service promise and indicate areas that have to be improved. Thus, the company has to pay much attention to customer policy development and proper formatting of service standards. Also, customer service promise has a significant effect on the positioning of distribution centre facilities and inventory required for its operation, on the speed of logistic system functioning and on the determination of use of transport mode in order to provide a various type of delivery (same day, express, standard) [3]. Moreover, in order to be reliable for their target customers a company has to provide security payment methods, warranty and good return policy.

Importantly, different customers may require different service levels and different market segments demand various quality of service. To meet customer's needs and to create a flourishing distribution network, it is important to pay attention to the concept of seven "rights" of customer service: right customer, right product, at right time, in right place, at right cost, at right quality, in right condition [3]. Proper customer service promise is very important for determination of final demand and expected profit.

By the nature, customers exhibit a wide variety in buying preferences and not all are satisfied with existing service system [8]. The company has to organise proper communication with their suppliers and retailers, which are able to provide appropriate service in order to satisfy end customer's needs and requirements. Additionally, the company can survey their customers in order to understand their needs, determinate the significance of each service element for them and identify service requirements for development of specific service packages for customers.

In 1972, after a decade of the development by Takahama factory, Toyota Motors introduced the KANBAN system, which was one of the first attempt of the Just-In-Time concept implementation. The essence of this technology is that all factory production divisions including the final assembly lines are only supplied with a determinate number of material resources and by the time that are required for customer's order fulfillment [9]. Therefore, the KANBAN system allows to reduce the stock of material resources at the input and the amount of work at the output stage. At the same time this system allows to identify weaknesses in the production process itself. After Toyota Motors experience, the KANBAN system has adopted by other automotive factories in Japan. In Russia, this system was implemented by Open Joint-stock Company KAMAZ and the Just-In-Time concept is realized by the automobile enterprise company named Open Joint-stock Company AVTOVAZ [10].

Another good example of the effective company's logistics planning is an American multinational package delivery company and a provider of supply chain management solutions - United Parcel Service, Inc. (UPS) [11]. One of UPS great decision was the seasonal hiring increase and the addition of new vehicles, trailers and aircraft for the 2014 holiday season. The company also relied on more precise forecasting to make better decisions [12].

The company named Nittsu Shoji as a member of Nippon Express Group is a leader of the logistics and international merchandise distribution in the 21st century and can be an illustration of the effective logistics planning approach. The company offers a wide variety of products for creating optimal business environments and also focuses its industry-leading development capabilities on the creation of original packing materials to cater to individual corporate needs [13].

3. CONCLUSION

In order to design optimal distribution network, the company should always begin with analysis of market potential by region and its transport opportunities and detailed analysis of customers buying preferences. Thus, the company can understand how many suppliers are needed, how many retailer channels need to be existed in each location and which transport and equipment are required. In addition, it is important to look how manageable the new distribution network setup will be. There is a number of important factors such as product characteristics, sustainability, risks, product life cycle, packaging, unit loads, which gas to be considered when planning for logistics. The strategic planning includes the overview of the external environment in which a company operates, internal factors and the development of corporate, logistics and comparative strategies. The planning approach for logistics includes the four key aspects of logistics design: process design, network design, information system design and organizational structure.

It is a long way of defining the tasks and analysis requirements for design of an optimal distribution network, which will have successful transport communications that have appropriate transport modes and equipment. Finally, the proper organised logistics system can allow companies to rationalise and maximise efficiencies in their distribution processes and in whole company's operation the markets.

REFERENCES

1. Hamedani, S.G., Jabalameli, M.S., Bozorgi-Amiri, A., A multi-objective model for locating distribution centres in a supply chain network considering risk and inventory decisions, *Management Science Letters*, 3, (2013), 1077-1088.
2. Hall, D., Jones, R., Raffo, C., Anderton, A., *Business studies*, 4th ed. Essex: Pearson Education, 2010.
3. Rushton, A., Croucher, P., Baker, P., *The Hand Book of Logistics and Distribution Management*, 5th ed., Kogan Page, 2014.
4. Titus, D., Customer Service 101: Delivering on the promise. *Business NH Magazine*, February, (2011), 36-37.
5. Gronroos, C., *Service Management and Marketing*, Lexington, MA: Lexington Books, 1990.
6. Jobber, D., Fahy, J., *Foundations of marketing*, 3rd ed. London: McGraw-Hill Education, 2009.
7. Harrison, H., A Planning System for Facilities and Resources in Distribution networks, *INTERFACES Practice Issue*, 9(2), (1979), 6-21.
8. Magrath, A.J., Hardy, K.G., Six Steps to distribution Network Design, *Business Horizons*, 34(1), (1991), 48-52.
9. System KANBAN, Online, available at: <<https://logsystems.ru/articles/sistema-kanban>> [Accessed 7 May 2018].

10. Sabadash F.A., Tolmachev O.M., Zapuskalov N.M., Modernization of machine-building enterprises on the basis of logistic systems KANBAN and JUST-IN-TIME, Newsletter of Nosov Magnitogorsk State Technical University, 14(1), (2016), 130-136.
11. UPS website, Online, available at: <<https://www.ups.com/az/en/about/history.page>> [Accessed 7 May 2018].
12. Forbes website, Online, available at: <<https://www.forbes.com/sites/samsungbusiness/2015/02/16/delivering-with-data-how-logistics-companies-are-shipping-on-time/#5e00ea002d20>> [Accessed 7 May 2018].
13. Nittsushoji website, Online, available at: <http://www.nittsushoji.co.jp/kigyouno/booklet/pdf/profile_en.pdf> [Accessed 8 May 2018].



IMPLEMENTATION OF INFORMATION SYSTEMS: WEAKNESS IN HUMAN FACTORS AS CRITICAL SUCCESS FACTORS

Savo Efremovski, Stojan Dukoski, Katarina Dukoska

PVPU "Euro College" - Kumanovo, Macedonia

Abstract: Computer based information systems have become an integral part of modern organizations, but many systems don't perform successfully or are not used at all. Implementation process plays a big role in success or failure of information system. For that reason the implementation process cannot be considered only as a technical task because most systems that are very advanced in technical point of view are unsuccessful in performing their intended task in organization. Organizations, generally, tend to use the technology to its best potential in order to achieve competitive advantage and improve quality of service. In order to achieve this they need a strong and consistent information system, and this cannot be accomplished with unsuccessful or partly successful system.

One of the main cause of unsuccessful system is improper implementation, and this circumstances will prevent the organizations in achieving their desired benefits, despite the fact that the information system is performing their daily tasks and functions.

The success of the Information system can be measured by the level of which the information systems fulfill their intended goal and achieve their intended benefits. In accordance to this, the implementation of information systems should be treated as change management and more of the attention to be placed on different management aspects of the process: technical, human and organizational.

Research done in this paper reflects the problems during implementation of different specific information systems, addressing human factors as critical success factors influencing successful implementation.

Weakness in human factors analyzed in this research should help organizations develop a implementation strategy or can be used as a base for further research.

Keywords: Implementation, Information systems, Information management, weakness in human factors, implementation strategy

1. INTRODUCTION

Many organizations spend a lot of time on the design and the development of the information systems, while the process of implementation is relatively ignored [1]. Important process that plays a big role in the success or failure of information system is implementation. The implementation cannot be considered as a technical task only, most systems failed because they were very advanced in technical design and very good from the technical standpoint. Therefore more attention should be given to technical, human and organizational aspects.

Although developing countries have achieved success in some IS projects, some authors, based on the study of large numbers of IS projects in these countries [2] [3], have categorized many of these projects as total or partial failures [4].

This research concentrates on identifying the weaknesses of human factors in implementation of information systems that influence the success of the project and the acceptance from the staff.

2. IDENTIFICATION OF CRITICAL FACTORS IN INFORMATION SYSTEMS IMPLEMENTATION

After search of critical factors in the literature on the implementation of information systems, and some specific systems, a number of factors were identified, some of which were selected for inclusion in the study because they were subject to consensus and were often cited in the literature on the implementation of Information Systems.

Swanson identified nine factors that influence the success and failure of implementation: user involvement, manager's commitment, basis value, mutual understanding, design quality, performance level, project management, resource adequacy and situational stability. [5]

Alvey has sorted variables into six sets of factors: motivation for introducing a new system, system dedication, organizational culture, management of the implementation process, the difference between the existing system and the replacement and the technology itself. [6]

Land, based on Alvey research, prepares guidelines for preparing the organization for change. These guidelines include: organizational climate, understanding of shareholders, preparation of organization change management, identifying barriers to change and establish a strategy for implementation. [1]

In the last decade, new research has not been oriented to the study of critical factors in the implementation of Information Systems in general. They concentrate on certain systems and identify critical factors that play a major role in the successful implementation of that system. Such studies focused on the implementation of software for work teams, enterprise systems, maintenance of management information systems, business process re-engineering and information-communication technology (ICT) projects. Other researchers notes the tendency to focus on a specific factor of identified problems and to systematically study its impact on IS implementation.

The most frequently cited critical factors in the literature, eleven in total, are organized into three categories. The first category contains factors related to the organizational area. The second category groups human resource and personnel factors and the third category contains technology-related factors.

Table 1. Critical Factors of Information System implementation

Organizational factor	Human Factor	Technology factor
Top Management Support	User Involvement	Technology itself -system design - objectives and -information features
Motivation	Commitment	
Communication	Organizational culture	
Training	Attitude	
Financial resources	Qualified IT staff	

Human factors analyzed in this research are User Involvement, Commitment, Organizational culture, Attitude, Qualified IT staff

3. APPROACH FOR THE IDENTIFICATION AND ANALYSIS OF CRITICAL FACTORS

Human factors were studied, tested and identified by conducting semi-structured interviews with 12 managers in higher education institutions and 10 managers from organizations involved in this research. In each company, the researcher interviews key managers such as: sector managers (human resources and finance), IT manager and top manager who have conducted any of the two specific systems (financial and human resources). The McKinsey 7S Framework is used as a guide in formulating interview questions related to the investigation of critical factors in the implementation of Information Systems. For example, for the strategy element, from the "7S" model, we formulate questions about the strategy that concerns a top management issue, for example we seek information about providing adequate resources or prioritization of certain tasks.

4. ORGANIZATIONS AND SYSTEMS INCLUDED IN THE STUDY

Organizations selected for this study are from different activities, three from higher education and others are mainly from the service activity and have implemented systems that are the goal of this research, financial and human resources. All organizations fall into small enterprises with fewer than 50 employees. All companies have implemented the two specific systems (financial and human resources systems) as the goal of this research.

Financial systems in organizations most often included accounting applications, and in some of them budget, planning, and audit applications. Human resources systems were mainly based on certain procedures established by management and were run without the use of a specialized software tool with manual lists, except in several of them.

Human resources systems include data for employees in the company from the lowest to the highest rank and keeps records of personal data of all employees: documents, payroll, vacation, promotions, certificates, job description and outgoing and incoming documents. The financial system consists of various main applications that deal with all financial functions within companies, such as accounting, controlling and budgeting.

5. WEAKNESS IN HUMAN FACTORS

As a result of the analysis of the human factors from the responses received from the managers in the analyzed organizations, various weaknesses were identified in the human critical factors. Below are the analyzes of the main problems identified in each factor.

User Involvement

User involvement is a significant issue in Information system implementation which is frequently mentioned in the literature and plays a big role in increasing the chances of successful implementation. The main weaknesses in this started with insufficient attention or involvement from the managers during the process. The inconsistency between the manager's responses towards this factor indicates the big gap between the top managers perception and

the reality of Information system implementation, because they left the process as the IT Manager's responsibility, without any follow up to ensure effective implementation and to recognize departments problems. On the other hand, some managers did not understand the proper way to implement user involvement.

Commitment

Commitment did not receive any attention or any effort to create it from any of the managers in the organizations. Although commitment toward some systems was observed, it was not the result of conscious effort but occur incidentally.

Organizational culture

Organizational culture also has many weaknesses in the organizations. It can be identify as absent or very limited shared values, and a management style and perspective that varied between autocratic and democratic. The managers individually exchanged technology and some of them supported the change to better conditions within the organizations but there was no consensus on specific aims and the way to achieve these aims. The absence of IS/IT strategy, or a clear plan to provide guidelines, could have caused the shortcoming in shared values. In addition, there was no dissemination of IS/IT strategy in the organizations that had started to formulate strategy. Recognition of it was limited to some senior managers within the organizations, whereas other managers and staff did not recognize the strategy and did not have any information about its objectives.

Attitude

There is two aspects of attitude, one is the attitude of managers toward theirs staff and the next one is towards the new system. More of the managers in the organizations had a positive attitude towards their staff, some of them had a good relationship with them and healed regular meetings, where the others ignore the end users and only communicated with sector managers. Generally, managers were not very interested in identifying the attitude as a critical factor of IS implementation.

Qualified IT staff

Shortage of qualified IT staff was identified as the most important problem that faced the organizations, although it was more severe in some than others. Moreover, the big gap in frequency between this problem and other problems demonstrates and emphasizes its high importance.

REFERENCES

- [1] F. Land, *The Management of Change: Guidelines for the Successful Implementation of Information Systems*, London: Chapman & Hall, 1992.
- [2] M. Odedra-Straub., *Global information technology and socio-economic development*, Stanford: Nashua, N.H. : Ivy League Pub., 1996.

- [3] C. Avgerou and G. Walsham, *Information Technology in Context: Studies from the Perspective of Developing Countries*, Hampshire: Ashgate Publishing Company Brookfield, 2001.
- [4] H. R., "Information Systems and Developing Countries: Failure, Success and Local Improvisations," *The Information Society*, 2002.
- [5] E. B. Swanson, *Information Systems Implementation: Bridging the Gap Between Design and Utilization.*, Illinois: Richard d Irwin, 1988.
- [6] P. Alvey, "Alvey Programme annual report," IEE Publishing Dept., London, 1988.



IS THERE AN END TO THE DIALECTICS: THE ONGOING CONFLICT BETWEEN THE POST-STRUCTURALIST AND NEO-MARXIST THEORY

Petrushevski Ljubisha

PVPU Euro College, Kumanovo, Macedonia

Abstract: The paper gives further evidence of the well-known and intensively contested incongruence at the level of the theoretical investigations of the economic phenomena. It follows the trajectories of the seemingly conflicting theoretical positions (in broad terms, the one is Marxist's and the other deconstructionist's) trying to find the possible places of the fissure or a close relation of any kind. The analysis is centered on some rarely envisaged aspects of the economy to reveal the substantially different logic that struggles to come to terms with the recent economic crises in the western societies. In the words of Italian academician from Bologna, Franco Berardi "the solution to the economic difficulty of the situation cannot be solved with economic means: the solution is not economic." I also contend that the failure of the economic system points out to the more fundamental ontological rift raging between the post-structuralist and neo-Marxist economic theory in regard to the market and pre-market organization of the economy, the creation of the values, the circulation of the exchange systems and most importantly, of the need for a complete inoperativeness, or for a revival of the dialectical processes in the modern capitalist society. The well-known concepts of *the sovereign* or *the master* as well as the notion of *the gift* will be elaborated alongside the theoretical positions of some of the key figures of both camps.

Keywords: Derrida, Deleuze, Jameson, Zizek, master/slave, dialectics, the gift

1. DIALECTICS AND THE ONTOLOGICAL RIFT

The position of Wisdom is that the Void brings ultimate peace, a state in which all differences are obliterated; the position of dialectical materialism is that there is no peace even in the Void (Zizek, 2015, p. 415)

The only school that has remained faithful to the investigation and criticism of Marxism (along the strictly Marxist one) is the Continental school of philosophy with its main proponents in France. Initially both Marxist and Continental school of thought base their theories on the need to constantly re-evaluate the teachings of Hegel. The neo-Marxist (or as some say post-Marxist) claim that Hegelian concepts (Master/Slave recognition, dialectics) are fundamental for the theory of historical materialism but they at the same time they acknowledge the unreliable and unstable status of the subject/object relational axis that makes the dialectical process extremely difficult, but not impossible. Continental philosophy, on the other hand, is not strictly developing its theory on the basis of the reading of Hegelian philosophy. They combine the wider spectrum of approaches ranging from Hegel, Marx and up to Nietzsche, Freud and Lacan. In its post-structuralist phase (roughly starting from

Bataille and on to Derrida, Deleuze and Baudrillard) they developed clear anti-dialectical approach. They concentrate on the role of the excessive force in the dialectical process that displaces the ontological struggle between the subject and the object, between the worker and the capitalist or between the individual and the society. The displacement produces other results than the ones originally projected so that instead of clear overcoming of the conflicting positions the rife produces new conflicts. Its central claim is that there is certain incommensurability at work between the subject and the object: there is some unresolved ontological gap that prevents the closure of the system of meaning. We will later see how neo-Marxist critics admit the presence of the ontological gap but nevertheless find it useful for the necessary dialectical relation between the subject and the object.

From the methodological point of view, the ontological rift between these two schools has created numerous difficulties in the attempt to overcome the deep tensions between various scientific and sociological disciplines that operate in completely different dimensions where “each pole of the specific dualism posited by this version of dialectic is governed by distinct laws and dynamics, which cannot be made to apply to or govern the opposite term” (Jameson, 2009, p.25).

My thesis follows the trajectories of both theoretical positions (in broad terms, the one is Marxist’s and the other deconstructionist’s) trying to find the possible places of the fissure or a close relation of any kind. Deconstructionism (especially in the case of Baudrillard) is either inclined on the side of the object that is controlling the game or proclaims the situation whereby the positions are radically uncontrollable on any side, while the neo-Marxism prefers the subject as determining force of the historical development of the humanity. If we use Zizek’s opening quote it appears that the Continental school is more philosophically abstract, leading to a rather passive position of Wisdom in relation to the ontological gap in the fabric of the universe, while Marxism advocates the state of unrest and movement at the very core of the Being that allows for a possibility of new dialectic relation to occur even in the age of virtual capitalism. For them, the pre-ontological noise (less than nothing) always creates the condition for the creation of something out of nothing.

2. THE ANTI-DIALECTICS

The central aspect that defines the deconstructive strategy is the distinction between the economy of the need and the economy of the desire in the process of the formation of the subject. Hegel, Marx, Freud and Lacan testify to the fact that the subject formed by the desire (as a necessary precondition for the recognition of a human, apart from the animal) is in unstable position, almost impossible to be simply lived from. The formation of the subject at Hegel necessarily gives rise to the Master/Slave process of recognition where the practical goal (physical survival) creates weak slavish subject that relocates the responsibility for his life to the Master. Hegel influenced Marx, who managed to reveal the almost magical force of the capital to exploit the basic need of the worker for survival and use it for its own growth. In the similar vein, Freud sketches the excessive force of desire over the need: desire is in practice what subject does not functionally need. Being in an excess of the subject’s need for pleasure and well-being, the desire turns into an obsessional repetitive drive at the core of the being, what in *Beyond the Pleasure Principle* Freud termed the death-drive. Lacan concentrates on the irreducibility of the gap opened by the excessive force of the desire that prevents the closure in the constitution of the subject. As Zizek (2015) states,

Lacan’s point of view is...that the big Other is inconsistent, self-contradictory, thwarted, traversed by antagonisms, without any guarantee...in short, the big Other is not the

kind of substantial Master who secretly pulls the strings but a stumbling malfunctioning machinery (p. 21).

The post-structuralist emphasis on the excessive nature of the phenomena creates the dualist confrontation that doesn't seem to create the necessary preconditions for the start of the dialectical process. In other words oppositions do not presuppose each other and don't follow the logical necessity to enter into the dialectical relation. Let's take as an example the notion of the *gift*.

Developed in anthropology by Mauss and later used by Bataille, it is the precondition for the existence of the economy: what is now economically experienced is what was originally given to us (by the nature, the previous generations and so on). However, as soon as the exchange system is introduced, the gift is silently removed in order not to challenge the whole system of exchanges in the society. Marx states, for example, that at the base of the capitalism is the gift (the labor and of the time given to produce certain goods by the worker/producer). It is the mystical power of capitalism to have sequentially managed to remove it from the market in order to produce the surplus for the capitalist, thus making the worker/producer be alienated from the product of his labor. For Marx, the clear role of the market economy in capitalism is to hide the exploitation of the workers and their contribution for the existence of the system – or in other words, their gift.

Jean Baudrillard is the ultimate proponent of the anti-dialectical thought that announces the end of the conflicts in a situation where the subject, in his narcissistic silence, enjoys his internal mastery while accepting the object and the big Other as the ruler of the game.

He claims that *uncertainty principle*, as established by the famous German physicist Werner Heizenberg, rules the global capitalism. The principle proves that it is impossible at the same time to measure the position and the velocity of the object. One has to choose the one but in turn will lose the other. Baudrillard applies its logic to the level of the real: one cannot at the same time define the real and its representation (the model, the sign).

The system of the virtual capitalism, attached to the system of signs, produces determinate values, needs and uses in order to model them for the market consumption. They exchange with each other but never with the real. This is how virtual capitalism cleverly silences and prevents the dialectical contradictions that generate the movement to something beyond them. In other words, by the use of the virtual mechanics that plays with models but never with the real, capitalism reduces the option for its overcoming and eventual replacement.

3. THE ATTEMPT FOR THEORETICAL RECONCILIATION

In his recent book, *Valences of the Dialectic* (2009), Fredric Jameson attempts to somehow reconcile the opposing theoretical positions, that of the idealism and of the materialism. First, as a true Marxist, he persists in the necessity to recognize the materialist view and the dialectical mode of thought as valuable tools in the analyses of the modern world. He maintains that the only knowledge of the world man can have is the historical one since it is created by human endeavor; the nature, not being created by man cannot be objectively apprehended. That way, he limits the totality of the dialectical thought that attempted at uniting under its umbrella all the aspects of the human existence. He is all too aware that Hegel's, and the subsequent Engels's attempt, at producing a comprehensive philosophy of nature definitely failed as a project. Jameson is clever at restricting the scope of the application of the dialectical thought. He even admits that dialectic, at best, is more a local

than a universal principle. As an example, he proposes the case of the Newtonian physics that though termed universal in its inception-is now no more than a “mere local system within an Einsteinian cosmos” (Jameson, 2009, p. 15). In other words, there are certain areas where it is applicable and many other where it is not. He stresses that both dialectical and anti-dialectical thinkers are operating within their local dialectic, or, in physical terms, in their local dimension. He advocates the creation of the mode of thinking that will be applicable in more than one locality. For such a thought to be valuable, he suggests that it should *persist* indifferent localities and retain its coherence when different conceptual substances (economical, aesthetic etc) are used.

Jameson suggests the creation of the multiple (or multidimensional) dialectic. He proposes the end of the one-dimensional dialectic, simply because there is no third term in the triad thesis-antithesis-synthesis to offer the overcoming of the opposition. That applies for Master/Slave dialectic as well since “... the Slave is not the opposite of the Master, but rather, along with him, an equally integral component of the larger system called slavery or domination” (Jameson, 2009, p. 20). He establishes a new dialectical theory “beyond the unity of the negative opposites” (p.22), the one he calls *static dialectics*. The term denotes an inability to propose the overcoming of the opposition due to the fact that there is some gap in the world that prevents the closure of the system, something he calls “incommensurables in the Being itself” (p.15).

So, for Jameson, what dialectical theory has achieved so far was not the proof that the apparent oppositions are in fact united in their identity, but *the detection* of the complete instability and multidimensionality of the world phenomena - the fact particle physics revealed a century ago. In order to deal with the incommensurable oppositions, Jameson advocates the need for a new dialectic that will, first of all, go beyond the opposing principles of the current theory (modernism against postmodernism, structuralism versus post-structuralism, dialectic counter deconstruction and so on) and find new opportunity to apply the dialectic again, being now put on hold in a static phase. The new use of dialectic he proposes shall again use the negation of the negative, which in principle is the basic procedure in dialectical thought.

What kind? Not the old one, the Hegelian unity of the two opposites, but the unity of two positives. In order to do that, both conflicting theories have to tend towards the neutralization of the negatives within their systems and then reinvent the dialectical process. Paradoxically, as Jameson proposes-you neutralize the negatives, by keeping them alive and safeguarding their tension intact.

4. ZIZEK'S INTERVENTION

Slavoj Zizek is considered to be the leading figure in the post-postmodernist and post-Marxist criticism. As the most elaborate proponent of the latest resurgence of the dialectical thinking, he seems to combine all the positions of his predecessors, in addition to some compelling twists of thought.

Zizek finds it essential to speak again of the possibility of replacing capitalism with some advanced form of communism. For that purpose, he returns again to the Master/Slave dialectics. To talk about Masters one needs a vertical structure of a sort. But, relying on the work of Alain Badiou, Zizek asserts that even in the horizontal structure there is still a strong domination of one structure over the other, “When the master disappears, he is replaced by the boss, by his authoritarianism, and sooner or later this always ends in fascism-unfortunately, history has proven this to us” (quoted in Zizek, 2014, p. 183).

The true Master for Zizek is the one who commands, a rebel and a mediator, who (similarly to the psychoanalyst) transfers the subjects into knowledge, “A Master is needed because we cannot accede to our freedom directly—in order to gain this access we have to be pushed from the outside” (Zizek, 2014, p. 188).

The Master will dare us achieve what we believe is impossible being constantly afraid of failure. To express this, Zizek uses the famous quote of Steve Jobs, “A lot of times, people don’t know what they want until you show it to them” (quoted in Zizek, 2014, p. 189). The Master does not rely on people’s feedback in his actions; he just follows the path of his desire, and his “power stems from his fidelity to his desires, from not compromising them” (Zizek, 2014, p. 189-190).

By refashioning the Master/Slave dialectics, Zizek pinpoints some of the shortcomings in the Deleuzian philosophy. The horizontal (rhizomatic) structure leaves little room for the Master figure. But, as Alain Badiou and Zizek contend, the master figure is still essential to the modern man, “The master is the one who helps the individual become subject... One has to renew the position of the master; it is not true that one can do without it, even and especially in the perspective of emancipation” (quoted in Zizek, 2014, p. 183). And, this asks for some renewal of the verticality, at least, in some areas and under careful monitoring.

Zizek strongly refutes Baudrillard’s and to some extent Deleuze’s de-subjectified universe of fractal indeterminacy and contingent flux of multiplicities. He specifically challenges Baudrillard on his famous announcement of the hyperreal, simulated post-human world where the digital code regulates the whole system, making it impossible to trace the real among the media falsification which are further related to other false fabrications but never to the truth.

Zizek opens up the ontological paradox opened up by Hegel and fully developed in the work of Lacan. He quotes Lacan, stating that the necessary condition for the subject’s alienation is also the prerogative for the very existence of the subject. What is paradoxical in Lacan’s statement though is that there has been another parallel process of the alienation of the Other that doubles the lack. Only this lack is not the same as the first one. This one is what Lacan calls the operation of *object a* that is, not simply the lacking object—a nothing where there should have been something—but the object that redoubles the lack and is thus a paradoxical something subtracted from nothing. (Zizek, 2015, p. 33)

This object that operates on the pre-ontological “less than nothing” level equates Hegel’s insistence in his *Science of Logic* that nothing carries the same determinate force as the pure being. This calls for the different ontological proposition – *a reality of the virtual* as Zizek calls it.

The proper way to frame the contemporary ontological question then for is, not in terms of *hyperreality* or virtual reality, but in terms of the underlying *reality of the virtual* where Zizek locates the possibility for the new dialectical relation.

REFERENCES

- Bataille, Georges, *The Accursed Share*, New York: Zone Books, 1988-1991
- Baudrillard, Jean, *Selected Writings*, 2nd edition, ed. by M. Poster, Palo Alto, CA, Stanford University Press, 2001
- Freud, Sigmund, *Beyond the Pleasure Principle*, New York, Bantam Books, 1959
- Hegel, G. W. F., *Phenomenology of Spirit*, Oxford: Oxford University Press, 1977

Science of Logic, Dover: Dover Publications, 2005

Jameson Fredric, *Valences of the Dialectic*, London: Verso, 2009

Mansfield, Nick, *The God Who Deconstructs Himself: Sovereignty and Subjectivity Between Freud, Bataille, and Derrida*, New York, Fordham University Press, 2010

Marx Karl, *Estranged Labor*, 1844

(<https://www.marxists.org/archive/marx/works/1844/manuscripts/labour.htm>)

Marx Karl, *Capital*, 1867

(<https://www.marxists.org/archive/marx/works/download/pdf.htm>)

Stolze Ted, *Contradictions of Hyperreality: Baudrillard, Žižek, and Virtual Dialectics*, International Journal of Zizek Studies, Special Issue, Vol. 10 Issue 1, Cerritos College, Norwalk, CA, 2016

Zizek Slavoj, *Absolute Recoil: Towards A New Foundation Of Dialectical Materialism*, New York: Verso, 2015



FROM QUANTITIES TO QUALITIES – THE EXCESSES AND THE LIMITS OF THE ECONOMY

Petrushevski Ljubisha

PVPU Euro College, Kumanovo, Macedonia

Abstract: Almost a century ago, Georges Bataille—an obscure French philosopher and sociologist—contested that instead of the blind servility to political economy, humanity has to retreat back to the primitive economical thought, in order to solve the basic problems of civilized life, and effectively put an end to wars which are the result of the economical misapprehension. He advocated that economy should not be treated in separation, but in totality. All human activities, including some that have symbolic meaning, should be equally considered in the discourse about economy. Economy in total means, not only the predominance of the discourses of the market economy, or what Bataille terms as “restricted economy”, but also the proper valuation of the impact of the psychic, spiritual, artistic, religious and erotic economies. Bataille’s theory about the totality of the economy at the level of energy quantification was focused on something he coined “general economy”, which was supposed to reveal the anthropological truth of man’s relation to the economy of the universe. To him, the solar economy based on the energy discharges is opposed to the earthly economy based on the captivation and preservation of energy. This posits serious non-compatibility between our conceptual understanding of the way our society and economy function, and the truth of the universe of which we are integral part. As a result the whole function of modern societies seems to depend on the translation of the quantities of energy into qualities of the concepts and on the expulsion of the discourses of loss, since “thought itself is the suspension of expenditure.” Regardless, the energy is here to stay.

Keywords: Bataille, Freud, the restricted and the general economy, transgression

1. INTRODUCTION

What exactly does Bataille mean by economy? The conventional Western understanding of economics, according to Bataille, is mired in the limited thinking of specific functions and ends. We are trapped in a world of work, with defined and knowable horizons that blind us to the true nature of our location in the broad cosmic context. Our exploitation of specific resources (our uses of energy) is always constrained within the limits of practical goals (Mansfield, 2011p.19).

The way global capitalism shifts its direction and produces regular crises in the last 50 years asks for the expansion of the theoretical positions beyond the limits of the classical political economy (that has the production and exchange as the main object of study). Most of the theories diagnosing the global crises propose measures that include the improved regulation of the markets and of the financial sector. The question is: what kind of legal

control can Governments impose to regulate the delirious pace of the multinational capital, bent on endless accumulation? Only handful of theoreticians (none of them strictly economists) dare question the ethical primacy of accumulation in the profit based global economy. In their view, the race for an unlimited accumulation produces the world-wide economic crises: in order to prevent further crises, a thorough re-evaluation of the fundamental concepts of the accumulative world economy should be performed. For some of them, a radical psychological and philosophical investigation should re-examine the weaknesses of our economical (and other) thought.

Georges Bataille (1897 - 1962) was a Parisian thinker-heir to such important artistic figures such as Baudelaire, Apollinaire, and Breton. His work in the area of philosophy, sociology, aesthetics and economy, have arguably become more important than of any other figure from the time of High Modernism in France and in Europe. Bataille exposed his basic concepts about the new economic model of "general economy" in his classic work-from 1957, *The Accursed Share*. He argued that theoreticians of classical economics are offering a limited understanding of the nature of economic movements. Bataille conceived of economy on a meta-level of the movement of energy. That model does not use as a basis the governing of the earth resources only, but strives towards a general model that encompasses the flow of energy in the whole of the universe. He contends:

... the economy is never considered *in general*... It does not take into consideration a play of energy that no particular end limits: the play of *living matter in general*, involved in the movement of light of which it is the result. On the surface of the globe, for *living matter in general*, energy is always in excess; the question is always posed in terms of extravagance. The choice is limited to how the wealth is to be squandered.... (Bataille, 1988-1991, p. 22-23)

While classical economic thought emphasized the need for an efficient utilization of resources Bataille is in favor of the expenditure of the excess energy without any practical use. "The truth of the universe is *expenditure*," proclaims Bataille - the problem lies in the fact that it is beyond the reach of our sensible understanding. I find this proposition essential for it reveals the full significance of my study of Bataille. The expenditure affects the way we use the cosmic energy, communicate the universe and give meaning to our lives. At its limits, the concept of useless expenditure might give answers to three fundamental fields of investigation. First, it may effectively resolve the economic balancing of the earthly resources; second, it will act as a missing link in man's relation to the truth of his being; and finally, it may deal with the problematic issue of our existence as thinking beings in the unthinking universe. In other words Bataille treats the issue of expenditure from the anthropological, philosophical and epistemological perspective in his attempt to disclose the riddle of the universe that the mind of a modern man is still unaware of.

2. ECONOMY AND ENERGY AS PRIME PRINCIPLES IN PHILOSOPHY AND PSYCHOANALYSES

In order to illustrate the crucial role of the expenditure as the balancing factor in the functioning both of the universe and the world economy Bataille questioned the fundamental concepts of economy and energy as defined by the philosophy and psychoanalyses. The relation energy-economy unlocks the structure of the unconscious, of the being and of the

formation of subjectivity respectively. In broader terms, the binding and the unbinding of energies somehow reveals and articulates the ontological constitution of the universe.

In the Greek philosophy energy and economy were regarded as the basic or as the grounding principles of the being. What is the relation between the energy and the economy as prime principles? The proposition is that wherever there is an exchange of energy we may discuss about an economy. In Aristotle, the term *economia* simply means to take care of the household in the way that all the economic investment should eventually return back to the same household. This obligates a circular closed system that requires minimum level of outside disturbances. His terms *energia* on the other hand, denotes something that has the capacity to become: some force that has the potential and *telos*, a striving towards some end. If we look at those two terms in Bataille's use we may conclude that *economia* is what is left when the forces of *energia* are allocated to some practical ends. Thus economy is restricted form of the total flow of the energy of the universe.

Similarly, when describing the tensions and movements of the psyche in relation to the production and restriction of the pleasure principle, Freud uses the "economic point of view" and finds it crucial for the psychoanalytic investigation to "estimate this 'economic factor' in addition to the 'topographical' and 'dynamic ones'" (Freud, 1959, p.1). His discovery of the psychic instincts led him to devise a theory of the relation of the energy (in physical terms) and its metaphorical transformation into the energy tropes (charge and discharge, or *cathexis* and *anti-cathexis*) and economy tropes (placement, investment, accumulation, exchange and expenditure). The energy shift in the organism according to Freud, creates the ego defensive system that desperately works to balance the tensions of the internal and the outside psychic energies. The ego, being weak and threatened, resorts to the process of constant stabilization of the psychic content: it "endeavours to keep the quantity of excitation present in it as low as possible or at least to keep it constant." (Freud, 1959, p.1) The pleasure principle for Freud dictates that the mental apparatus will find "anything that is calculated to increase that quantity is bound to be felt as adverse to the functioning of the apparatus, that is as unpleasurable" (Freud, 1959 p.3). He contends that, "*Protection against stimuli* is an almost more important function for the living organism than *reception of stimuli*" (1959, p.21).

The disciplining of the psyche introduces the reality principle that works on the "postponement of satisfaction, the abandonment of a number of possibilities of gaining satisfaction and the temporary toleration of unpleasure" (Freud, 1959, p.4). The homogenization of the energy of the ego is devised to translate the unlimited quantity of psychic energy into a quality by the use of the linguistic structure: the thinking conscious subject becomes the locus of never-ending process of the domestication of the outside. In addition, the concept of *work* arises in relation to energy transformation from the indeterminate system of flow (what Bataille would call general economy) to that of the rational system of use (restricted economy). Work utilizes the energy while play disperses it.

However, despite the constant regulation imposed by the reality principle, Freud reveals the utter instability in the relation between pleasure and the unpleasure. This way, Freud has tackled the truth of the economics of energy of the subject. Mansfield (2011) writes, "In Freud, the economic model provides the psychoanalytic project with its final and complete 'metapsychological' understanding of the human subject. Made up of multiple flows of energy that can transform into one another unstoppably and even violently, the economic subject is a site of chaos of dissociated impulses" (p. 4-5).

In his monumental book from 1965, *Freud and Philosophy*, Paul Ricoeur contends that the quantified energy resists articulation or any other qualitative discharge. What is more, the psychic energies of pleasure and displeasure seem to easily displace into each other so

they could not be treated as something stable or essential; the fact which makes the relation of quality uncertain, to say the least. The bottom line is that the energy of the libido, or of the life force as Bergson calls it, “is always seeking to transcend itself and always remains inadequate to the work it would fain produce” (quoted in Shope, 1972, p. 2). Bataille accepts Freud’s view that the energy always fails to reach the original goal or to be contained within certain structure of utilitarianism. Since it has no object, the psychic energy has no *telos* in the way Aristotle’s conceives of the movement of the physical energy. The force of the death drive in Freud or of the similar force of the useless expenditure in Bataille directs the destructive energy beyond the narrow confinement of the useful work. The psychic quantity of desire moves towards the other quantity of desire and is never qualitatively stabilized within the confines of a human need or wish. Both Freud and Bataille have learned this truth from Hegel who claimed that the goal of human desire is the desire of other humans and that the whole development of the self-consciousness and of the human society is based on the *need for recognition by the others*.

3. BATAILLE’S DOUBLE ECONOMICS: RESTRICTED AND GENERAL ECONOMY

In the field of economy the concept of expenditure clearly destabilizes the discourse of the modern market economy, which being devised by the neo-liberal thought, is based on the logic of equivalence. The market works follows this logic: in order for the goods to be exchanged they have to follow some basic principle, whereby they will meet the abstract level of equality. As it goes, there is nothing that cannot be exchanged. Nothing outside of this logic is credible for the rational modern man: whatever is productive and can be exchanged is valid, and is put on the market. Non-productive forces and activities that carry tendencies beyond themselves are negated and expelled from the system.

What we are left with is a one-dimensional outlook on the economy which counts only on the issues related to productivity. The result is that as a leftover of the expansion the enormous amount of extra energy finds no proper outlet, regardless of the overall anesthetization of modern life. The regular earthly economy of accumulation thus operates under the shadow of its double, the cosmic economy of dissipation and squandering of energy. For Bataille, both economies should be intertwined and not separated, as the role of the expenditure in the “general economy” is crucial in opening the “restricted economy” of the capitalist production to the flows of unlimited energy that is fundamentally missing in the times of crises. Bataille’s economic proposition is simple: destroy in order to create.

4. CONSCIOUSNESS AND TRANSGRESSION

At the level of consciousness Bataille concludes that the expenditure, as the truth of the universe, is in permanent conflict with our thought. In contrast to our thought, the sun-as a visible truth of the cosmos-is always at loss, expending with no re-compensation. The loss is communicated all over the universe, except, maybe on the Earth, where its logic is refused. Humans claim to know the truth of the universe, organizing their lives around the rationality that *cannot think* of expenditure. Thinking is organized around accumulation of facts. But collecting data does not lead to knowledge. The thinking process requires *accumulation* and not *expenditure* in order to function properly, therefore, the function of the society depends on

the expulsion of discourses of loss since “thought itself is the suspension of expenditure” (Hollier and Allerd, 1990, p. 67).

And this is where scientific thinking prevents us from knowing the universe. Hollier and Allerd (1990) posit, “Denying the cost of information (that one has to expend oneself in order to know), science is the intellectual, ideological version of the earthly refusal of expenditure” (p. 137). In other words, science, as the harbinger of the rational thought, refuses to enter the cosmic rites of expenditure. What it always lacks is the larger picture, the background of the problem or “general milieu” as Bennington (1995) calls it. Without the milieu one cannot analyze the particular domain of study.

In order to continue its expansion every organism, a structure or a system should be opened for influx of new energy. Any closed system however is never completely closed but is “contaminated” with the heterogeneous elements that strive towards an excess, a rupture, a breach of the system. It is obvious that the only way for clarity of cognition (knowledge, rationality) is the contamination of the cognition. The openness towards the energy necessitates the loss of structure of the closed rationality. In other words, the way towards the larger self is the loss of self. In Bataille’s thought the contaminated part—the accursed share, as the excess of energy, is of more importance than the integral, contained part of the accumulated energy.

5. CONCLUSION

We are not alienated from the broader cosmic ends that we are serving, we are merely unaware of them or, to put it more strongly, afraid to acknowledge them (Mansfield, 2011, p.19).

Bataille was well aware that to overturn the existing value system of the capitalist society will mean the complete change of modern value system, kind of a “Copernican transformation” that will produce changes in the way we ethically conceive of the wealth and the profit. The problem of the energy conversation/dissipation and the redistribution of wealth require ethical reevaluation of the economic and political discourses of the market economy, and the serious revitalization of the pre-capitalist and pre-scientific mode of thinking within the modern economic order.

The capitalist model in general does not support activities that produce substantial and unproductive loss of energy and of resources. Capitalism operates in a closed system: Bataille contends that human life can start only when this limited system is overrun and men “find themselves constantly engaged in process of expenditure” (Bataille, 1988-1991, p.128).

Psychoanalysis has proven that in order to prevent the outside stimuli for entering the ego the complete psychic energy is invested in the creation of the restricted economy of the psyche. In order to conserve the system the reality principle expels all the excesses of excitations produced by heterogeneous force of the instincts. However, the expelled waste can never be totally removed. Some leftovers continue to trouble the system until it becomes bloated with it. There are numerous examples in modern economic and social life of this process: the enormous pile of waste in the industrial and digital production (the deposition of the industrial and other waste is nowadays a world-wide problem), the upsurge of the violence in the society (the almost regular outburst of massive killing in American schools comes to mind), the excess of the unruliness and the corruption within the Law and so on.

It is up to the developed countries to understand and be aware of the necessity to work towards the ethical distribution of the energy and of the wealth on the planet. As we have seen from the example of the recent excesses of the fake news in the global networks, the disposal

of the waste is not one-directional as the recycled re-disposal of the informational trash by the Macedonian teenagers have resulted in the destabilization of the democratic system of the most powerful country in the world. Nobody in the future will be immune to that process. Humanity has to raise its awareness of the energy balance and achieve qualitative distinction from the mechanical organization of the energies that characterize the animal world and the non-human universe or as Walter Bonime asserts, “Man’s highly developed cerebral cortex results...in a social existence which is qualitatively different from the *group* existence of all other animal orders” (Bonime, 2006, p.374). Capitalism favors endless creation of surplus but after so much increase the surplus prevents the growth. The politics of loss and expenditure should create the new economic foundation for the balanced growth of the world economy in the spirit of the sustained development.

REFERENCES

- Bataille, Georges, *The Accursed Share*, New York: Zone Books, 1988-1991
- Bennington Geoffrey, *Legislations: the Politics of Deconstruction*, Verso, 1994
- Bonime, Walter, *The Psychic Energy of Freud and Jung*, New York, The American Journal of Psychiatry, Volume 112, Issue 5, 2006
- Freud, Sigmund, *Beyond the Pleasure Principle*, New York, Bantam Books, 1959
- Hollier Dennis, Allred Hillary, *The Dualist Materialism of Georges Bataille*, Yale French Studies, No. 78, On Bataille, 1990
- Mansfield, Nick, *The God Who Deconstructs Himself: Sovereignty and Subjectivity Between Freud, Bataille, and Derrida*, New York, Fordham University Press, 2011
- Ricoeur Paul, *Freud and Philosophy*, [Yale University Press](#), 1965
- Shope, Robert K. *Physical and Psychic Energy*, Columbia University New York, [Philosophy of Science](#) 38 (1):1-12 (1971)



THE GENERATION DIFFERENCES IN EVERYDAY TRANSPORT

Regina Zsuzsánna Reicher, Anita Kolnhofer-Derecskei

Óbuda University, Keleti Faculty of Business and Management, Hungary

Abstract: Travelling takes up a large part of our day as part of our daily routine. Going shopping, commuting to work, visiting friends and family - during an ordinary day, people spend a considerable amount of their time to cover many kilometers using different means of transportation.

In this article we are discussing the relation between generation a person belongs to and the method of travel they favor, in the first part of our study seconder data is used then primer responses to a survey are analyzed. It seems apparent that people of a younger generation tend to favor public transportation, although whether it really is a generational difference or it just comes from the age of the people undertaking the survey remains to be seen.

Keywords: generation, Y generation, travel preferences, survey

1. GENERATIONS – EACH ONE IS A DIFFERENT WORLD?

The foundation for generation research was provided by Williams Strauss and Neil Howe American historians with their work titled *Generations* published in 1991. They discuss in their work that there is a pattern in the world vision, set of values and attitude of the consecutive human generations and this pattern is cyclical [4].

Table 1. Generations from the 20th century till today [12] pp.: 8

Millennial era (turn of the millennia)				
Silent generation	Artist (adapting)	1925-1942	1925-1942	Crisis: economic crisis, World War II
Baby boom generation	Prophet (idealist)	1943-1960	1943-1960	Summit: USA superpower
"13 th generation" Generation X	Nomadic, reactive	1961-1981	1961-1981	Awakening: consciousness revolution
Millennial generation	Hero (citizen)	1982-1995	1982-1995	War of problem solving cultures, postmodern
Native (homeland) generation	Artist (adapting)	1996-today	1996-today	Crisis: global financial crisis, climate change, war on terrorism

Tapscott (2009) analyses basically five generations. The first generation discussed in detail is the baby boom generation, born between 1946 and 1964. The information revolution

for them was the radio and the television. Generation X, who – according to Tascott - were born between 1965 and 1976, arrived to a specific social environment. This generation is extremely aggressive communicator and very strongly media-oriented. They are followed by the generation Y or Net-generation. Their number is at least as high as the baby boom generation. Their members study or work very efficiently. They almost immediately process the information they receive and share it with their friends. The next generation is the generation Z, who are still on the labour market and currently enhance their skills in education. For them all the digital devices are the most natural and they almost cannot live without them. [14] Generation alpha is coming behind them; they, however, has just started primary school; their personality and character is being formed, thus they cannot be described from this aspect. Bencsik-Eisingerné says that the members of generation Y and Z – who are very close - are looking at each other in “amazement”. The members of generation Y are unable to understand why the youth of generation Z prefer to interact virtually and superficially, even if they have a chance to have direct interpersonal communication. [1]

Valuch and his co-author examined the Hungarian historical conditions in terms of sociology and politics and said that the Hungarian members of generation Y were born after 1982 and they were hugely affected by the explosive growth of information technology, globalization and drastic transformation of education system. [13] The Hungarian characteristics of generations are discussed in detail in one of our former articles [7] where it is underlined that the generational differences are often identified with age-level characteristics. These two phenomena, however, should be separated and it should also be considered that the borders between generations are not so sharp; there are so-called cuspers or intermediate generations, too.

The behaviour of the members of a generation may typically differ from each other. They may have different opinions about job opportunities, working hours, family, possible recreation activities, and immobility-mobility. They have different approaches to the Internet or the digital world. The current young employees handle the different technical devices with extraordinary naturalness; these are part of their everyday life. The Internet and electronic information sources have become primary aspects even in choosing a higher education institution. The research has proved, however, that in spite of the wide-range implementation and access to electronic communication in liaising among students, the need for personal contacts also exists [8]

Of course, it is a question, whether they use these devices properly or not. It is indisputable, however, that by now all their activities from their private life through learning to finding jobs involve different applications, utilization of mobile devices and possibilities offered by the Internet.

As might be expected, this affects, for example, their attitudes to travelling, too. They try to utilize the possibilities offered by the digital background maximally either in collecting information, purchasing tickets or even within the means of transport.

Several international research programs deal with the generation gaps observed in the use of the means of transport. There were a few reports about it in the United States that the use of cars is gradually declining among the members of generation X and Y, but public transport or walking is still preferred mostly by the younger generation. [17] According to the infographic of Wallace (2015), 69% of generation Y choose public transport at least once a week and 21% at least once a month because (1) they pay as they use (there are no additional costs); (2) it is environmentally friendly; (3) active online presence can be maintained while using public transport; and (4) it builds community. It was interesting to find out the loss of which technological solution could have the most negative impact on their life: while

generation Y put mobile and smart phones on the first place, generation X would miss cars the most. Comfort features quickly lead to developing habits, thus further strengthening the preference of public transport because it does not distract attention during use and, of course, the responsibility and risk of accident is also lower as opposed to the frequent use of mobile phones while driving a car.

Grimsrud és El-Geneidy (2014) examined the travelling habits in Montreal in the form of a longitudinal study and found that this trend will probably continue in the future, in other words the future generations will probably prefer public transport, too. [16]

The car driving habits of generation X have also changed (The Trapaze Team, 2015) in the United Kingdom (environmentally conscious car selection, sensible use) but – in contrary to the trend in the USA – the number of car users increased even in case of generation Y. The reason for this is that more and more people are moving out from the downtown areas of big cities to the suburban areas. But even with this there are still more arguments in favour of public transport (traffic jams, rush hour can be avoided, lower total costs, no parking issues). Typically the members of generation Y appreciate their mobile phones more than their cars in the UK, too. They regularly use travel assistance solutions (applications) and immediately share their experiences or „blog” them in detail. They like and are happy to use the means of public transport.

The travelling habits within the European Union have been analysed by Eurostat (2015) and on the basis of this currently in Hungary the members of generation X and Y are commuting (to work) the most. Which sector employs the surveyed commuters? In case of Hungary, only 2% of them work in agriculture, almost 27% in industry and most of them in the service sector. It is interesting that among the neighbouring countries there is a shift towards generation Y only in Romania, Slovenia and Slovakia. As regards the genders, the number of male commuters everywhere is higher compared to females. Of course, the country specific regulations and costs – for example the high tax content of Hungarian fuel prices - should also be considered.

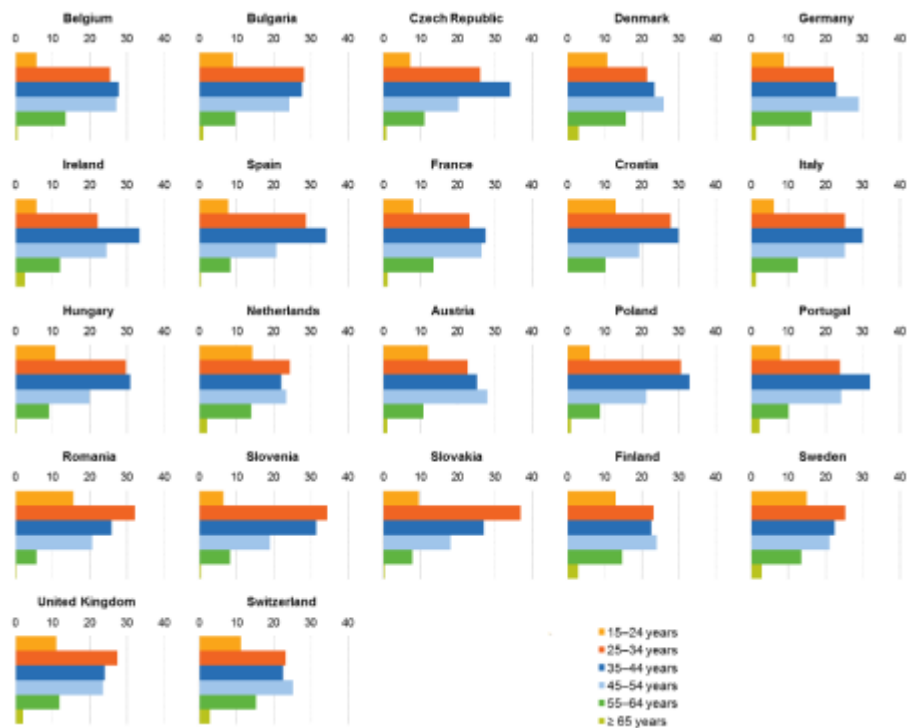


Diagram 1. Age distribution of commuters within EU countries [2]

The Hungarian Statistical Office [10] surveyed the travel habits by interviewing almost 15,000 households. 46% of respondents used cars for their everyday travel as main mode of transport; the average travel distance was 22 km and the average travel time was 22 minutes. The monthly cost spent on public transport, was HUF 3505 per person; the price of one bus ticket in the capital was HUF 320. According to the estimations, the population spent HUF 732 billion on everyday transport. It has been concluded on the basis of the survey that the mode of transport preferred in everyday travel was determined mostly by the size of the settlement; and the people living in the capital used public transport the most actively. The most frequent reason was commuting to work (40%). 27% of respondents mentioned public transport, 38% used cars and 17% bicycles. 1,5 people travelled in one car on average. 41% chose car to commute to work, while 27% used it because of kindergarten runs; 78% of drivers were male. It took 22 minutes on average to reach the destination; in case of shorter distances the ratio of public transportation was higher. As regards travel activity, the spring months and Mondays were stronger, but 81% of the total 3,2 billion journeys fell on weekdays. The activity within days (peak hours) is shown on Figure 2.

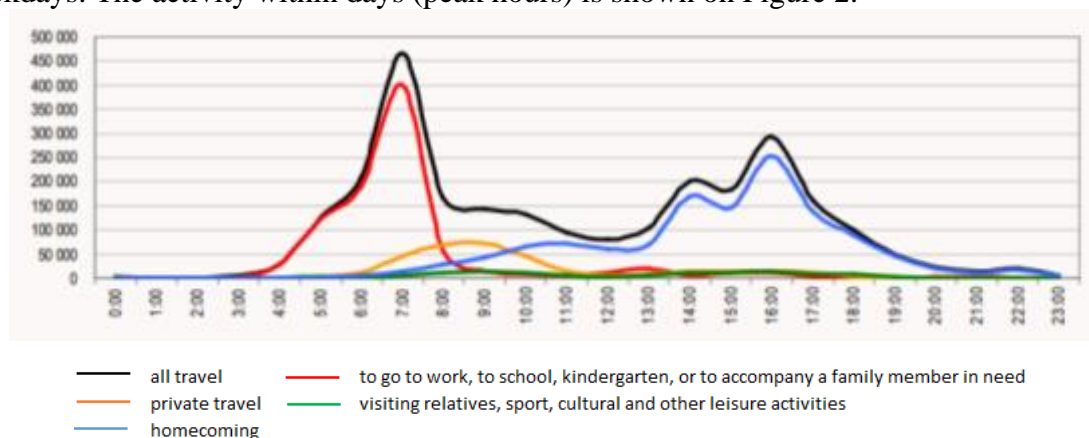


Diagram 2. Number of journeys on weekdays on weekdays according to the date of departure in 2012 Source: Hungarian Statistical Office [9]

During the weekends it was shifting in time and fell on later. The expenditures were interesting because 27% of the surveyed households in the countryside, while 24% in the capital did not spend anything on any types of transport, in other words they travelled free of charge. Although the highest spending – amounting to HUF 519 billion - was attached to car use in the surveyed period and (as it included all the costs) it gave the average fee of HUF 25/passenger/km. The public transport was the most expensive in Budapest.

The typical Hungarian features were examined for example by the joint research of GKI (Economic Research Co) and Jófogás (e-commerce website). It has concluded that the generations save money differently, their motivation background is different and they travel in different ways. Generation Y relies more on public transport. Although almost 80% of the respondents think that it would be important to reduce the use of cars in terms of environmental protection, still 50% of them regularly drive their cars. (Diagram 3)

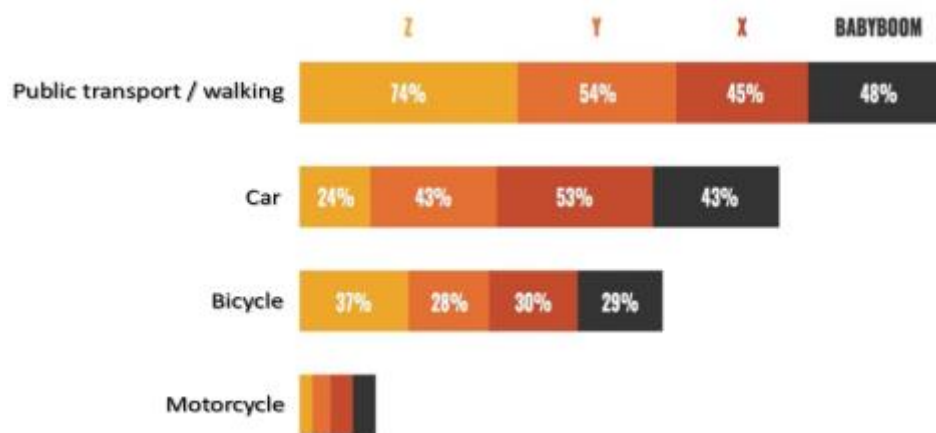


Diagram 3. Ratio of passengers travelling daily and regularly in different ways: divided by generations [5]

2. RESEARCH

The current study discusses the results of the first stage of a comprehensive research. The objective of the mini research was to draw a picture of the typical features of travelling habits in case of generation Y and Z as well as the differences from generation X. It is also examined whether the element of environmental consciousness appears in this field. Our research consists of several stages. First in the frames of qualitative examination, focus group discussions were organized in three groups, each of 5-7 people. The members of the groups were exclusively from generation Y and Z. On the basis of discussions with the groups, a preliminary questionnaire survey was made and shared among our students with the request that they distribute the questionnaire with the snowball method. Part of the outcomes is published in the current article. The research will go on with a 10-day diary-based examination with 10 people in each group where further differences will be explored. Finally, a large-sample survey is planned to close the work.

2.1 RESULTS

58% of our respondents were female, which is a slight over-representation of women compared to the national average [6]. 58% of those answering the questionnaire represented generation Y, 19% were from generation Z, while 23% from generation X. (Diagram 2)

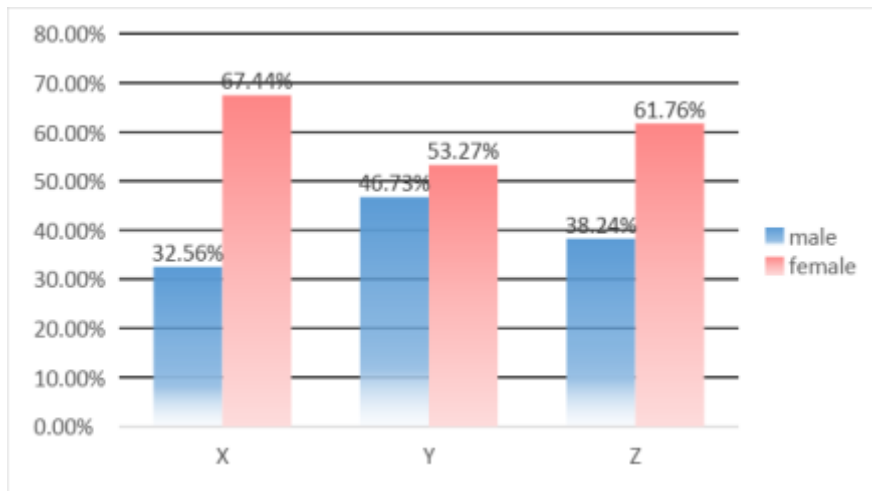


Diagram 4. Sample characteristics – ratio of generations according to gender Source: own research (n=184)

76% of our respondents travel for short distance on a daily basis. It has been examined what means of transport the generations would choose for a shorter distance. Members of generation Y and Z would significantly prefer public transport ($p=0,0051$) to cars and they would choose this form of travelling the most frequently in case of short distance journeys, too. (Diagram 3) All the generations, however, prefer car to bicycle. The MOLBubi service (public bicycle-sharing scheme) has never been used by 87% of respondents. The car use possibility set up along the lines of Bubi service has had similarly bad results. It is true, though, that this service has not been implemented widely in Hungary yet, and this result can be due to this.

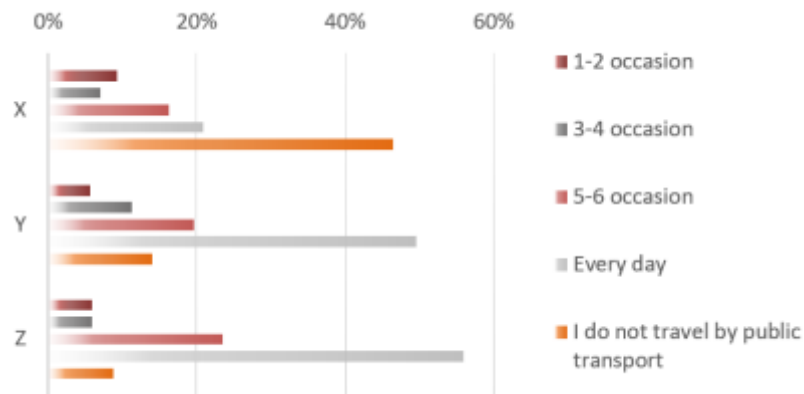


Diagram 5. How many times per week do you travel by public transport? Source: own research (n=184)

28% of respondents travel on a long distance on a monthly basis, while almost 20% of them have long journeys every day or once a week. Therefore almost 70% of them regularly travel long distance. There is no significant difference between the choices of generations. Even with this, however, only 17% of respondents say that they choose train for their travels the most frequently.

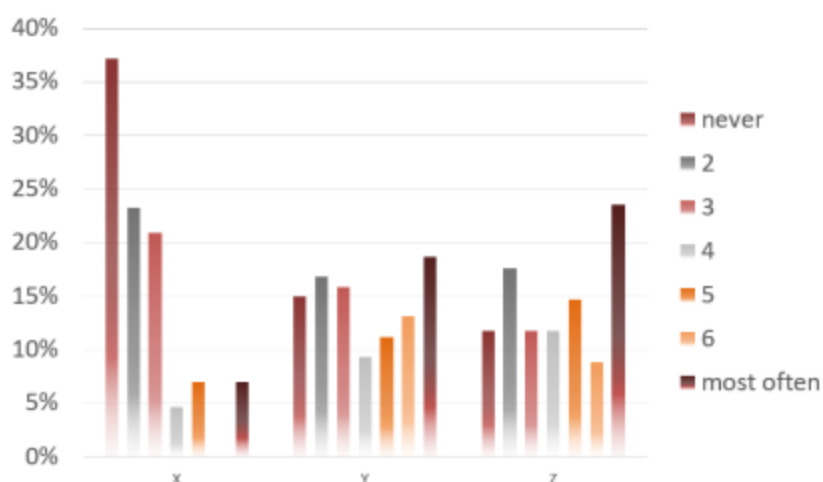


Diagram 6. Please rank, how often you use: [train] Source: own research (n=184)

3. SUMMARY



Professional literature has been dealing with generation gaps for years, analysing several areas. Generations Y and Z have an extremely strong impact on labour market and the development of services. It has been proved that their behaviour and way of thinking is totally different in many fields of life from the preceding generation X or baby boom generation. In the United States, almost 40% of the population belong to them. On the basis of KSH statistics, the number of people belonging to generation Y is currently about 2,200,000 people in Hungary, that is 22% of the total population; while the members of generation Z aged over 15 give about 9% [6]. It means that the younger generation makes up the third of the population thus representing a considerable consuming power. That's why it is important to learn their habits and expectations in the field of services, including their travel habits, too. It can be concluded that they use and prefer public transport from the alternatives, if it is possible. According to the references, they are much more mobile than their predecessors and it is true for the short- and long-distance journeys, as well as the changes of their residences or jobs. [11] They use and choose the different means of public transport more frequently than the members of generation X. It is important for them that the transport is fast and flexible; it is even more important than the price, therefore they probably would be willing to pay higher prices for higher quality of service. Since time is such an important factor, it should be given similarly high priority in the development concepts of transport. According to the references, the generation Y is less sensible to environmental issues than the members of generation X or the baby boomers, but still 50% of them pay attention to energy saving, recycling or the emission of polluting materials by means of transport. [18] The members of the Hungarian generation Y seem to be even less eco-friendly on the basis of their choices, although it may be due to several reasons, for example financial reasons. The car use is also viewed differently depending on age: while a young person regards it as an unnecessary luxury (therefore they rather walk or ride a bicycle); it is an everyday necessity for a middle-aged person with family. In summary, it can be concluded that there are significant differences in the selection of means of transport and in the long run the members of younger generation should further be encouraged to choose the practical and convenient means of public transport. In order to make progress in this field, however, the service provider should also make substantial

investments, changes and adopt a new mind-set. Wallace (2015) surveyed these demands and declared that the members of American generation Y expect the following developments in the public transport in the next ten years: real-time travel information, even more reliable transport system, more passenger-friendly and intuitive experiences, and Wi-Fi, 3G or 4G wherever they travel. [19] The Trapeze Team (2015) added online ticket to this list. [15]

The aging population, as a non-negligible demographic feature, has also strong impact on the demand for public transport. Procrastination is very typical for the younger generation – as it is also obvious from obtaining their driving licence at an older age – and some specific national characteristics should also be considered. Although for totally different reasons (e.g. health or income) but the older generation also prefers public transport. In the USA this happens above age 60, when people decide to give up driving mostly due to their deteriorating eyesight [3].

The travelling habits, of course, can be explained not only with generational differences but also with age-related issues (age, income, family status, health condition, etc.), economic periodicity or gender (e.g. women are less likely to prefer driving). Urbanisation and the increasing number of urban population, as well as the technological innovations (e.g. changed shopping habits, online shopping) also affect the choices [3]. Out of all these, in case of age-related characteristics, it can be observed that the youth typically travel more, especially when they have stable financial background and little constraint in terms of their family situation.

THANKS

The research is carried out in the frames of  BrainBay Centrum. The study was made with the support of New National Excellence Program No ÚNKP-17-4 of the  Ministry of Human Resources.

REFERENCES

1. Bencsik A., Eisingerné Balassa B. (2013) Intergenerational management and the cultural background of knowledge sharing: 'children's rooms' of mosaic families versus workplace coexistence *Humánpolitikai Szemle* 20:(1-2) pp. 10-25. (in Hungarian)
2. Eurostat (2015): Statistics on commuting patterns at regional level. http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_commuting_patterns_at_regional_level (Downloaded: 26.03.2018.)
3. FHWA Office of Policy and Governmental Affairs (2011): The Next Generation of Travel: Research, Analysis and Scenario Development. Literature Scan Report Summary. https://www.fhwa.dot.gov/policy/otps/nextgen_https_scan.cfm (Downloaded: 26.03.2018.)
4. Howe N., Strauss W. (1991). *Generations The History of America's Future, 1584 to 2069*, William Morrow and Company, NYC, USA
5. <http://www.gkidigital.hu/2017/09/25/sporolas-miatt-elunk-kornyezettudatosabban/> (Downloaded 26.03.2018)

6. <https://www.ksh.hu/>
7. Kolnhofer-Derecskei, A. – Reicher, R. Zs. – Szeghegyi, Á. (2017): The X and Y Generations' Characteristics Comparison. *Acta Polytechnica Hungarica*. Vol. 14, No. 8, pp.: 107-125.
8. Kozma, T. (2005): Inquiry of motivation in institution selection and its methodological problems. *Efficiency and Responsibility in Education*, Kostelec nad Cernými lesy, Czech Republic, pp. 141-148. (ISBN 80-213-1349-8)
9. KSH (2013): The public and private transport characteristics, 2012. *Statisztikai tükör*. VII/47. (in Hungarian)
10. KSH (2016): The priority target of the Commuting. Study Workshop (in Hungarian)
11. Ng & Parry (2016) *Multigenerational research in human resource management*, Emerald Group Publishing Limited, USA
12. Pais E. R. (2013). Basic facts about the science communication of the Z generation, *PTE Pécs* (in Hungarian)
13. Róbert P. Valuch T. (2013). Generations in History and Society. Generational political attitudes and participatory patterns in a historical sociology approach. *Politikatudományi Szemle* vol. 22 No. 4. pp. 116–139. (in Hungarian)
14. Tapscott D. (2009): *Grown Up Digital: How the Net Generation is Changing Your World*, McGrawHill, New York
15. The Trapeze Team (2015): X marks the spot: understanding your passengers from Generation X. and Why Gen Y? Understanding Millennial passengers. <http://www.trapezegrp.co.uk/article/>
16. Grimsrud, Michael - El-Geneidy, Ahmed (2014) :Transit to eternal youth: lifecycle and generational trends in Greater Montreal public transport mode share. *Transportation*. January 2014, Volume 41, Issue 1, pp 1–19|
17. Tomer, Adie – Kane, Joseph (2014): Census Data Shows How Much Less Millennials and Gen-Xers Commute by Car. *Streetsblog USA*. <https://usa.streetsblog.org/2014/10/08/census-data-shows-how-much-less-millennials-and-gen-xers-commute-by-car/> (Downloaded 29.04.2018)
18. Twenge M., Freeman E. C., Campbell W. K (2012) Generational Differences in Young Adults' Life Goals, Concern for Others, and Civic Orientation, 1966 –2009 *Journal of Personality and Social Psychology*, 2012, Vol. 102, No. 5, pp.: 1045–1062
19. Wallace, David (2015): Public Transit & Mobile WiFi: Millennials Lead the Way. *Infographic Journal*, 2015/5. <http://infographicjournal.com/public-transit-mobile-wifi-millennials-lead-the-way/> (Downloaded 29.04.2018)



Vladan Mihajlović, Milan Mihajlović

Serbian Weightlifting Federation, Belgrade, Serbia

Abstract: Observing the structure of sport, at least three different types of sport organizations structure can be identify. The first one, governing bodies, administrate and regulate sport, taking care about sport development at all levels, taking into account both the rules of the game and the competition itself. The second one, sport event organizations, focusing on sport organizations who produce a specific competition system. The third one, sport for all, includes those organizations producing mostly recreational sport program.

In essence, the sport is organized as follows. Athletes are members of the club. Clubs are organized in the national sports federation. Athletes партиципате in a club or national selection. Each sports federation at the national level individually join to the National Olympic Committee, as well to the international sports federation for specific sports branch (at the continental and world level). The National Olympic Committee join to International Olympic Committee.

Keywords: sport, organizational structure, sport governing bodies, sport event organizations, sport for all

1. UVOD

Savremeni sport zauzima značajno mesto u društvu. Postoje sredine gde je prisutno izraženo idealizovanje vrednosti sporta i njegove funkcije, a manje je onih gde se sport smatra nečim sekundarnim. Sportom dominira takmičarska funkcija, ali se brzo uvidelo da postoji saradnja dve strane – takmičarske i komercijalne, a danas čak tri strane u sportu – takmičarske, komercijalne i šire društvene zajednice. Sport se ranije posmatrao najčešće kroz njegovo unutrašnje okruženje, sportiste, trenere, sportske sudije, sportske menadžere. Međutim, već duže vreme, potpuno ravnopravno, uz unutrašnje okruženje sporta, stoji i širi svoj uticaj spoljašnje okruženje sporta, navijači, mediji, sponzori. Ovo pokazuje da je sport deo društva, da pripada globalnom poretku i da najverovatnije, što je društvo bolje – sport je bolji, što društvo ima više problema – sport je „lošiji“. Međutim, praksa je pokazala da baš tamo, u onom društvenom okruženju koje izgleda „idealno“, sportisti ponekada ne uspevaju da postignu rezultate adekvatne ulaganjima, a da tamo gde ima „problema“, sportisti postaju najbolji na svetu, suprotno očekivanjima i teorijama. Upravo ovaj detalj daje nadu svim akterima u sportu i upućuje ih, da se utakmica mora igrati do poslednjeg trenutka i da nema unapred određenog pobednika.

Iako ga vezuju za ekonomiju [5], sport je pre svega društvena delatnost, a ne bilo koja privredna delatnost ili biznis. Ima jedinstvenu društvenu, obrazovnu i kulturnu ulogu koja je korisna za društvo u celini. Sportski događaj se koristi da zemlja domaćin pokaže svoju kulturu i tradiciju, sličnost i različitost od „ostatka sveta“. Sport omogućava promociju ne samo igrača, klubova, nacionalnih selekcija, već i gradova, regija, država pa čak i kontinenta. To je jedan od razloga zašto su učesnici veoma osetljivi na ishod takmičenja.

2. RASPROSTRANJENOST SPORTA

Već od XVII veka sport egzistira u formi koja je relativno slična današnjoj. Za prvi sportski klub, koji i danas postoji, smatra se Džokej klub osnovan 1750. godine u Londonu (kasnije je premešten u Njumarket). Njegovi članovi su bili džentlmeni koji su voleli konjske trke i bili veoma uticajni članovi ondašnjeg engleskog društva. Ovo pokazuje da je sport delatnost sa tradicijom, ima značaj za društvo, duboko je utemeljen u zajednicama i okuplja ljude. Danas je rasprostranjen na svim kontinentima i ne postoji država na svetu u kojoj nije prisutan. Koliki značaj i ugled ima sport može se ilustrovati činjenicom da Međunarodni olimpijski komitet od 2009. godine ima status stalnog posmatrača u Generalnoj Skupštini Ujedinjenih Nacija. Savremeni sport i olimpijski pokret svoje poreklo vode iz Evrope. Engleska je kolevka savremenog sporta [11], a Grčka je kolevka ne samo drevnih već i modernih Olimpijskih igara. Institucionalno organizovanje sporta – prvo organizovanje lokalnih sportskih događaja, formiranje klubova, nacionalnih sportskih saveza, međunarodnih sportskih saveza, zatim organizovanje prvih kontinentalnih i svetskih prvenstava – takođe vodi poreklo iz Evrope. Većina današnjih sportskih grana i disciplina imaju svoje korene u Evropi, u Engleskoj. Možemo tvrditi da su, u savremenom obliku, u Engleskoj nastali: tenis, stoni tenis, plivanje, vaterpolo, atletika, veslanje, hokej na travi, kriket, ragbi, konjički sport, bodi bilding, pikado, badminton, skvoš, pauverlifting. Iako je savremeni fudbal nastao u Engleskoj, istorijske činjenice govore da je ta sportska igra sa mnogo dužom tradicijom. U Škotskoj su nastali golf, kajak i kanu, karling, klizanje. U Švajcarskoj je nastao savremeni bob i skeleton, u Danskoj rukomet, u Nemačkoj auto moto sport, u Norveškoj nordijsko skijanje, u Austriji dizanje tegova i alpsko skijanje, u Holandiji jedriličarstvo, u skandinavskim zemljama orijentiring, u Francuskoj grčko rimski stil rvanja i savate, a u Rusiji sambo i bandi (u skandinavskim zemljama poznat kao „zimski fudbal”), a u Srbiji realni aikido. Daleki istok je kolevka borilačkih sportova: u Kini je nastao kung fu, tai či čuan, vušu; u Japanu džudo, aikido, karate, kendo, sumo rvanje, džiu-džica, a u Koreji tekvondo. U Argentini je nastao pato, u Brazilu kapoera, u Čileu i Urugvaju različite forme rodea. U Kanadi je nastao hokej na ledu i lakros, u Sjedinjenim Američkim državama košarka i odbojka. Amerikanci su dali specifičan doprinos savremenom sportu i njegovoj popularizaciji tako što su pojedine sportske grane i discipline, pod uticajem modernizacije društva i razvojem tehnologije, pretrpele duboke promene i tako su nastale nove, transformisane, atraktivnije i poželjnije za publiku, medije, sportsku industriju i koje su se dobro integrisale u američko društvo i njegov stil života. Kao primere možemo navesti bejzbol, softbol, američki fudbal, umetničko klizanje, triatlon, kik boks, snoubord, džet ski, pejtntbol, odbojku na pesku i većinu tzv. ekstremnih sportova. Popularizaciji pojedinih sportova posebno doprinose mediji (Koković, 2004). Međutim, na televiziji su sve manje prisutne tzv. „klasične” sportske grane, a sve više one koje mogu izazvati „pojačane” emocije, poput borbi u oktagonu, slobodnog penjanja uz stenu, vožnja Bi-Em-Eks bicikala po nepristupačnim terenima i sl. Sve ove sportske aktivnosti u sebi nose povećan rizik od povređivanja i baš to najverovatnije doprinosi njihovoj popularnosti. Ekstremni sportovi dobijaju na popularnosti osamdesetih i devedesetih godina XX veka. Popularizaciji i komercijalizaciji ekstremnih sportova posebno je doprineo novozelčanin Alan Džon Haket koji je 1987. godine promovisući bandži džamp skočio sa Ajfelovog tornja. Nakon toga dolazi period razvoja takmičenja pod nazivom „X Games“. „X Games“ je multi sportsko takmičenje koje se održava jednom godišnje, a organizator je TV mreža ESPN. Obe, letnje i zimske „X Games“ se održavaju u SAD, od 1995. (Los Anđeles) tj. 1997. godine (Aspen), ali sve više takvih takmičenja se održava u svim drugim delovima sveta.

Popularnost sporta varira od države do države, od kontinenta do kontinenta [4]. Fudbal ima globalnu, svetsku popularnost [2], a po broju takmičara i posmatrača na sportskim događajima, izdvajaju se još košarka, odbojka, kriket, bejzbol, hokej na travi. Mnoge sportske grane i discipline imaju regionalnu popularnost. Tako je hokej na ledu uglavnom popularan u Skandinaviji (Švedskoj, Finskoj, Norveškoj), Rusiji i Severnoj Americi (SAD, Kanada). Ragbi je popularan u Australiji, Novom Zelandu, Engleskoj, Francuskoj. Vaterpolo je popularan u nekim evropskim zemljama. Moderne Olimpijske igre su započele kao sportski događaj u kome su učestvovali samo muškarci, od 1900. godine učestvuju i žene [6], u najvećem broju slučajeva se sportska takmičenja održavaju za muškarce i žene odvojeno, u badmintonu i tenisu se dodeljuju medalje i za mešoviti dubl, dok su ritmička gimnastika i sinhrono plivanje sportska takmičenja namenjene ekskluzivno ženama. Ipak možemo konstatovati da je tokom prošlosti postojalo ograničenje učešća žena u sportskim aktivnostima uopšte, a posebno u pojedinim, tradicionalno nazvanim „muškim sportovima” poput dizanja tegova, rvanja, boksa. Danas takva ograničenja skoro da ne postoje jer se na Olimpijskim igrama u dizanju tegova žene takmiče od 2000. godine, u rvanju od 2004, u boksu od 2012, a u skijaškim skokovima nastupaće od 2014. godine. Veoma retko, ali organizuju se takmičenja u sumo rvanju za žene, tradicionalno muškom sportu.

3. STRUKTURA SPORTA

Sport se razvijao kroz faze od amaterskog, preko profesionalnog menadžmenta, od lokalnog, preko nacionalnog, zatim međunarodnog do globalnog menadžmenta, od menadžmenta putem pokušaja i pogrešaka, preko menadžmenta uslovljenog medijima, partnerski razvijanog menadžmenta, do tzv. profesionalno obučenog menadžmenta [1], a formiranje specifičnih tzv. check up pitanja i checklist-a je od izuzetnog značaja za svaku sportsku organizaciju koja organizuje događaj [9].

Sportisti su članovi kluba. Klubovi iste sportske grane su organizovani u nacionalnu sportsku federaciju [8]. Sportisti nastupaju u klubskoj (u okviru kluba) ili nacionalnoj selekciji (u okviru nacionalne sportske federacije). Svaka sportska federacija na nacionalnom nivou pojedinačno pristupa nacionalnom olimpijskom komitetu, kao i međunarodnoj sportskoj federaciji za određenu sportsku granu (na kontinentalnom i svetskom nivou). Nacionalni olimpijski komitet (NOC) pristupa organizacijama kontinentalnih olimpijskih komiteta, Udruženju nacionalnih olimpijskih komiteta (ANOC) i Međunarodnom olimpijskom komitetu (IOC). Sportske federacije, koje kontrolišu one sportske grane i discipline koje se nalaze na programu Olimpijskih igara, prihvaćene su u Udruženje međunarodnih federacija letnje olimpijade (ASOIF) i Udruženje međunarodnih federacija zimske olimpijade (AIOWF), a Međunarodni olimpijski komitet prepoznaje i priznaje još jedan broj sportskih federacija koje su članovi Udruženja međunarodnih sportskih federacija priznatih od Međunarodnog olimpijskog komiteta (ARISF). Međunarodne sportske federacije (na svetskom nivou) članovi su organizacije SportAccord, danas poznate kao GAISF (Global Association of International Sports Federations). Samo one međunarodne sportske federacije koje su članovi ARISF ili GAISF-a mogu da pristupe olimpijskom programu. One sportske federacije koje ne učestvuju u olimpijskom programu, takmiče se u okviru Međunarodne asocijacije Svetskih igara (IWGA).

Jedan broj sportista i klubova pripadaju tzv. nepriznatim nacionalnim i međunarodnim sportskim federacijama, što znači da ih šira sportska zajednica još uvek nije prepoznala (sport je prisutan na suviše maloj teritoriji, nedovoljan je broj sportista i sportskih organizacija, nema sistema selekcije, treninga, takmičenja, nema rukovodećeg tela na kontinentalnom i

globalnom nivou itd). To su najčešće sportovi koji imaju isključivo malu lokalnu popularnost i van određene teritorije su potpuno nepoznati. Takve sportske grane i discipline, kada se formira međunarodno rukovodeće telo (na kontinentalnim i svetskom nivou), prihvataju se u organizaciju GAISF. Tek tada one mogu da učestvuju u programu Međunarodnog udruženja svetskih igara. Jedan broj sportskih federacija je pristupio Međunarodnom ne- olimpijskom komitetu. Možemo izdvojiti bar tri vrste sportskih organizacija u savremenom sportu: kao upravljačko telo u sportu; organizacije koje sprovode sportske događaje; i tzv. Sport za sve. Organizovanje sportskih događaja ostavlja značajan dugotrajan uticaj na lokalno okruženje, ekonomiju i društvo [7], posebno na turizam [12].

4. MEĐUNARODNI OLIMPIJSKI KOMITET I GRANSKE SPORTSKE FEDERACIJE

Olimpijski pokret obuhvata organizacije, sportiste i pojedince koji prihvataju olimpijsku povelju i autoritet Međunarodnog olimpijskog komiteta: Međunarodne sportske federacije (IFs), Nacionalne olimpijske komitete (NOC), kao i Organizacione komitete olimpijskih igara, Nacionalne sportske federacije, klubove i sportiste (koji pripadaju međunarodnim sportskim federacijama i nacionalnim olimpijskim komitetima). Međunarodni olimpijski komitet je međunarodna, ne-vladina, neprofitna organizacija sa sedištem u Lozani, i predstavlja „krovnu, kišobran" organizaciju olimpijskog pokreta [10]. Ima presudnu ulogu u razvoju međunarodnog sporta, čak i međunarodne politike, posebno od 1995. godine kada je Predsednik Međunarodnog olimpijskog komiteta po prvi put prisustvovao zasedanju Generalne Skupštine Ujedinjenih nacija, a povodom rezolucije o „Olimpijskom primirju“. Međunarodni olimpijski komitet poseduje ekskluzivno pravo na Olimpijske igre, olimpijski simbol (5 krugova), olimpijsku zastavu (bela pozadina sa olimpijskim simbolom u pet boja), olimpijsku himnu, olimpijski moto („Citius, Altius, Fortius“ - Brže, Više, Jače), olimpijski plamen, olimpijsku baklju. Olimpijski pokret zahvaljući svom prilagođavanju, danas okuplja više zemalja i teritorija od Ujedinjenih nacija, što može da bude izvor nesporazuma. U Međunarodni olimpijski komitet učlanjeno je 204 nacionalna olimpijska komiteta. Olimpijske igre se održavaju svake četvrte godine, a prema prvobitnoj verziji „Olimpijskih pravila“ (danas je to „Olimpijska povelja“), koja su tokom prošlosti doživela mnoštvo promena, stajalo je: (1. član) da je u interesu Međunarodnog kongresa i svih zemalja da Olimpijske igre u modernom obliku, pridržavajući se klasičnih okvira, ožive; (2. član) da na Igre treba pozvati sportske saveze svih „kulturnih zemalja“ i da zemlje mogu da predstavljaju samo njihovi državljani (svima se preporučuje organizovanje prethodnih, izbornih takmičenja da bi na Igre došli samo najbolji); (3. član) da će na Olimpijskim igrama biti zastupljena atletika (trčanje, skakanje, bacanje i dizanje tereta), sportovi na vodi (jedrenje, veslanje, plivanje), klizanje, mačevanje, rvanje, boks, streljaštvo, gimnastika, biciklizam i konjički sport; (4. član) da na Olimpijskim igrama, sem u mačevanju, mogu učestvovati samo oni kojima sport nije profesija (amaterski princip); (5. član) da organizacioni komitet igara može da isključi sa takmičenja sve koji povrede olimpijske norme; (6. član) da u sklopu atletskog, treba organizovati jedno „glavno takmičenje“ pod nazivom pentatlon (petoboj).

Granski sportski savezi se formiraju (u teritorijalnom smislu) na dva nivoa:

- Nacionalnom (opštinskom, gradskom, okruga, pokrajine, države), u koji se udružuju klubovi i

- Međunarodnom (regionalni, kontinentalni, svetski), u koji se udružuju nacionalni granski sportski savezi.

Granski sportski savez je ne-vladina, neprofitna organizacija dobrovoljno udruženih sportskih organizacija radi ostvarivanja zajedničkih ciljeva, potreba i interesa u oblasti određenog sporta. Savez vodi bazične evidencije svojih članova, sportskih objekata, vrhunskih sportista, sportskih stručnjaka i sportskih rezultata. U Savezu se izrađuju jednogodišnji i četvorogodišnji planovi rada i razvoja i planovi stručnog rada. Nacionalni sportski savezi su registrovani u skladu sa nacionalnim zakonodavstvom (kod nas u skladu sa Zakonom o sportu, Službeni glasnik Republike Srbije, 10/2016). Brojni međunarodni granski sportski savezi imaju svoje sedišta u Švajcarskoj i tamo su registrovani u skladu sa članom 60. Švajcarskog građanskog zakonika. Granski međunarodni savez (International Federation, IF's) je međunarodna ne-vladina organizacija koja povezuje nacionalne granske saveze za:

- jednu sportsku granu (npr. članovi Međunarodne federacije za dizanje tegova jesu nacionalni granski sportski savezi za dizanje tegova) ili
- više sportskih grana i disciplina (npr. Međunarodna skijaška federacija - za više sportskih grana: alpsko skijanje, kros kantri, skijanje slobodnim stilom, nordijske kombinacije, skijaški skokovi, snoubord).

Granski međunarodni savez propisuje takmičarska pravila, standarde u vezi sa objektima za takmičenje, spravama, rekvizitima, odećom i obućom takmičara, organizuje i nadgleda međunarodna takmičenja, verifikuje rekorde, podstiče razvoj sportske grane, vodi sportsku razvojnu politiku i saradnju. Međunarodne federacije se udružuju u „krovne, kišobran organizacije“ u cilju rešavanja zajedničkih problema, posebno usklađivanja takmičarskih kalendara [3]. Međunarodne federacije imaju posebnu odgovornost u lancu organizovanja sportskih događaja, ne samo iz razloga što su one odgovorne za održavanje nekog takmičenja, već i iz razloga što one neposredno odlučuju / biraju organizatora takmičenja. Tako njihova loša procena može dovesti do neuspeha takmičenja. Učešće sportskih federacija na Olimpijskim igrama nije samo privilegija da se predstave u javnosti, već i da značajno finansijski prihoduju. Međunarodni olimpijski komitet izdvaja značajna sredstva za međunarodne sportske federacije kako bi njihov nastup na Olimpijskim igrama bio uspešniji. Kada nastane nova sportska grana/disciplina, ponekad se desi da se pojavi više organizacionih tela koje pretenduju da predstavljaju tu novu sportsku granu, čak postoji više nacionalnih i međunarodnih federacija. U nekim sportskim granama, međunarodna federacija nema tu moć kakvom raspolaže neko nacionalno telo. To se obično dešava u početnim fazama životnog ciklusa te organizacije. Tako su reketbol i lakros veliku popularnost stekle u SAD sedamdesetih godina XX veka. Međunarodna reketbol, ili lakros federacija još uvek su manje značajno telo od nacionalne, američke federacije.

5. UDRUŽENJA NACIONALNIH OLIMPIJSKIH KOMITETA (ANOC)

Shvatajući značaj povremenog okupljanja radi razmene mišljenja i zaštite zajedničkih interesa, prvo masovno okupljanje nacionalnih olimpijskih komiteta organizovano sa navedenim ciljem se desilo 1965. godine u Rimu (Italija). Na IX Generalnoj Skupštini Nacionalnih olimpijskih komiteta koja je održana 26-27 juna 1979. godine u San Huanu (Porto Riko) događaj je prerastao u Konstitutivnu Generalnu Skupštinu organizacije koja je

nazvana „Udruženje nacionalnih olimpijskih komiteta“ („Association of the National Olympic Committees“, ANOC). „Udruženje nacionalnih olimpijskih komiteta“ u svoje članstvo okuplja nacionalne olimpijske komitete koji su priznati od strane Međunarodnog olimpijskog komiteta i trenutno je 205 članova ove organizacije. Nacionalni olimpijski komiteti su učlanjeni u pet kontinentalnih organizacija [8]:

- Evropski olimpijski komiteti („The European Olympic Committees, EOC; Les Comites Olympiques Europeens“, COE), 49 članova
- Udruženje nacionalnih olimpijskih komiteta Afrike (Association of the National Olympic Committees of Africa, ANOCA; Association des Comités Nationaux Olympiques d'Afrique, ACNOA), 53 člana
- Pan-američka sportska organizacija (Pan-American Sports Organization, PASO; Organización Deportiva Panamericana, ODEPA), 42 člana
- Olimpijski Savet Azije (Olympic Council of Asia, OCA), 44 člana
- Nacionalni olimpijski komiteti Okeanije (Oceania National Olympic Committees, ONOC), 17 članova

Kontinentalna udruženja nacionalnih olimpijskih komiteta (COE, ANOCA, PASO, OCA) su organizatori multi-sportskih događaja, sva osim Nacionalnih olimpijskih komiteta Okeanije (ONOC). „Udruženje nacionalnih olimpijskih komiteta“ (ANOC) ne organizuje sportske događaje.

Udruženje evropskih nacionalnih olimpijskih komiteta“ je osnovano 1975. godine u Lisabonu (Portugal). Udruženje se uglavnom bavilo problemima pripreme olimpijskih igara, Olimpijskom solidarnošću, marketingom olimpijskih igara i sl. Organizacija 1995. godine menja naziv u „Evropski olimpijski komiteti, EOK“ („The European Olympic Committees, EOC“) i delatnost organizacije se proširuje.

EOK organizuje sledeće multi-sportske događaje:

- Igre malih zemalja Evrope (Games of the Small States of Europe, GSSE)
- Evropski olimpijski festival mladih (European Youth Olympic Festival, EYOF)
- Evropske igre (European Games)

6. ZAKLJUČAK

U drugoj polovini XIX i početkom XX veka sport je samo u organizacionom smislu bio relativno razvijen – formiran je Međunarodni olimpijski komitet, održane su Olimpijske igre i prva svetska prvenstva, započeto je formiranje međunarodnih sportskih federacija, izvršena je prvobitna standardizacija sportskih pravila i sportske opreme. U suštinskom smislu, sport je tada još uvek bio nerazvijen i korišćen je pre svega kao sredstvo prenošenja ideja običnim ljudima.

Sport, sportske organizacije i sportski događaji su prošli faze od amaterskog, preko profesionalnog menadžmenta, od lokalnog, preko nacionalnog, zatim međunarodnog do globalnog menadžmenta, od menadžmenta putem pokušaja i pogrešaka do tzv. profesionalno

obučenog menadžmenta. Tako je danas stvoreno okruženje koje upućuje na preteranu komercijalizovanost i izdvojile su se tri vrste sportskih organizacija: kao upravljačko telo u sportu; organizacije koje sprovode sportske događaje; i tzv. Sport za sve.

REFERENCE

- [1] Emery, P. Past, present, future major sport event management practice: The practitioner perspective, *Sport Management Review*, 13(2), (2010), 158-170.
- [2] Giulianotti, R., *Football. A Sociology of the Global Game*, Polity Press, Cambridge, 1999.
- [3] Keller, T., *The Development of Sport*, AGFIS - GAISF, Amsterdam, 1986.
- [4] Koković, D., *Sport and media (Sport i mediji)*, Fakultet za uslužni biznis, Novi Sad, 2004.
- [5] Lee, C.; Mjelde, J.W.; Kwon, Y.J., Estimating the economic impact of a mega-event on host and neighbouring regions, *Leisure Studies*, 36(1), (2015), 138-152.
- [6] Lera-Lopez, F.; Rapun-Garate, M., Sports Participation versus Consumer Expenditure on Sport: Different Determinants and Strategies in Sports Management. *European Sport Management Quarterly*, 5(2 / June), (2005), 167 – 186.
- [7] Masterman, G., *Strategic Sports Event Management*. Routledge, London, 2014.
- [8] Mihajlović, M.V., *Sport organizations and sport events (Sportske organizacije i sportski događaji)*. Sportski savez Srbije, Beograd, 2013.



INFRASTRUCTURE MORTGAGE AS AN INSTRUMENT OF CLUSTER PROJECTS' IMPLEMENTATION IN THE SPHERE OF PUBLIC-PRIVATE PARTNERSHIP

Albina M. Kiseleva, Kirill A. Samodinskiy

Omsk State University n.a. F.M. Dostoevsky, Russia

Abstract: The authors consider the situation in infrastructure sector and the current legislative initiatives suggesting to use infrastructure mortgage as a promising tool for the implementation of cluster projects in the field of public-private partnership, using the Russian Federation as an example. Infrastructure mortgage refers to a modified form of public-private partnership when private business is involved in the construction of infrastructure with the support of the state and the payment of infrastructure is carried out as it is used. The article substantiates the expediency of search for new instruments of investment activation in order to implement infrastructure projects and suggests using of infrastructure mortgage as one of such instruments. The authors have developed and presented a schematic diagram of the introduction of infrastructure mortgage in the practice of cluster projects on the basis of public-private partnership. In addition, the article presents a method of assessing the effectiveness of the using infrastructure mortgage for participants of regional clusters.

Keywords: infrastructure mortgage, cluster policy, public-private partnership, investment activity, regional development

1. INTRODUCTION

The implementation of infrastructure projects such as construction and modernization of buildings, structures, facilities intended for electricity, gas, heat, water supply and sanitation shunting in order to ensure the functioning of industrial objects is one of the priority directions of the socio-economic development of states creating conditions for the functioning of the whole economy. A separate relevant direction is the integration of the public-private partnership system into the development and implementation of these projects. As a rule these industries are of particular interest to private partners, due to their own engineering and infrastructure potential, as well as the possibility of establishing and maintaining business communications with territorial authorities.

At the same time the development of the engineering infrastructure of territory in most cases remains an sphere with insufficient funding. Typically this is due to the specifics of the implementation of infrastructure projects, that include:

- 1) low liquidity of investments in infrastructure objects;
- 2) significant time gap between risk financing at the initiation stage and the generation of profit resulting from the operation;

- 3) special control by the state due to the involvement in the implementation of most infrastructure projects of natural monopolies;
- 4) difficulty of assessing the direct economic and multiplier effect from the implementation of an infrastructure project in the long term.

2. RESULTS AND DISCUSSION

2.1. PROSPECTS OF USING INFRASTRUCTURE MORTGAGE INSTRUMENT IN RUSSIAN CLUSTER POLICY

In the Russian Federation the difficulty of implementing infrastructure projects is explained by the situation of investment conditions. The main factors limiting such activities determined by the Federal Service of State Statistics are presented below.

Table 1. The distribution of organizations to assess factors, limiting the investment activity, % to the total number of organizations [1].

Factor limiting investment activity	2010	2015	2016
Lack of demand for products	19	28	27th
Lack of own funds	67	61	61
Imperfect legal and regulatory framework, regulating investment processes	10	27	27
A sophisticated mechanism for obtaining loans for the implementation of investment projects	15	42	46
High percentage of commercial loans	31	56	56
Investment risks	23	60	50
Existing taxation regime of investment activities	-	36	33
High level of inflation in the country	-	65	60
Parameters of exchange rate policy in the country	-	54	48
Uncertainty of the economic situation in the country	32	66	61
The economic situation on the world market	-	50	41
Price fluctuations on the world energy market	-	44	39

As can be seen from the table the key factors limiting investment in the Russian Federation are factors of a financial nature and economic instability. Their effect is also manifested in the impact on the reduction in the input of capacities of infrastructure facilities in Russia (see Table 2). According to experts InfraOne Research, all investments in infrastructure by the state and business in Russia do not exceed 4.8% of GDP or 4.3 trillion rubles. At the same time, the minimum funding requirement is 2.3 trillion rubles, another 3.3 trillion rubles is needed for development [2].

Table 2. The commissioning of capacities of infrastructure facilities

Infrastructure facility	2010	2015	2016	Growth rate 2016/2010,%
Turbine power stations, thousand kW	1915.6	1744.5	856.7	44.72
Power lines 35 kV and above, km	2126.8	2304.0	2708.6	127.36
Compressor stations on trunk gas pipelines, gas fields and underground gas storage facilities, thousand kW	145.0	410.4	667.3	460.21
New railway lines , km	111.1	17.8	62.5	56.26
Secondary main track, km	104.5	97.3	16.7	15.98
Roads with a hard surface, km	3081,1	2511.3	2449.5	79.50
Berths of seaports (including overloading full-time complexes of seaports), m	892.2	-	60.0	6.72
Main gas pipes and branch pipes, km	2012.6	2529.6	959.9	47.69
Oil pipelines main and oil products main regional, km	1222.9	802.1	850,6	69.56
Interurban cable communication lines, km	6870, 1	105.3	1.6	0.02
Water supply networks, km	2234,4	2697,0	1675.2	74.97
Sewerage networks, km	496.3	471.8	445.8	89.82
Gas networks , thousand km	14.0	9.7	8.7	62.14
Heating networks, km	204.3	106.1	170.1	83.26
Sewage treatment plants, thousand m ³ per day	461.8	360.0	410.8	88.96
Systems of recycled water supply, thousand, m ³ per day	1050.2	1905.8	464.1	44.19

Thus there is an objective need to improve the efficiency of the state investment policy by developing tools for financial support and state guarantees. Also it is worth noting that the investigations of the consulting company McKinsey have shown that an increase in investment in transport infrastructure by 1% of GDP leads to the creation of 3.4 million new jobs in India, 1.5 million jobs in the US , 1.3 million jobs in Brazil. In Russia an increase in investment only in transport infrastructure can lead to an increase in the number of jobs by 1.7% of the total economically active population of the country. At the same time, the decrease in total transport costs for all types of goods by 10%, according to the Center for Strategic Research, gives an additional + 0.12% to GDP.

Under described conditions, one of the most promising tools for implementing infrastructure projects of the public-private partnership is the so-called infrastructure mortgage.

Infrastructure mortgage is understood as a modified form of public-private partnership where private business is attracted to infrastructure construction with the support of the state, infrastructure is paid for as it is used. The essence of infrastructure mortgages is that a private partner investing own funds in the construction or modernization of an object receives income from its operation in the form of payments or a tariff, and an institutional investor issues securities secured by these obligations. Infrastructure mortgage involves the actual acquisition

of an infrastructure facility on credit received from private investors , and the use of the mechanism of state guarantees on the basis of a sovereign infrastructure development fund.

In accordance with sub-paragraph "c" of paragraph 1 of Russian President's instructions issued following a meeting of the State Council on improvement of investment attractiveness of the region was held on December 27, 2017 the Government of the Russian Federation was instructed to ensure the implementation of pilot projects for the development of infrastructure, including the construction and repair of highways, with the involvement of private capital under a new mechanism - " infrastructure mortgage " , which encourages the use of best practices to improve the quality of work and reduce their cost [3]. This mechanism can improve the availability of funding and the attractiveness of investments in infrastructure modernization .

The draft federal law "On amendments to the Federal Law "On Concession Agreements "," On public-private partnership, municipal-private Partnership in the Russian Federation and Amending Certain Legislative Acts of the Russian Federation" and the Amendments to Certain Legislative Acts of the Russian Federation" is expected the introduction of a mechanism for issuing bonds secured by the pledge of private partner rights under an agreement on public-private partnerships, municipal -private partnerships and (or) the object of such an agreement, as well as the pledge of the concessionaire's rights under the concession agreement [4]. There are the quantitative and qualitative criteria to the creditor such as the volume of credit (loan) or a credit line, loan term, interest rate, the cost of banking services and terms of their performance; ways to ensure the fulfillment of obligations of the borrower (private partner) to the public partner, the terms of the collateral provided by the borrower (private partner), the conditions and grounds for opening a credit line, the conditions and grounds for early repayment of the loan (loan), as well as the terms of the direct agreement offered by the creditor.

The essence of the infrastructure mortgage mechanism is the creation The Investment Fund for Infrastructure Projects by regional authorities, which will provide financing in the form of a capital grant to private partners, attracting money from the market through bonds. These financial instruments provide state guarantees, release from the budget and are extinguished, including the proceeds from the sale of the projects themselves. The yield of such bonds is usually higher than the yield of federal loan bonds, which potentially can interest large investors, including non-state pension funds. Institutional investors who are able to provide an infrastructure mortgage on the basis of a bond loan, in addition to non-state pension funds , banks, investment and mutual funds and other lending institutions are considered.

In our opinion the infrastructure mortgage can be used as a promising implementation tool and cluster projects in the sphere of public-private partnership . Such possibility is due to the fact that by cluster projects associated with the autonomy from the target support to certain industrial sectors and hard infrastructure, and focused on the use of holistic system approach more than an oriented at creating competencies or "soft infrastructure"[5]. As a reason for this can be selected these:

1. Due to the fact that the composition of the cluster include financial institutions, infrastructure mortgage mechanism potentially will create a unified system of financing of infrastructure projects for the benefit of involving clusters members of the public partner as a guarantor of the implementation of the projects minimizing the factor of instability of the economic situation.

2. Despite the vitality of the cluster model of production even in low-quality engineering infrastructures governmental facilities, improvement of infrastructure is a key factor in increasing the productivity of the cluster and therefore - multiplicative - a catalyst for socio-economic development of the territory [6].

3. Implementation of infrastructure mortgage instrument in cluster policy will allow the broadcast experience at international level, especially in the development of cross-border clusters. Thus in accordance with the directions of the main stage and the implementation of coordinated (agreed) transport policy states - members of the Eurasian Economic Union, approved with Supreme Eurasian Economic Council 26 December 2016 No. 19, the member states of the integration association ensure the coordination of the cooperative projects planned to be implemented for the development of industrial and innovation infrastructure (industrial clusters, industrial parks and industrial parks) with ongoing and planned projects for the creation of transport infrastructure facilities in the participating states [7].

4. Cooperation in clusters on the basis of public-private partnership involves significant advantages compared with traditional contracts, as it allows to provide uniform distribution of risks between the public and private partners. At the same time the effectiveness of such projects is achieved while minimizing the control function on the part of the state [8].

Note that the first project implemented within the framework of the mortgage infrastructure instrument in the Russian Federation should be the construction of a highway "Tula - Novomoskovsk", connecting the regional center of the city of Tula, Novomoskovsk, in whose territory the industrial cluster formed. Key members of the cluster, such as "Knauf Gips Novomoskovsk, JSC" and "Procter & Gamble Novomoskovsk, LLC" are interested in this project due to the fact that the existing the low quality of infrastructure forces them to limit their production [9].

2.2. THE PRINCIPAL MODEL OF INTRODUCING AN INFRASTRUCTURE MORTGAGE INTO THE PRACTICE OF IMPLEMENTING CLUSTER PROJECTS BASED ON PUBLIC-PRIVATE PARTNERSHIPS

In our opinion, the principal model of introducing an infrastructure mortgage into the practice of implementing cluster projects based on public-private partnerships can be presented as follows:

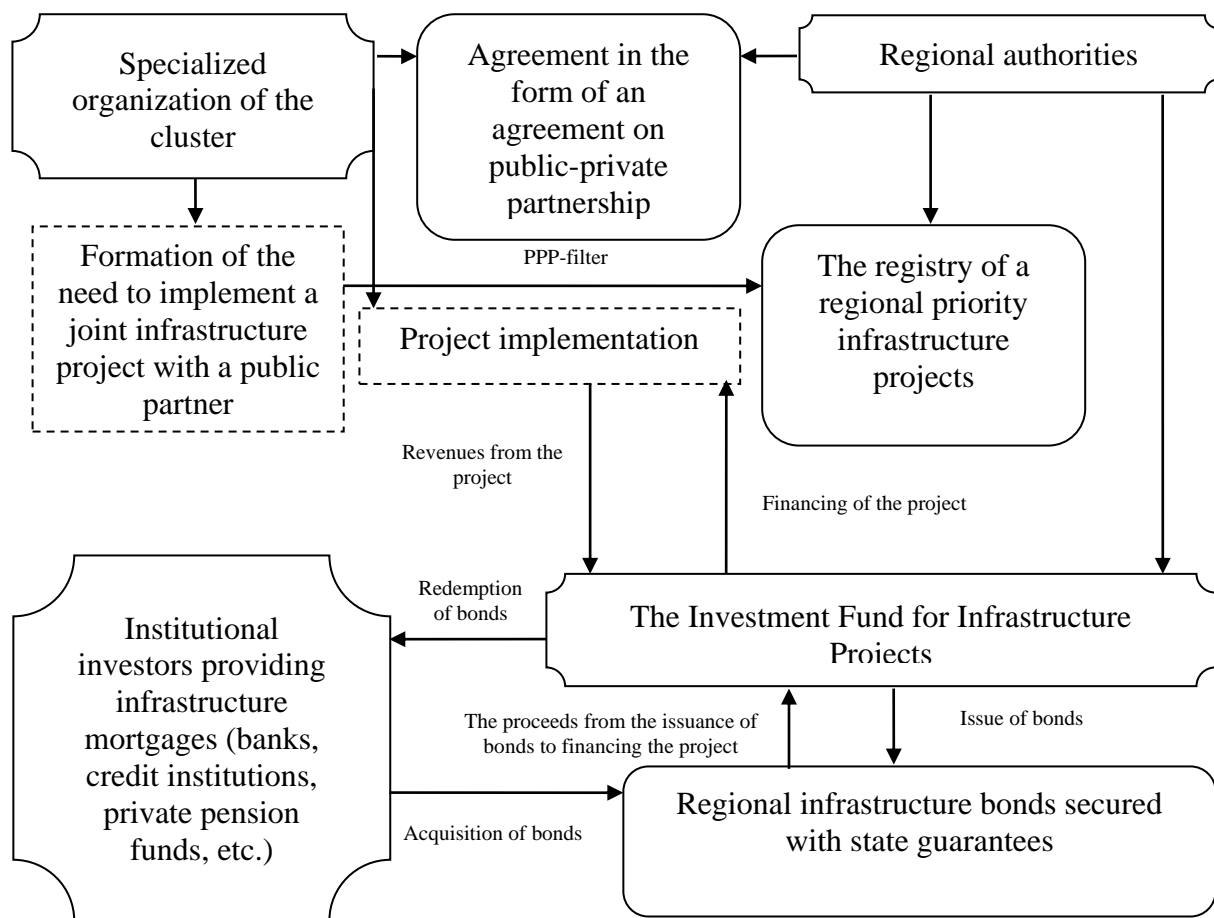


Figure 1. Model of introduction of infrastructure mortgage in the practice of cluster projects on the basis of public-private partnership

So the interaction of a public and private partner in the implementation of an infrastructure project using an infrastructure mortgage can be carried out within the framework of an agreement between a specialized cluster organization and regional authorities. This project must pass the so-called PPP filter (analysis of feasibility, profitability, risks for partners) and be included to the register of regional priority infrastructure projects. The fund for investment in infrastructure projects created by regional authorities attracts the funds of institutional investors from the market by issuing regional infrastructure bonds secured by state guarantees, thereby ensuring the financing of the project. At the same time the redemption of the issued bonds is due to the proceeds from the project.

Note that in this case institutional investors investing in the interests of cluster residents are claiming to receive income from the issued infrastructure bonds, and the income is higher than the income from bonds of a different type and income from deposits. Thus this promising scheme, in our opinion, based on the fact that institutional investors, are generally included in clusters infrastructure, then have information on the activities of the cluster, the financial condition of its residents, the potential return and the risks of implementing cluster projects. This provides the ability to assess the feasibility of investing in a cluster infrastructure project, reducing the time required for the competitive procedure to ensure parallel competitive financing, and monitor its implementation.

In addition the use of the infrastructure mortgage mechanism in the interests of economic clusters may be attractive in terms of providing additional regional preferences. For example, in the US, the mechanism of so-called municipal bonds for private ownership is used (private -activity bonds) . Municipal bonds issued for infrastructure projects and provides for exemption from federal taxes and Guaranty the receiving private partner income in the amount of not less than 10% [10]. Using the tools to provide tax incentives can increase the cash flow of investment in infrastructure projects.

2.3. THE SYSTEM FOR ASSESSING THE EFFECTIVENESS OF THE USE OF INFRASTRUCTURE MORTGAGES FOR PARTICIPANTS IN REGIONAL CLUSTERS

The system for assessing the effectiveness of the use of infrastructure mortgages for participants in regional clusters can be presented as follows:

1. The internal rate of return of a cluster infrastructure project implemented using the infrastructure mortgage tool:

$$IRR_{cip} = \frac{f + \frac{A-P}{T}}{\frac{A+P}{2}}$$

where IRR_{cip} is the internal rate of return of a cluster infrastructure project implemented using the infrastructure mortgage tool ;

A - the nominal value of the infrastructure bond ;

P - current market price of an infrastructure bond;

f - annual income for an infrastructure bond;

T - c rock implementation of the cluster infrastructure project.

2. Net present value of a cluster infrastructure project implemented using an infrastructure mortgage tool :

$$NPV_{cip} = -IC + \sum_{t=1}^N \frac{CF_t}{(1+IRR)^t} = -IC + \sum_{t=1}^N \frac{CF_t}{(1+i)^t}$$

where NPV_{cip} is the net present value of the cluster infrastructure project;

CF_t - payment for an infrastructure bond;

i - the discount rate.

3. The profitability of a cluster infrastructure project implemented using the infrastructure mortgage tool :

$$ROI_{cip} = \frac{E_o + E_m - C - S}{C - S} * 100\%$$

where ROI is the profitability of a cluster infrastructure project implemented using the infrastructure mortgage tool ;

E_o - income from repaid infrastructure bonds

E_m - income from the multiplicative effect of the implementation of the cluster infrastructure project , expressed in the profit growth of the residents of the cluster - the project participants through the implementation of this project;

C - cost of realization of the cluster infrastructure project;

S - the amount of state financial support for the implementation of an infrastructure project in the form of subsidies to cluster residents or tax benefits.

3. CONCLUSION

Infrastructure mortgage may be used as an effective instrument of cluster projects' implementation in the sphere of public-private partnership. In the case of ascertaining the indicators as acceptable for the purposes of investment, infrastructure mortgage can become effective instrument for the implementation of cluster projects through public-private partnerships and infrastructure development of the territory as a whole.

4. ACKNOWLEDGMENTS

The reported study was funded by the RFBR according to the research project No. 18-010-00436.

REFERENCES

1. Investment activity in Russia: conditions, factors, trends. Federal Service of State Statistics. Moscow, 2017.
2. Investments in infrastructure 2018. Analytical review. Where do the interests of investors and authorities intersect? Results of 2017. Forecast for 2018-2019 years. InfraONE Research.
3. List of instructions of the President of the Russian Federation V.V. Putin on the results of the State Council meeting on increasing the investment attractiveness of the regions following the meeting of the State Council on December 27, 2017. URL: <http://www.kremlin.ru/acts/assignments/orders/56940>.
4. Draft Federal Law On Amendments to Federal Laws On Concession Agreements, On Public-Private Partnerships, Municipal Partial Partnership in the Russian Federation and Amendments to Certain Legislative Acts of the Russian Federation and Amendments to

Certain Legislative Acts of the Russian Federation // Legal reference and information system "Consultant-plus".

5. Per Lundequist and Dominic Power. Putting Porter into Practice? Practices of Regional Cluster Building: Evidence from Sweden. *European Planning Studies*, Vol. 10, No. 6, 2002.
6. Gezahegn Ayele, Lisa Moorman, Kassu Wamisho, Xiaobo Zhang. A Case Study of Handloom Weavers in Ethiopia. *Infrastructure and Cluster Development*. IFPRI Discussion Paper, May 2010.
7. Decision of the Supreme Eurasian Economic Council of December 26, 2016 No. 19 "On the main directions and stages of the implementation of the coordinated (coordinated) transport policy of the member states of the Eurasian Economic Union".
8. Manley, Karen & Chen, Le . The impact of client characteristics on the time and cost performance of collaborative infrastructure projects. *Engineering, Construction and Architectural Management* . 2016, 23 (4), pp. 511-532.
9. Construction of the road " Tula - Novomosk ovsk " will begin in the fall 2018. URL : [http : // tass . en / ekonomika / 4864972](http://tass . en / ekonomika / 4864972).
10. Leaked White House infrastructure draft suggests private investment on track. URL: <https://www.constructiondive.com/news/leaked-white-house-infrastructure-draft-suggests-private-investment-on-trac/515268/>



THE ROLE OF SOCIAL CORPORATE RESPONSIBILITY IN THE FORMATION OF LOYALTY OF EMPLOYEES AND CUSTOMERS ON THE EXAMPLE OF THE ROBERT BOSCH COMPANY

Ksenia Perminova, Ulia Siaglova

*The Russian Presidential Academy of National Economy and Public Administration under the
President of the Russian Federation (RANEPA), Institute of Public and Private Sector
Management Faculty of Marketing, Advertising and Service, Russia*

Abstract: The diversity of CSR goals and outcomes in emerging markets, the active process of forming technologies for integrating marketing approaches and CSR standards in international practice, have determined the interest of a number of research and training organizations in conducting a large-scale study of CSR practices in different market conditions. The paper is devoted to the study of CSR principles with the main aim at solving the actual social problem of the Russian subsidiary of the Robert Bosch Company as an example. The conducted marketing research in the form of survey of the Russian department and customers of the company helped to illustrate the current development of internal and external CSR now. The information base of the desk phase of the study is a statistical and analytical information, reports prepared by international agencies, organizations and specialized associations and public authorities in Russia and abroad.

The hypothesis of the study is that the implementation of CSR programs in the long term increases the brand commitment of all affiliated structures and clients of the company. The research methodology is based on a comparative analysis of the results obtained by the method of sociological survey of employees of various Russian companies and data collected by a similar methodology for the Russian subsidiary of Bosch and its representatives.

As the result of this paper, possible solutions to the social problem are found and recommendations for their implementation are given. In addition to the research, a corporate social project “For Life” was formed, which is also proposed for consideration by the company’s management.

Keywords: Corporate Social Responsibility, Marketing Research, “Generated For Life” Business model, Robert Bosch GmbH, Ways to increase loyalty

1. THE THEORETICAL APPROACHES

1.1. THE RELEVANCE OF THE RESEARCH

Market economy, business, corporations are often associated with opportunism, consumer attitude to staff, customers, partners, society as a whole. Big business requires a philosophy of activity and social interaction. Perhaps there is little room for absolute values in

business, but now it is difficult to build anything without relying on high ideals and the human factor. Among both theorists and practitioners, there is no unity on the feasibility and effectiveness of the CSR model.

The relevance of the research is determined by the fact that the modern stage of the development of the marketing concept in the world is characterized by the formation of a new paradigm, the dominant factor of which is the social factor. The world community approached the era of "human marketing" with an emphasis on accounting for the formation of the needs of social behavior as a basis for consumer behavior. It is possible to realize such an approach by expanding marketing based on its complementation with a moral and ethical qualification and considerations.

1.2. THE INTERNATIONAL EXPERIENCE

The international community, following the adoption of the UN Global Compact (UNGC), which defines 10 principles of social responsibility, considers the implementation of CSR principles in the company's activities as a key factor for sustainable development. This largely determines the great interest of the international scientific community in the interdisciplinary and applied aspects of CSR. Among the papers dealing with the social effect of CSR, it is necessary to single out the studies of the following authors: A. Torres, H.A. Tammo, J. Tribo, [13] Berrone P. [1], S.N. Bhattacharya [2].

In the domestic literature, the CSR problem was studied in the works of Naletova A. [9], Gladkova E. [7] Blagireva E.[3]. Qualitative reviews of empirical studies and classification of theoretical positions on the relationship between social responsibility and financial and marketing performance have been widely spread in the last decade and are presented in particular by J. Griffin and J. Mahon (2007), Walsh and Margolis (Vlachos P. A., 2012), R. Nancy, L. Michael, [10]. Orlittski M., L. Schmidt and L. Rhines [11] give the synthesis of the results of existing studies on the quantitative level in Meta-analyzes. The research results of the authors Anna Torres, [13] given in "Generating global brand equity through corporate social responsibility to key stakeholders"; indicating that CSR-policy, apart from direct influence on the society, has an indirect beneficial influence on other stakeholders. Due to the satisfaction of public inquiries, the firm reinforces the trust of other interested parties. The information base of the desk phase of the study is a statistical and analytical information, reports prepared by international agencies, organizations and specialized associations and public authorities in Russia and abroad.

1.3. THE CONCEPTUAL BASIS OF A PROBLEM

The conceptual basis of the CSR problem is in the stage of active formation, as evidenced by the work of Dahlsrud [6], in which the author analyzes 37 CSR definitions, and after their qualitative analysis determines the content of the concept in five definitions: the ecological dimension, the social dimension, the economic dimension, the measurement of interest and the aspect of voluntariness.

1.4. CSR OBJECTIVES

The introduction of CSR into business practice has different objectives. In developed markets, CSR activities are investments of resources that are expected to achieve corporate

goals, which determines the motivation of CSR project managers. Most companies use CSR activities only for marketing purposes, in order to gain additional assets and improve reputation. Other companies are looking for new ways to improve their business practices through innovation, improving quality, improving working conditions and security, striving to create a balance between the work and personal life of employees, taking care of the environmental impact and resource use, without a clear intention of acting socially responsible. The third group of companies has a clearly defined concept to act in a socially responsible manner within its business strategy and sustainable development plans. The diversity of CSR goals and outcomes in emerging markets, the active process of forming technologies for integrating marketing approaches and CSR standards in international practice, have determined the interest of a number of research and training organizations in conducting a large-scale study of CSR practices in different market conditions.

However, all activities related to the implementation, adherence to the principles of corporate social responsibility are, for the most part, extremely costly, and their effectiveness, thereby questioned the heads of companies. They are ready only to take into account a wide range of public interests in decision-making, which in turn looks only as a violation of the interests of the organization itself.

On the other hand, at the present stage of development of the mass goods market, differentiation of products and services within the framework of various CSR programs can play an important role in the development of brands, since the strategic approach in the development of corporate social policy implies embedding the idea of social responsibility in the company's strategy and focus on creating long-term competitive advantages. The development of strategic CSR is most consistent with the transition to a new logic of "social investment", which consists of the company's impact on society and vice versa (inside out and inside in). [3]

The effects generated by the implemented corporate responsibility policy are at the heart of CSR influence on the performance of the organization.

The CSR effect is understood as a change in the welfare of the company and its stakeholders because of the implementation of the principles of corporate social responsibility through social investment.

1.5. THE EFFECTS OF CSR

Two lines of reasoning should be followed to determine why the CSR effect arises. Firstly, CSR affects the reputation of the organization and the brand preferences of customers, as well as their loyalty to them. Such studies include, for example, the work of Bhattacharya [2]. Secondly, CSR as a non-financial indicator has a positive impact on the performance of the company, in particular, on the financial indicators of the brand [8].

Therefore, CSR effects can theoretically be divided into two different types:

1. Social impact - changes in the welfare of external and internal stakeholders.
2. Business effect - changes in the welfare of the company and its shareholders.

In the field of social impact research, the study of Carroll [5] suggests that firms should fulfill four types of obligations to maintain the reputation of "good citizens": economic, legal, ethical, and philanthropic. Currently, CSR is defined in a broad sense as the obligation of the organization to respect the rights of the individual and promote human well-being in its activities. This implies a duty on the part of business to behave ethically.

Moreover, it should contribute to economic development of the society, together with improving the quality of life of its employees, their families and the local community as a whole, which in its essence is an impact on the stakeholders and generates a social effect. The importance for introduction of CSR in companies based on the following arguments:

- Moral duty
- Sustainable development
- License for activities
- Reputation effect

It is a moral obligation for companies to be "good" and to do the right things with regard to social norms. These principles underpin the work of "Social responsibility for business" - a leading NGO in the field of CSR in the United States. Members of the NGO should: "ensure that business objectives are achieved, taking into account human rights, social norms and without prejudice to the environment".

Sustainable development is reflected in environmental and social control. Norwegian Prime Minister Gro Harlem Brundtland gave the best definition of this category: "Meeting the needs of the present generation without endangering the needs of future generations".

It is the impact of CSR on reputation. Thanks to the introduction of corporate social responsibility, it is possible to develop the image of the organization, strengthen the brand, encourage employees and even increase the company's quotations on the stock exchange. The ability of CSR programs to influence the images and feelings of consumers in relation to the brand is especially worth noting here, so many brands make great efforts to create such unique associations in the minds of their customers [13].

Thus, the company achieves brand recognition. An important role is played by the understanding of the values of the public, its ethics and morals, through the introduction of ethical principles in the activities of the organization, which allows generating public confidence in the company. Let us consider as a subject of research long-term experience of realization of the CSR principles by the Bosch Company. Consider the practice of companies that have placed social and corporate responsibility at the head of their business and have achieved phenomenal indicators on the international market.

2. THE RESEARCH AND EXPERIMENT SECTION

2.1. THE OBJECT OF THE RESEARCH

Robert Bosch (1861-1942) in Stuttgart founded the Robert Bosch Group in 1886 as a 'Workshop of Precision Mechanics and Electrical Engineering'. [4] Since the opening, Robert Bosch has been aiming to help people by repairing and then creating own things 'generated for life'. Even the company's slogan reflects a love for people and high responsibility for the society.

'From a small workshop in which a first human-safe engine ignition system from magneto was invented, the company became the world's leading provider of technology and services. In 2016, about 375000 employees provided sales for more than 70, 6 billion euros. The company operates in four main business sectors: mobility solutions, industrial technologies, consumer goods, construction technologies and energy. Bosch includes 440

subsidiaries and regional companies in more than 60 countries. Bosch creates technologies developed for life, but surprisingly the company manages to do a brilliant business, while focusing on solving global issues of mankind, which include health, education, migration and ecology problems.’ [4]

Bosch has been operating in Russia since 1993. It has eight branches. Bosch group's turnover in Russia in the 2016 fiscal year amounted to 92 billion rubles, which is 4% more than in the 2015 fiscal year. More than 3,740 employees of the company (as of January 1, 2017) provide sales. The visibility and credibility of the Bosch brand is not in doubt. (The 3rd year in top 20 brands of Russia) [4]. The company aims to create a global brand that will be easily recognizable around the world.

The organizational structure of the company "Robert Bosch" in Russia is presented in Figure 1:

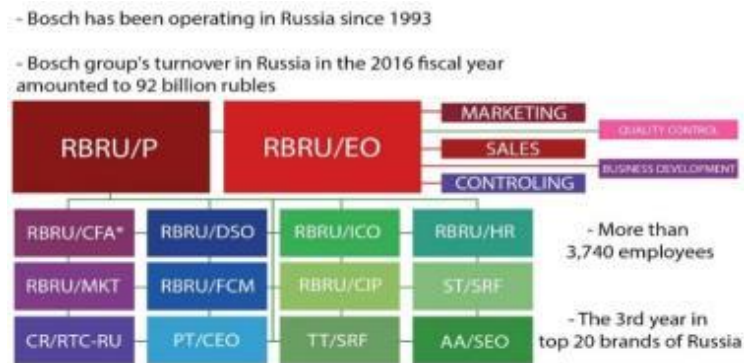


Figure 1. The organizational structure of the company "Robert Bosch". Made by author.

The assumption of responsibility for society and future generations has a long tradition at Bosch. In the early days of the company, Robert Bosch pioneered the launch of welfare programme for associates and their families; in non-business areas he played an active philanthropic role too. Today, the Robert Bosch Foundation promotes health care, international understanding, welfare, education and training, art, culture, and science.” [4] Moreover, The Robert Bosch Foundation has been supporting projects that aim at strengthening the ties of friendship and understanding between countries in the fields of healthcare, science, education for more than a decade. Sustainable development of the company based on the strategy “generated for life” and conveying the focus on creating safe, environmentally friendly and economic solutions, does not limit the company’s opportunities.

2.2. THE FEATURES OF CSR IN RUSSIA

Now, based on the program of innovative complexes - resource centers adopted by the Department of education of Moscow, Robert Bosch Company in Russia implements one project called “Bosch resource centers”. The main task of resource centers is to improve the quality of training of young specialists. According to Presidential decree No. 597 of 7 may 2012 on measures to implement state social policy, the number of highly skilled workers should be increased by 2020, so that it is at least one third of the number of qualified workers.

The equipment of resource centers on the basis of construction colleges and technical schools corresponds to the level of modern production and enables young people to engage for free on Bosch educational materials under the Ministry of Education. The certificate

obtained as a result of such education raises the level of knowledge of young specialists, increases the culture of using power tools and promotes a high level of loyalty in the future.

The main goal of the research is to determine the level of influence of the socially responsible policy consistently and long-term pursued by Bosch on the loyalty of the personnel and employees of service centers and dealers. The hypothesis of the study is that the implementation of CSR programs in the long term increases the brand commitment of all affiliated structures and clients of the company.

2.3. FINDINGS AND DISCUSSIONS

The research methodology is based on a comparative analysis of the results obtained by the method of sociological survey of employees of various Russian companies and data collected by a similar methodology for the Russian subsidiary of Bosch and its representatives. The survey was conducted by the method of filling in the online form of a questionnaire, which includes 6 blocks of questions on various aspects of CSR, acquaintance of employees and customers with socially responsible actions of companies, objective data regarding the Respondent's status and characteristics of the company such as size, scope of activity, financial and market stability.

At the first stage of the research, the results of which are given in this report, the survey was conducted among employees of service centers in different regions of the country: Krasnodar region, Kaliningrad region, Kirov region, the Republic of Komi, Saratov region, Moscow region.

According to the management structure, service centers are not formally subordinate to the Central office, but they are an important point of contact between users and the brand "Bosch". The data obtained are not yet sufficient to assess their representativeness and validity and are of a pilot nature. The majority of respondents (70%)-men with higher education (85%), familiar with the concept of CSR (47%) and ready to explain its meaning (17%), considering the presence of socially responsible policy unconditional advantage of the company (94%).

When determining the areas of CSR influence on the Bosch performance indicators, the respondents noted that the strongest influence of CSR activity has on the reputation of the company and customer loyalty. According to respondents, CSR has no direct impact on sales and profits. The importance of CSR policy on the marketing results of the company was noted by the majority of respondents, which corresponds to the theoretical provisions given in this work.

The assumption that CSR activities increase the loyalty of the company's personnel is confirmed by the data on the high and very high level of satisfaction with work in the company, which was noted by respondents who are aware of or involved in the implementation of CSR projects (72%). The level of willingness to participate in CSR projects and the penetration of standards of CSR in the corporate culture of the company and of affiliated organizations can be estimated by the distribution of answers to the question about willingness to support the establishment of a voluntary contribution Fund to assist employees who are in a difficult life situation. 76.5% of service center employees supported the initiative and 17.6% are ready to support it depending on the level of participation. This indicates that the knowledge and understanding of CSR policy by employees formed an active social position and readiness for real participation in socially significant events as actions leading to the strengthening of the company's reputation, increasing loyalty of stakeholders and customers, ensuring the success of the company's marketing activities.

Further research into the perception of CSR by employees of the company Bosch will allow a comparative analysis of the attitudes of employees and customers towards the CSR programs of various market participants and identify the factors, which determine the success of their implementation. Management and shareholders of the company will receive a tool that allows to evaluate the effectiveness of CSR programs, depending on the country of implementation, the focus of the program, target audiences. Formation of feedback mechanism is an important element of corporate social responsibility development system.

REFERENCES

1. Berrone P., Surroca J., Tribo JA, “Corporate ethical identity: a test of the mediating role of stakeholder satisfaction” // *Journal of Business Ethics* 76: 35-53, 2007.
2. Bhattacharya CB, Sen S., “Doing better at doing good: When, why and how consumers respond to corporate social initiatives” // *California Management Review*, 47, 9-25, 2004.
3. Blagireva E.N., “Projects "pro bono" as an effective marketing tool for service companies” / *Marketing services: new challenges and opportunities*. - Moscow: The Case, 2011.
4. Bosch Zunder, ‘Drawing on people power’, p.2-10, Stuttgart, 2016
5. Carroll A., B., “A three-dimensional conceptual model of corporate social performance” // *Academy of Management Review*. P. 497-505, 2009.
6. Dahlsrud A., “How Corporate Social Responsibility is Defined : an Analysis of 37 Definitions. How Corporate Social Responsibility is.”, 2006.
7. Gladkova E. A., Poldolina M. L. , Voznesenskaya E. A.; author-compiler Kalugina E. V., “The social entrepreneurship: from ideas to business idea.” IMSGS, 2014.
8. Luo X., Bhattacharya C., B., “Corporate social responsibility, customer satisfaction, and market value” // *Journal of Marketing*. P. 1-18, 2006.
9. Naletova A.S., Safronova N.B., “Evaluation of CSR performance indicators for socially responsible investment in emerging markets” // SPb, SPbSU Graduate School of Management, 2014.
10. Nancy R., Michael L., Rotchild L., “Declaration on Unique Principles and Features of Social Marketing.” / "Social Marketing and PR", N 4, 2011.
11. . Orlitzky M., Schmidt F. L., Rynes S. L., “Corporate social and financial performance: A meta-analysis” // *Organization Studies*, 24 (3), 403-441, 2003.
12. Reverte C., Gomez- Melero E., Cegarra- Navarro J., “The influence of corporate social responsibility on organizational performance: evidence from Eco-Responsible Spanish firms.” // *Journal of Cleaner Production*, 1-15, 2015.
13. Torres A., Tammo HA Bijmolt , Josep A. Tribó “Generating global brand equity through social responsibility to key stakeholders” // *International Journal of Research in Marketing*, v. Russia. 29, n. 1, pp. 13-24. ISSN 0167-8116, 2012.



ANALYSIS OF WORKING ENVIRONMENT AND CONDITIONS OF WORK IN PRODUCTION ORGANIZATIONS WITH ASPECT OF THE INFLUENCE OF HARMFUL IN THE WORKING PROCESS

Violeta Stefanović¹, Snežana Urošević², Ivana Mladenović-Ranisavljević³

¹Gradska uprava grada Leskovca; ²Univerzitet u Beogradu, Tehnički fakultet u Boru;

³Univerzitet u Nišu, Tehnološki fakultet u Leskovcu, Serbia

Abstract: Preservation a high level of health and safety at work is an important aspect of the business of socially responsible organizations. In the functioning of technological systems, employees are exposed to various influences and actions resulting from technological processes and operations in them. Therefore, the modern organizations requires to create a safe and harmless working conditions in order to adequately protect the health of employees and their safety. In accordance with the above mentioned research in this paper, they are directed towards the analysis of the working environment and working conditions in different industrial sectors at the tariff of the Jablanica Administrative District. Twenty different workplaces were examined and analyzed in various production processes, those were the workplace where the level of professional risk was increased, on which women are exposed to numerous harmful effects that becoming or occur in the work process. Based on the results and data obtained from the analysis, it was concluded that the most common negative impact on the health and safety of employees is harmful in the process of work - noise and chemical damage. The analysis found that in the chemical and textile industry production facilities, especially in the processes of processing and treating materials, the presence of chemical damage exceeds the maximum permissible and standards of prescribed value. The obtained results indicate that an effective and powerful health and safety management system at work can help to prevent uncontrolled risk and achieve the general wellbeing of employees and organizational goals.

Keywords: health, safety, employees, working conditions

1. UVOD

Briga o zdravlju i bezbednosti zaposlenih predstavlja važan aspekt poslovanja društveno odgovornih organizacija i pokazuje etički i socijalni nivo razvoja organizacije. Povećanje nivoa bezbednosti i zdravlja na radu, stvaranje povoljnih uslova rada i radnih odnosa, kao i optimizacija radnih procesa utiču na postizanje visokog stepena zadovoljstva radnika, opšte dobrobiti zaposlenih i postizanju organizacionih ciljeva [1, 2].

U proizvodnim procesima radnici su izloženi različitim uticajima koji su posledica tehnoloških procesa i operacija u njima. Imajući u vidu da je praktično nemoguće eliminisati pojavu štetnosti i opasnosti, kao i izgraditi bezotkazna i savršeno ergonomična sredstva rada, neophodno je izabrati takvu organizaciju tehnološkog procesa koja uvažava uslove radne

sredine, inicijalne faktore rizika, sadrži mere, postupke i sredstva za blagovremeno eliminisanje i smanjenje neželjenih posledica [3].

Kada se uzme u obzir napred navedeno može se reći da optimizacija uslova rada predstavlja opšti princip i preduslov umanjenju opasnosti koje mogu da ugroze život i zdravlje zaposlenih na radu. Optimalni uslovi rada u najvećoj meri zavise od vrste posla, ali i drugih faktora uslovljenih proizvodnim procesima, individualnim karakteristikama i sl.

Utvrđivanje nivoa opasnosti i mogućih štetnih uticaja na radnom mestu najznačajnija je faza u proceni profesionalnog rizika i ima izuzetno značajan efekat u upravljanju kvalitetom radne sredine i radnih procesa. Analiza radnih mesta zahteva sagledavanje svih faktora radne sredine koji mogu uticati na bezbednost i očuvanje zdravlja radnika. Realizuje se prikupljanjem podataka iz stručne dokumentacije, merenjem i ispitivanjem, posmatranjem i praćenjem tehnološkog procesa, analizom stanja u pogledu bezbednosti na radu, prikupljanjem potrebnih informacija od strane zaposlenih i drugih izvora.

Na osnovu analize, posmatranja i praćenja proizvodnih procesa utvrđeno je da postoje brojni faktori koji ugrožavaju čoveka na radnom mestu i van njega. Prvu grupu takvih faktora čine fizički faktori: mikroklima (temperatura, vlažnost i brzina strujanja vazduha), osvetljenje, buka, vibracije, zračenje, hemijske i biološke štetnosti. Drugu grupu predstavljaju oni faktori koji proizilaze iz rada mašina, korišćenja alata i dejstva električne struje [4].

Posledice izloženosti neadekvatnim vrednostima mikroklimе, osvetljenja, buke i vibracija, biološkim i hemijskim faktorima ne predstavljaju direktnu opasnost za život zaposlenog, ali prekomerna i dugotrajna izloženost neadekvatnim vrednostima ovih parametara može dovesti do oštećenja u organizmu i uticati na zdravlje radnika.

U okviru sprovođenja mera bezbednosti i zdravlja na radu menadžeri snose posebnu odgovornost. Obaveza menadžmenta organizacije je da obezbedi uslove za bezbedan i zdrav rad zaposlenih. Od njih se u skladu sa važećim zakonskim propisima zahteva da sistemski prate i otklanjaju sve potencijalne opasnosti na radnom mestu [5]. Odredbama Zakona o bezbednosti i zdravlja na radu utvrđena je i obaveza poslodavca da zaposlenima obezbedi i preda na upotrebu sredstva i opremu lične zaštite prema zahtevima radnog mesta.

U većini organizacija u kojima su pretežno zaposlene žene ergonomski problemi jedan su od osnovnih uticajnih faktora neadekvatnih uslova rada. U proizvodnim pogonima zaposlene se susreću sa brojnim problemima vezanim za slabo osvetljenje prostorija, lošu ventilaciju, kao i sa nedostatkom brojnih efikasnih mera bezbednosti. Kao profesionalno štetni faktori, pored fizičkih, hemijskih i bioloških, javljaju se i brojni drugi činioci koji narušavajući komfor u radnom procesu, dovode do promene zdravstvenog stanja i radne sposobnosti zaposlenih žena. Tu spadaju svakako neracionalna organizacija rada i odmora, nepovoljni psihosocijalni odnosi u kolektivu, dužina radnog vremena i niz drugih komponenti bitnih za formiranje zdrave radne sredine [6].

Poslednje decenije obeležene su stalnim ispitivanjem i razvojem mnogih metoda i mera u cilju poboljšanja uslova rada. Zhou sa grupom saradnika proučavajući klimu bezbednosti na radu izdvaja pet faktora bezbednosti: „sistem i procedure bezbednosti“, „posvećenost menadžmenta“, „stav o bezbednosti“, „radna okolina“ i „komunikacija i uključenost u sistem bezbednosti“ [7]. Stim u vezi može se reći da radna okolina i uslovi rada predstavljata jedan od značajnih faktora formiranja pozitivne klime bezbednosti na radu.

Konačno stvaranjem bezbednih uslova na radnom mestu i radnoj okolini omogućuje se zaposlenom da obavlja rad u optimalnim uslovima, što se veoma povoljno odražava na očuvanje fizičkog i mentalnog zdravlja zaposlenih kao i na njihove radne sposobnosti.

Daud [8] u svojoj studiji ističe da je kvalitet poslovnog života zaposlenih važan faktor za poslodavce koji su zainteresovani za poboljšanje zadovoljstva zaposlenih poslom i njihovoj posvećenosti.

2. ANALIZA RADNOG OKRUŽENJA I RADNIH USLOVA U PPROIZVODNIM ORGANIZACIJAMA

Analiza radnog okruženja i uslova rada prikazanih u radu izvršena je u proizvodnim organizacijama na teritoriji Jablaničkog upravnog okruga. U cilju izvršenih analiza odabrano je nekoliko industrijskih sektora: proizvodnja elektro opreme za potrebe automobilske industrije, prehrambena industrija, hemijska industrija za potrebe poljoprivrede i hemijska industrija boja i lakova, industrija nameštaja, tekstilna industrija, automobilska industrija i metalska industrija. Posmatrana su i analizirana dvadeset radna mesta u različitim proizvodnim procesima, i to ona radna mesta na kojima je povećan stepen profesionalnog rizika i na kojima su zaposlene žene izložene brojnim štetnostima koje nastaju ili se javljaju u procesu rada.

Na bazi podataka dobijenih iz stručnih nalaza nekoliko organizacija različitog proizvodnog programa, analizirani su uslovi radne sredine, dobijeni merenjem parametara mikroklimе i zone komfora u zimskom periodu, kao i prisustva hemijskih izvora štetnosti, buke, prisustva vibracija i nivoa osvetljenja na radnom mestu, koji su takođe utvrđeni u zimskom periodu. Periodični pregledi i provere opreme za rad vrše se u roku koji je utvrđen tehničkim propisima i standardima ili koji je određen uputstvom proizvođača [9].

U skladu sa pozitivnim zakonskim propisima, ispitivanje mikroklimе u organizacijama vrši se u letnjem periodu kada je spoljna temperatura iznad 25⁰C, a u zimskom periodu kada je spoljna temperatura ispod 5⁰C, na radnim mestima na kojima se zaposleni kreću ili zadržavaju više od dva sata u toku radnog vremena.

Utvrđivanje nivoa osvetljenosti na radnom mestu u radnoj okolini vrši se u skladu sa prihvaćenom metodologijom ispitivanja i merenja osvetljenosti, propisima u oblasti bezbednosti i zdravlja na radu, tehničkim propisima i standardima [10]. Svaki radni prostor zahteva određen nivo, kvalitet i karakteristike osvetljenja shodno procesima koji se u njemu odvijaju. Stoga se može reći da je osvetljenje izuzetno važno za obavljanje poslova i da značajno utiče na kvalitet rada zaposlenih [11]. Potrebna osvetljenost na radnom mestu određena je standardom Dnevno i električno osvetljenje prostorija u zgradama (SRPS U. C9. 100/62) i u skladu sa istim u ovim organizacijama izvršena su kontrolna merenja na svim radnim mestima, a rezultati su prikazani u tabeli 1.

Shodno važećim zakonskim propisima fizičke štetnosti buka i vibracije na radnom mestu utvrđuju se u procesu rada na mestima gde se iste emituju. Ispitivanje vibracija [12-13] i buke [14,19] ostvaruje se merenjem, analizom i upoređivanjem istih sa propisanim vrednostima. Povećane vrednosti buke kao važnog parametra radne sredine u odnosu na zakonski utvrđene mogu značajno uticati na zdravlje radnika [14]. Pri izvršenim merenjima u organizacijama u kojima je sprovedeno istraživanje nivo buke utvrđen je u toku rada mašina u procesu proizvodnje, za svako radno mesto u pogonu. Dopušten nivo buke definisan je s obzirom na vrstu delatnosti i vreme izlaganja radnika buci od 8 časova. Isti je određen Pravilnikom o preventivnim merama za bezbedan i zdrav rad pri izlaganju buci [15]. Nivo mehaničkih vibracija utvrđen je kao uticaj vibracije na celo telo, a granična vrednost dnevne izloženosti na radnom mestu u skladu sa vremenom izloženosti je 1,15m/s².

U savremenoj industrijskoj proizvodnji prisutan je veliki broj hemijskih supstanci koje mogu štetno uticati na čoveka i njegovo okruženje. Utvrđivanje hemijskih štetnosti kao faktora radne okoline vrši se na radnom mestu gde se u tehnološkim i radnim procesima

javljaju hemijske štetnosti, uzimanjem najmanje jednog uzorka na radnom mestu najbližem izvoru štetnosti. Vrednosti maksimalno dozvoljenih koncentracija ovog parametra određene su standardom, odnosno merenjem Maksimalno dozvoljene koncentracije škodljivih gasova, para i aerosola u atmosferi radnih prostorija i radilišta (JUS Z.BO 001 од 1991) i Pravilnikom o preventivnim merama za bezbedan i zdrav rad pri izlaganju hemijskim materijama [16].

Na osnovu Liste bezbednosnih podataka o materijalima (Material Safety Data Sheet) može se uvideti da veće količine ovih para mogu biti opasne, usled lake adsorpcije i transporta do pluća, te prekomerni uticaj može negativno uticati na nervni sistem, srčanu razdražljivost i može imati drugo negativno dejstvo po zdravlje zaposlenih [17].

Imajući u vidu negativni uticaj ovog izuzetno važnog parametra radne okoline, hemijske štetnosti su posmatrane i u tabeli 1. prikazane kao:

- a) vrednosti u granicama i iznad maksimalno dozvoljenih i kao
- b) nivo prisutne prašine.

Uvidom u stručne nalaze, izrađene od strane ovlašćene organizacije – instituta, utvrđeno je da u organizacijama u kojima je sprovedeno istraživanje postoje radna mesta na kojima su usled povećanih vrednosti parametara radne okoline, iznad maksimalno dozvoljenih, bezbednost i zdravlje zaposlenih žena ugroženi [18].

Štetni uticaj svih ovih parametara na zdravlje i bezbednost zaposlenih zavisi od posledica koje one izazivaju, verovatnoće pojave štetnosti kao i ekspozicije zaposlenih njihovom uticaju.

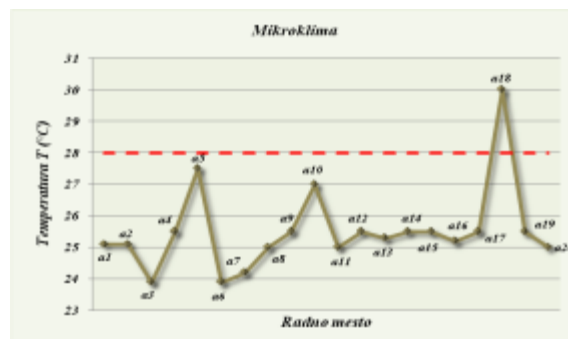
U radu, u tabeli 1 prikazane su vrednosti parametara radne okoline, definisane kao štetnosti koje nastaju ili se javljaju u procesu rada, utvrđene na dvadeset različitih proizvodnih mesta (izmerene u trenutku kontrole), koje su korišćene u daljoj analizi uslova rada. Merenja su izvršena u toku rada i vrednosti su prikazane crnom bojom a maksimalno dozvoljene vrednosti izražene su crvenom bojom.

Tabela 1. Vrednosti parametara radne okoline

Red. br.	Radno mesto	Mikro klima t(C ⁰)	Fizičke štetnosti		Hemijske štetnosti mg/m ³	Osvetljenje Lx
			Buka dB	Vibracije m/s ²		
a1	Poslovodja proizvodnje u pogonu tečnih i čvrstih pesticida	25,1 (28)	80 (85)	0 (1,15)	a) iznad vrednosti MDK [mg/m3] b) 2,44 (5)	145 (80-150)
a2	Laboratorijski tehničar u pogonu tečnih i čvrstih pesticida	25,1 (28)	71 (85)	0 (1,15)	a) iznad vrednosti MDK [mg/m3] b) 2,07 (5)	125 (80-150)
a3	Radnik u konfekciji grube čarape	23,9 (28)	87 (85)	0,51 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,03 (5)	140 (80-150)
a4	Radnik u konfekciji fine čarape (mašina za ušivanje unihopa)	25,5 (28)	79 (85)	0,51 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,05 (5)	141 (80-150)
a5	Radnik na fiksiranju peglanju tkanine	25,5 (28)	83 (85)	0,51 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,01 (5)	102 (80-150)
a6	Bojač (kada za bojenje tkanine - otvorena mašina)	23,9 (28)	77 (85)	0 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,05 (5)	105 (80-150)
a7	Operater na bowe mašini (mašina za bojenje tkanine - zatvorena mašina)	24,2 (28)	75 (85)	0 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,01 (5)	145 (80-150)
a8	Radnik na merceriziranju	25,0 (28)	93 (85)	0,6 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,01 (5)	143 (80-150)
a9	Radnik na pakovanju proizvoda u proizvodnji nameštaja	25,5 (28)	70 (85)	0 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,3 (5)	124 (80-150)
a10	Pomoćni radnik u okviru stolarskih radionica	27,0 (28)	77 (85)	0 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,01 (5)	124 (80-150)
a11	Modelar u procesu izrade predmeta (modela) od drveta i aluminijuma u proizvodnom procesu livnice	25,0 (28)	88 (85)	0,54 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 3,3 (5)	113 (80-150)
a12	Radnik na obmotavanju gumene niti	25,5 (28)	85 (85)	0,6 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,03 (5)	103 (80-150)
a13	Radnik na sakupljanju i drobljenju otpadnog sundera u proizvodnji nameštaja	25,3 (28)	85 (85)	0,2 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 3,6 (5)	116 (80-150)
a14	Radnik na farbanju tkanine (komore za farbanje)	25,5 (28)	86 (85)	0 (1,15)	a) iznad vrednosti MDK [mg/m3] b) 1,6 (5)	124 (80-150)
a15	Radnik u proizvodnom procesu automobilske industrije	25,5 (28)	87 (85)	0,51 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,6 (5)	113 (80-150)
a16	Radnik u proizvodnom procesu automobilske industrije – montaža	25,2 (28)	87 (85)	0,51 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 2,6 (5)	121 (80-150)
a17	Radnik na ručnoj obrad električnih provodnika za potrebe automobilske industrije	25,5 (28)	85 (85)	0,51 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 1,0 (5)	113 (80-150)
a18	Pekar	30,0 (28)	67 (85)	0 (1,15)	a) u granicama vrednosti MDK [mg/m3] b) 3,6 (5)	110 (80-150)
a19	Inženjer u laboratoriji hemijske industrije	25,5 (28)	84 (85)	0,51 (1,15)	a) iznad vrednosti MDK [mg/m3] b) 2,2 (5)	113 (80-150)
a20	Radnik na mašini za pakovanje (vertical flow-pack) u prehrambenij industriji	25,0 (28)	85 (85)	0,50 (1,15)	a) iznad vrednosti MDK [mg/m3] b) 4,2 (5)	113 (80-150)

Na osnovu prikazanih vrednosti mikroklima i uvidom u Stručne nalaze utvrđeno je da se temperature u analiziranim proizvodnim procesima, odnosno na radnim mestima, u zimskom

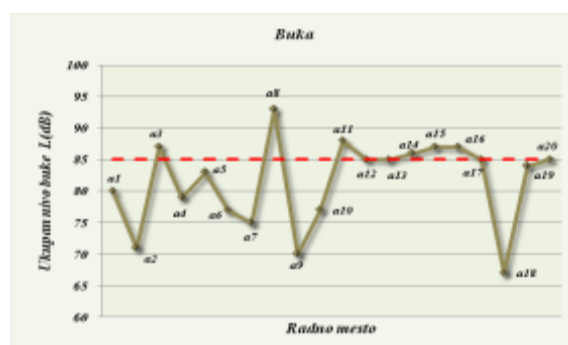
periodu, uglavnom malaze u zoni konfora. Na mestu a18 - odnosno u prehrambenoj industriji, usled specifičnosti radnog mesta utvrđeno je da vrednosti prelaze granično dozvoljene, te povećana temperatura može uticati na zdravlje zaposlene. Rezultati merenja grafički su prikazani na slici 1.



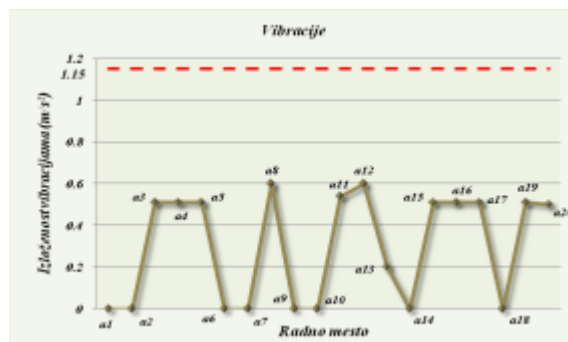
Slika 1. Vrednosti parametara radne okoline mikroklima

Kao značajan parametar radne sredine buka na pojedinim radnim mestima pri radu mašina u tehnološkim procesima premašuje maksimalno dozvoljene, zakonski propisane vrednosti. Vrednosti izmerenog nivoa buke prikazane u tabeli 1 grafički su predstavljene na slici 2. Nivo buke upoređen je sa dopuštenim vrednostima i izražen je u dB. Iz priložene tabele može se utvrditi da nivo buke na radnim mestima a3, a8, a11, a14, a15 i a16, premašuje standardima propisane vrednosti, te ista može negativno uticati na bezbednost i zdravlje zaposlenih. Takođe se može uvideti da su visoke vrednosti nivoa buke izmerene na većini posmatranih radnih mesta, te usled duže ekspozicije zaposlenih buka kao fizička štetnost u procesu rada može negativno uticati na zdravlje zaposlenih žena, a ujedno uticati na pojavu profesionalnih oboljenja.

Na osnovu podataka predstavljenih u tabeli 1 možemo uvideti da izmerene mehaničke vibracije, izražene kao uticaj vibracije na celo telo, kao potencijalne opasnosti na zdravlje zaposlenih ne premašuju standardima utvrđene vrednosti. Iste se javljaju se kao posledica rada mašina i prikazane su na slici 3.



Slika 2. Vrednosti parametara radne okoline – buka

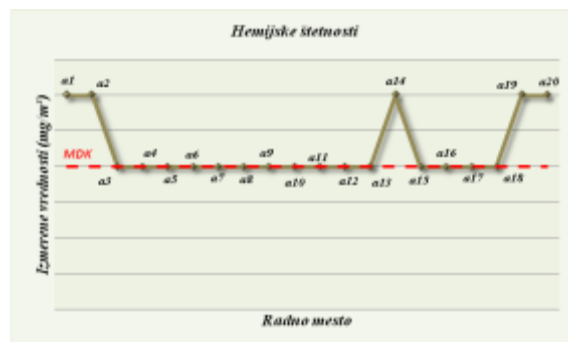


Slika 3. Vrednosti parametara radne okoline – vibracije

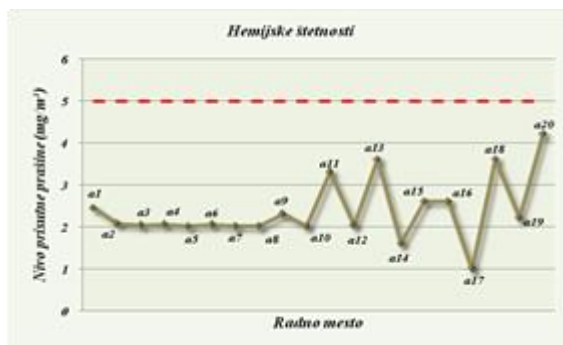
Pored buke koja se u brojnim proizvodnim procesima javlja kao negativni faktor uticaja radne okoline, prisustvo hemijskih materija čijem štetnom dejstvu su zaposlene žene direktno izložene može predstavljati potencijalnu opasnosti po bezbednost i zdravlje zaposlenih.

Obzirom da su u ovom istraživanju posmatrani različiti proizvodni procesi i različite grane industrije postoji i velika raznolikost u pogledu vrste hemijskih supstanci i škodljivih gasova, para i aerosola u atmosferi radnih prostorija i radilišta, koje su prisutne i izmerene u zoni disanja zaposlenog, te nije moguće uspostaviti poređenje istih. Stoga su podaci izmerenih vrednosti hemijskih supstanci prikazani kvalitativno kao vrednosti prisutnih hemijskih supstanci u odnosu na maksimalno dozvoljene koncentracije hemijskih supstanci prisutnih u procesu rada i nivo zapašenosti. Utvrđene vrednosti grafički su prikazane na slici 4 i slici 5.

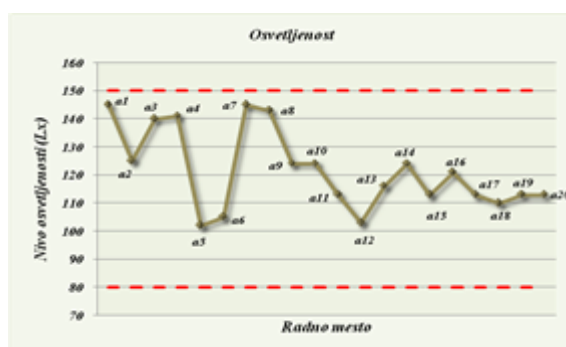
Analizom prikazanih rezultata je utvrđeno da se u proizvodnim pogonima tekstilnih i hemijskih organizacija, u kojima je sprovedeno istraživanje, naročito u pogonima hemijske obrade i tretiranja materijala, javljaju povećane koncentracije para hemijskih supstanci. Takođe je utvrđeno da je nivo prisutne prašine kao hemijske štetnosti u procesu rada na svim analiziranim radnim mestima ispod granične vrednosti. U svim analiziranim slučajevima u kojima je utvrđeno da su opasne hemijske materije prisutne na radnom mestu poslodavac je dužan da proceni rizik po bezbednost i zdravlje zaposlenih koji se javlja usled prisustva tih hemijskih materija, trajanja i intenziteta izloženosti.



Slika 4. Vrednosti parametara radne okoline – hemijske supstance



Slika 5. Vrednosti parametara radne okoline – nivo prašine



Slika 6. Vrednosti parametara radne okoline - osvetljenje

Adekvatan nivo svetljenja pri obavljanju bilo kog procesa izuzetno je značajan za očuvanje zdravlja zaposlenih i normalno izvršenje radnih zadataka, te je ovaj parametar radne sredine posmatran u ovoj analizi i uzet kao bitan element daljeg istraživanja. Vrednosti izmerenog nivoa osvetljenja prikazane su u tabeli 1 i na slici 6, kao prosečne vrednosti izražene u jedinici Lx, upoređene sa prosečnim vrednostima po zahtevima standarda. Može se uvideti da su sve izmerene vrednosti u opsegu 80-150 Lx. Na osnovu praktičnih istraživanja i obrazloženja datog od strane lica odgovornih za bezbednost i zdravlje na radu utvrdili smo da je ovo važan parametar zdravog i normalnog funkcionisanja i rada zaposlenih, te udaljavanje izmerene vrednosti od granične nije povoljno po zdravlje zaposlenih.

O izvršenom pregledu i proveru uslova radne okoline izdaje se stručni nalaz kojim se utvrđuje stanje, nivo i veličine karakteristični za određene elemente ispitivanja u skladu sa metodologijama ispitivanja uslova radne okoline. Stručni nalaz posebno sadrži iskazane rizike po zdravlje zaposlenih zbog prisustva fizičkih i hemijskih štetnosti iznad dozvoljenih nivoa ili koncentracija, nedovoljne osvetljenosti i mikroklima izvan zone komfora.

Kao profesionalno štetni faktori javljaju se i brojni drugi činioci koji narušavajući komfor u radnom procesu, dovode do promene zdravstvenog stanja i radne sposobnosti zaposlenih. Druge štetnosti koje se javljaju u radnom procesu, a koje mogu biti uzrok povrede na radu zaposlenog, profesionalnog oboljenja ili oboljenja u vezi sa radom takođe su posmatrane na radnim mestima ali iste nisu izdvojene iz stručnih nalaza i analizirane obzirom da u stručnim nalazima posmatranih procesa proizvodnje nije evidentirano njihovo prisustvo i uticaj na zdravlje i bezbednost zaposlenih.

Iz svega napred navedenog može se utvrditi da na pojedinim radnim mestima koja su analizirana u ovom radu, u proizvodnim procesima u kojima su zaposlene žene, parametri

radne okoline premašuju maksimalno dozvoljene i zakonski propisane vrednosti, odnosno da isti parametri mogu imati negativne posledice na zdravlje i bezbednost zaposlenih u različitim proizvodnim procesima.

Analizom prikupljenih podataka i prepoznatih, odnosno utvrđenih opasnosti i štetnosti i utvrđene liste opasnosti i štetnosti u radnoj okolini na svakom radnom mestu, izborom i primenom odgovarajućih metoda od strane lica zaduženih za bezbednost i zdravlje na radu vrši se procena rizika, kao i analiza verovatnoće nastanka i težine povrede na radu, oštećenja zdravlja ili oboljenja zaposlenog.

3. ZAKLJUČAK

Na osnovu rezultata i podataka dobijenih analizom došlo se do zaključka da najčešće negativni uticaj po zdravlje i bezbednost zaposlenih žena u posmatranim proizvodnim procesima imaju štetnosti u procesu rada i to fizičke štetnosti - buka i hemijske štetnosti. Analizom je utvrđeno da u proizvodnim pogonima hemijske i tekstilne industrije, posebno u procesima obrade i tretiranja materijala, prisustvo hemijskih štetnosti premašuje maksimalno dozvoljene i standardima propisane vrednosti. S obzirom da su tehnološki procesi proizvodnje izuzetno kompleksni i da se isti odvijaju direktnim korišćenjem složene opreme za rad, izvor buke praktično može biti svaki uređaj, postrojenje, instalacija i tehnološki postupak te je ovaj parametar radne sredine kao štetnost po zdravlje zaposlenih žena izdvojen kao najčešće prisutan. Štetni uticaj ovih i drugih parametara na zdravlje i bezbednost zaposlenih zavisi od posledica koje one izazivaju, verovatnoće pojave štetnosti i ekspozicije zaposlenih njihovom uticaju. Takođe je utvrđeno da vrsta faktora uticaja zavisi od same prirode i organizacije rada.

Na osnovu zahteva radnog mesta i procene uticaja radne okoline na bezbednost i zdravlje zaposlenih žena utvrđeno je da postoje radna mesta sa povećanim rizikom u procesu proizvodnje i obrade materijala.

Dobijeni rezultati rada ukazuju, na to da se ove analize mogu uspešno koristiti u cilju poboljšanja uslova rada, pogotovo kod radnih mesta na kojima su zaposleni najviše izloženi štetnim uticajima uslova radne okoline, u cilju očuvanja zdravlja radnika, povećanju zadovoljstva zaposlenih i postizanju organizacionih ciljeva.

Imajući u vidu da faktori radne okoline i stavovi zaposlenih o uslovima radne okoline mogu biti indikatori uticaja bezbednosti zaposlenih analiza radnog okruženja i radnih uslova može poslužiti u pravcu utvrđivanja nivoa razvoja klime bezbednosti u organizaciji.

Na kraju iz dobijenih rezultata može se uvideti da efikasan i snažan sistem upravljanja zaštitom zdravlja i bezbednosti na radu može pomoći u prevenciji nekontrolisanog rizika i postizanju opšte dobrobiti zaposlenih i organizacionih ciljeva.

REFERENCE

1. Logasakthi, K., Rajagopal, K., A study of employee health, safety and welfare measures of chemical industry in the view of salem region, International Journal of Research in Business Management (IJRBM), Vol. 1, Issue 1, June 2013, 1-10© Impact Journals.
2. Noah, Y., Steve, M., Work environment and job attitude among employees in a Nigerian work organization, Journal of Sustainable Society, 1(2), (2012), 36-43.

3. Krstić, I., Krstić, D., Kusalo, A., Analysis of indicators for the assessment of professional risk, (Analiza pokazatelja za procenu profesionalnog rizika), Inženjerstvo zaštite, 1(1), (2011), pp 45-58.
4. Jovanović, A., Mihajlović, I., Živković, Ž., Upravljanje proizvodnjom, Bor, 2005.
5. Urošević, S., Stefanović, V., Đorđević, D., Management of health and safety at work in the textile industry, (Menadžment sistem zdravlja i bezbednosti na radu u tekstilnoj industriji), Tekstilna industrija, 62(4), (2015), 39-46.
6. Arandžević, M., Jovanović, J., Medicina rada, Niš: Medicinski fakultet, prvo elektronsko izdanje za student integrisanih akademskih i osnovnih strukovnih studija, (2009), preuzeto sa http://www.medradanis.rs/docs/knjiga_medicina_rada.pdf.
7. Zhou, Q., Fang, D., Wang, X., A method to identify strategies for the improvement of human safety behavior by considering safety climate and personal experience. Safety Science, 46(10), (2008), 1406–1419.
8. Normala, D., Investigating the Relationship Between Quality of Work Life and Organizational Commitment Amongst Employees in Malaysian Firms, International Journal of Business and Management, 5(10), (2010), p75.
9. Pravilnik o postupku pregleda i provere opreme za rad i ispitivanja uslova radne okoline ("Sl. glasnik RS", br. 94/06, 108/06 - ispr., 114/14 i 102/2015).
10. Steidle, A., Werth, L., In the spotlight: Brightness increases self-awareness and reflective self regulation, Journal of Environmental Psychology, 39, (2014), 40-50.
11. <http://journals.tubitak.gov.tr/medical/issues/sag-98-28-5/sag-28-5-18-96168.pdf>
12. Wolfgang, R., Burgess-Limerick, R., Using consumer electronic devices to estimate whole-body vibration exposure, Journal of Occupational and Environmental Hygiene, 11(6), (2014), 77-81.
13. Faramarzi, F., Farsangi, M.A.E., Mansouri, H., Simultaneous investigation of blast induced ground vibration and airblast effects on safety level of structures and human in surface blasting, International Journal of Mining Science and Technology, 24(5), (2014), 663-669.
14. Kirin, S., Lauš, K., Noise level research in the technological process of absorbing, (Istraživanje razine buke u tehnološkom procesu ušivanja), Sigurnost, 53(3), (2011), 243-250.
15. Pravilnik o preventivnim merama za bezbedan i zdrav rad pri izlaganju buci („Sl. glasnik RS“, br. 96/2011 i 78/2015).
16. Pravilnik o preventivnim merama za bezbedan i zdrav rad pri izlaganju hemijskim materijama („Sl. glasnik RS“, br. 106/09).
17. www.upravljanjehemikalijama.com/hemikalije/narocito-opasne-hemikalije.
18. <https://laboureconomics.wordpress.com/2013/04/30/working-conditions-in-the-global-fashion-industry/>.
19. Atmaca, E., Peker, I., Altin, A., Industrial Noise and Its Effects on Humans, Polish Journal of Environmental Studies, 14 (6), (2005), 721-726.



POST-USE OF PRODUCTS - ENVIRONMENT MANAGEMENT TOOL

Saša Raletić Jotanović, Dragan Janjušić, Valerija Večei Funda

*College of Professional Studies in Management and Business Communication Sremski
Karlovci, Serbia*

Abstract: Post-use of products involves use of products and its packagings after the end of consumption, the expiration date or failure. Today, post-product use as a form of ecologically responsible consumer behavior is becoming more prevalent and as such an increasingly powerful tool for managing the environment. There are no data on post-use of the product in the Republic of Serbia. Due to all of the foregoing, the goal of the paper is analyze of post-use of products in the Republic of Serbia in terms of presence post-use of product and demographic characteristics of consumers who behave ecologically responsibly in that way. The paper implies empirical research on a sample of 100 respondents from the territory of Serbia through an e-questionnaire. Practical application of the results will enable more adequate management of the environment while the theoretical application of the results is reflected in the application of the results as secondary for other studies.

Keywords: post-use, ecologically responsible consumer behavior, environmental management

1. POST-UPOTREBA PROIZVODA

Ekološki odgovorno ponašanje potrošača podrazumeva ljudsku interakciju sa prirodom kroz potrošačku praksu [1].

Post-upotreba proizvoda podrazumeva upotrebu proizvoda i njegovog pakovanja nakon završetka konzumiranja, isteka roka trajanja ili kvara. U različitim kategorijama proizvoda to bi, na primer, značilo:

- u kategoriji hrane i pića – da se od iskorišćenih plastičnih čaša napravi ukrasni sneško belić,
- u kategoriji kućne hemije – dosipanje tečnog sapuna u već kupljenu flašicu za sapun,
- u kategoriji odeće i obuće – da se od stare obuće napravi saksija (Slika 1a),
- u kategoriji nameštaja – da se od stare fijeke napravi polica i držač za nakit (Slika 2b),
- u kategoriji tehničkih uređaja – da se delovi od starog bicikla, koji više nije za upotrebu, iskoriste za drugi bicikl,
- u kategoriji prevoza – da se od dotrajalih guma za automobile napravi dečije igralište, u kategoriji kancelarijskog materijala – da se od starog ili neispravnog cd-a naprave podmetači za čaše.



Slika 1. Post-upotreba proizvoda [2, 3]

Brojna istraživanja su sprovedena na temu post-upotrebe proizvoda kao ekološki odgovornog ponašanja potrošača u različitim državama sveta [4, 5, 6, 7, 8, 9, 10]. Većina napred navedenih istraživanja analiziraju post-upotrebu proizvoda sa različitih aspekata, kao i demografske razlike u odnosu na post-upotrebu proizvoda ispitanika.

Ako se posmatra pol u odnosu na post-upotrebu proizvoda, dve studije [5, 8] ukazuje da žene i muškarci u istoj meri „konzumiraju“ post-upotrebu proizvoda, dok studija [4] ukazuje da žene u većoj meri „konzumiraju“ post-upotrebu proizvoda od muškaraca.

Ako se posmatra starosna dob u odnosu na post upotrebu proizvoda studija [7] rezultirala je podacima da stariji potrošači u većoj meri „konzumiraju“ post-upotrebu proizvoda nego mladi, dok studija [4] ukazuju da su ipak, mladi potrošači ekološki odgovorniji nego stariji, kada se posmatra post-upotreba proizvoda.

Ako se analizira stepen obrazovanja u odnosu na post upotrebu proizvod zaključuje se da većina studija: [4, 5, 8] je rezultirala podacima da su obrazovaniji postrošači upravo oni koji su više angažovani u post-upotrebi proizvoda.

Ako se analiziraju mesečna primanja domaćinstva u odnosu na post upotrebu proizvoda dolazi se do zaključka da je većina studija [4, 5, 8] ukazuje da su potrošači u boljoj ekonomskoj situaciji angažovaniji u post-upotrebi proizvoda u odnosu na potrošače u lošijoj ekonomskoj situaciji.

Prema saznanjima autora, do sada ne postoji istraživanje na temu post-upotrebe proizvoda sprovedeno na uzorku ispitanika sa teritorije Republike Srbije. Postoje dva kros-kulturalna istraživanja na temu ekološki odgovorne kupovine i ekološki odgovornog konzumiranja na prostori svih šest bivših jugoslovenskih republika, u koje spada i Republika Srbija [11, 12]. Rezultati kros-kulturalnih istraživanja ukazuju da je ekološki odgovorno ponašanje potrošača u Republici Srbiji na niskom nivou kao i da postoje demografske razlike potrošača u odnosu na ekološki odgovorno ponašanje potrošača, sem pola.

Zbog svega napred navedenog, predmet istraživanja jeste post-upotreba proizvoda dok je cilj istraživanja analiza post-upotrebe proizvoda u Republici Srbiji i demografskih karakteristika potrošača koji se na taj način ponašaju ekološki odgovorno.

Prema rezultatima ranije sprovedenih studija, pretpostavlja se:

H1: Zastupljenost post upotrebe proizvoda u Republici Srbiji je na niskom nivou.

H2: Ispitanici različitih polova u istoj meri primenjuju post-upotrebu proizvoda u Republici Srbiji.

H3: Ispitanici različite starosne dobi u istoj meri primenjuju post-upotrebu proizvoda u Republici Srbiji.

H4: Ispitanici sa višim stepenom stručne spreme su angažovaniji u post-upotrebi proizvoda od ispitanika sa nižim stepenom stručne spreme u republici Srbiji

H5: Ispitanici iznad prosečnih mesečnih primanja domaćinstva su angažovaniji post-upotrebu proizvođa od ispitanika sa prosečnim i ispod prosečnim mesečnim primanjima domaćinstva u Republici Srbiji.

2. METODOLOGIJA ISTRAŽIVANJA

2.1. UZORAK ISTRAŽIVANJA

U Tabeli 1 je prikazana struktura uzorka prema polu. Na početku može se primiti da je ukupan uzorak na kome je rađeno istraživanje 276 ispitanika. Takođe, primećuje se da veći deo uzorka čine ispitanici ženskog pola.

Tabela 1. Polna struktura uzorka

Republika Srbija	Muški	Ženski	Total
broj ispitanika	114	162	276
%	41,30	58,70	100

U Tabeli 2 je prikazana je starosna struktura uzorka. Uočava se da skoro polovinu uzorka sačinjavaju mlađi ispitanici, uzrasta od 18 do 30 godina, te da sledeću značajnu kategoriju predstavljaju ispitanici starosti od 31 do 40 godina. Najmanje ispitanika potiče iz kategorije od 71 do 80 godina.

Tabela 2. Starosna struktura uzorka

Republika Srbija	Starosne kategorije (u godinama)					
	18-30	31-40	41-50	51-60	61-70	71-80
broji spitanika	118	86	22	32	14	3
%	42,76	31,16	7,97	11,60	5,07	1,44

U Tabeli 3, prikazana je struktura uzorka prema stepenu stručne spreme. Primećuje se da najmanje ispitanika ima završenu osnovnu školu, kao i da podjednak broj ispitanika ima završenu srednju školu, i višu/visoku školu. Nešto manji broj ispitanika ima završene diplomske, ili post diplomske studije.

Tabela 3. Struktura uzorka prema stepenu obrazovanja

Republika Srbija	Stepen obrazovanja			
	Osnovnaškola	Srednjaškola	Viša/visokaškola	MSc/magistratura/PhD
broj ispitanika	7	126	93	50
%	2,54	45,65	33,70	18,11

Na kraju, u Tabeli 4, prikazana je struktura uzorka prema prosečnim mesečnim primanjima. Primećuje se najviše ispitanika procenjuje da ima prosečna primanja dok najmanje ispitanika procenjuje da ima iznad prosečna primanja, u odnosu na republički prosek države.

Tabela 4. Struktura uzorka prema mesečnim primanjima

	Visina mesečnih prihoda		
Republika Srbija	Ispod proseka	Prosečna	Iznad proseka
broj ispitanika	70	112	94
%	25,36	40,58	34,06

2.2. INSTRUMENT

Krajnji upitnik je kreiran na osnovu prethodno sprovedenih istraživanja [8, 11, 12].
Krajnji upitnik je sačinjen iz tri dela:

1. Saglasnosti za popunjavanje upitnika. Popunjavanje upitnika je bilo anoniomno.
2. Demografskih karakteristika ispitanika: država, pol, godine starosti, stručna sprema i mesečna primanja domaćinstva. Pitanja vezana za državu, pol, stručnu spremu i mesečna primanja domaćinstva su zatvorenog tipa dok je pitanje o starosnoj dobi ispitanika otvorenog tipa.
3. Post-upotrebe proizvoda kao ekološki odgovornog ponašanja.

2.3. POSTUPAK I TOK ISTRAŽIVANJA

Upitnik je distribuiran kao link Internet platform Gugl drajva (Google drive) na i-mejllove ili fejbuk (Facebook) adres eispitanika.

3. REZULTATI

U Figuri 1. prikazan je odnos ispitanika koji primenjuju post-upotrebu proizvoda kao oblik ekološki odgovornog ponašanja potrošača i onih ispitanika koji ne primenjuju post-upotrebu proizvoda kao ekološki odgovorno ponašanje potrošača. Može se primetiti da nešto malo više od jedne četvrtine ispitanika ($AS=25,63$) „konzumira“ post-upotrebu proizvoda kao ekološki odgovorno ponašanje potrošača.

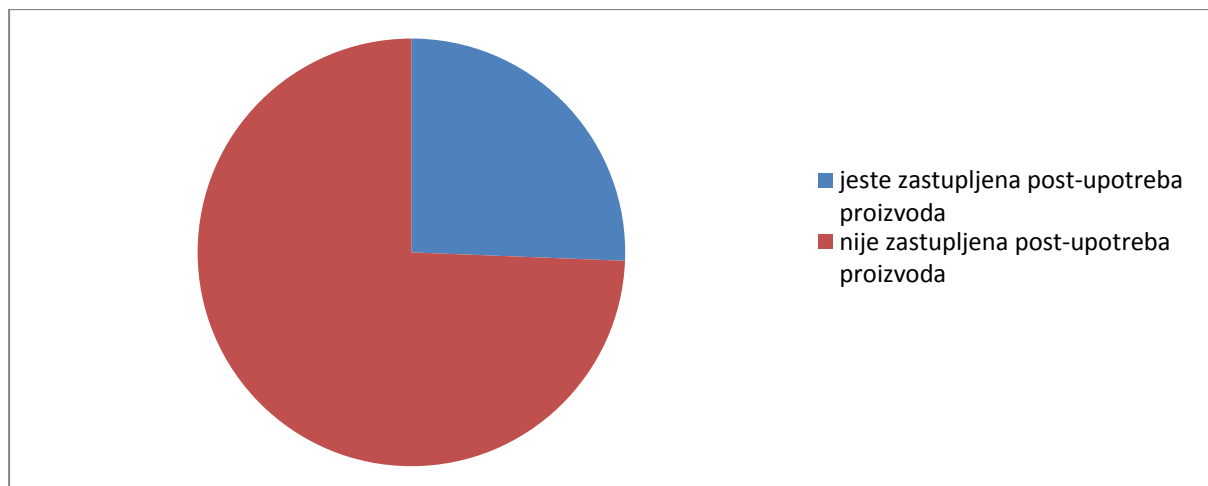


Figura 1. Zastupljenost post-upotrebe proizvoda u Republici Srbiji

U Figuri 2. prikazane su razlike u meri u kojoj je zastupljena post-upotreba proizvoda između polova. Može se primetiti da žene (AS=25,68) pokazuju tendenciju ka većoj post-upotrebi proizvoda u odnosu na muškarce (AS=25,593). Postojeća razlika je vrlo mala.

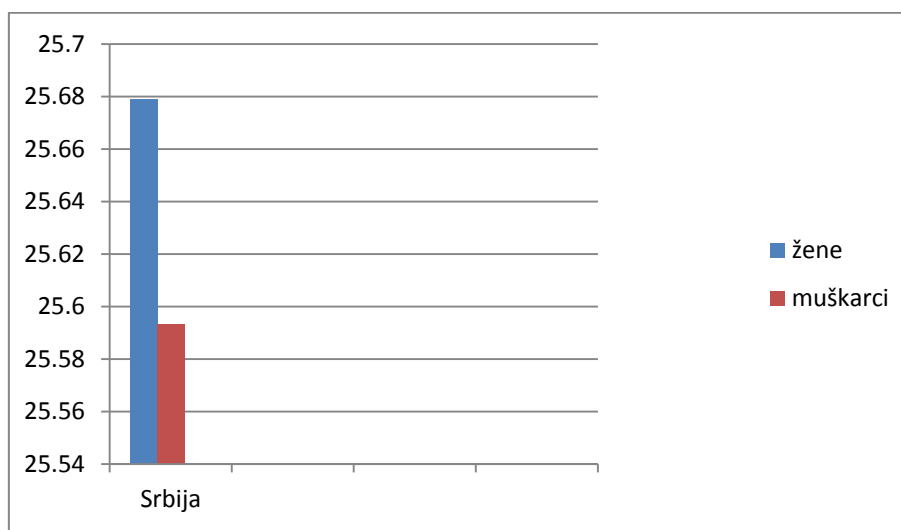


Figura 2. Razlike u polu u odnosu na post-upotrebu proizvoda u Republici Srbiji

U Figuri 3. su prikazane razlike u meri u kojoj je zastupljena post-upotrebi proizvoda u odnosu na starosnu dob ispitanika. Analiza Figure 3. ukazuje da je post-upotreba proizvoda najzastupljenija u starosnoj kategoriji ispitanika između 61-70 godina (AS=27,42857) dok je najmanje zastupljena u starosnoj dobi ispitanika između 18-30 godina (AS=25,12164). Međutim, ukazuje se da razlike između starosnih dobi nisu velike.

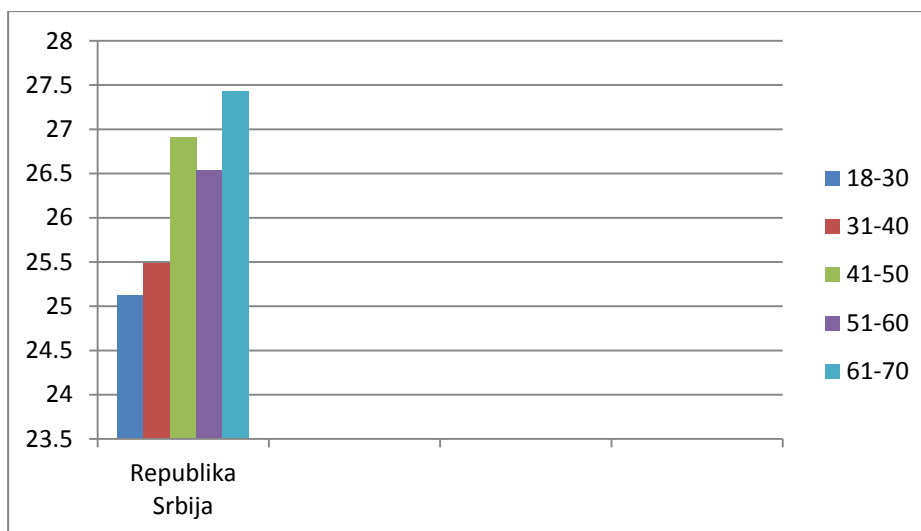


Figura 3. Razlike u starosnoj dobi u odnosu na post-upotrebu proizvoda u Republici Srbiji

U Figuri 4. su prikazane razlike u meri u kojoj je zastupljena post-upotrebi proizvoda u odnosu na stepen završenog obrazovanja ispitanika. Analiza Figure 4. ukazuje da je post-upotreba proizvoda najzastupljenija kod ispitanika koji imaju završeno osnovno obrazovanje (AS=30,000) dok je najmanje zastupljena kod ispitanika koji imaju završen master, magistraturu ili doktorat (AS=24,49043). Značajnije razlike postoje između ispitanika koji imaju završeno osnovno obrazovanje i svih drugih analiziranih grupa, u korist ispitanika sa osnovnim obrazovanjem.



Figura 4. Razlike u stepenu obrazovanja u odnosu na post-upotrebu proizvoda u Republici Srbiji

U Figuri 5. su prikazane razlike u meri u kojoj je zastupljena post-upotrebi proizvoda u odnosu na mesečna primanja domaćinstva. Analiza Figure 5. ukazuje da je post-upotreba proizvoda najzastupljenija kod ispitanika koji imaju ispod prosečna mesečna primanja domaćinstva (AS=27,02042) dok je najmanje zastupljena kod ispitanika koji imaju iznad prosečna mesečna primanja domaćinstva (AS=24,51724). Značajnijim razlikama se može

smatrati razlika između ispitanika koji imaju ispod i iznad prosečna mesečna primanja domaćinstva.

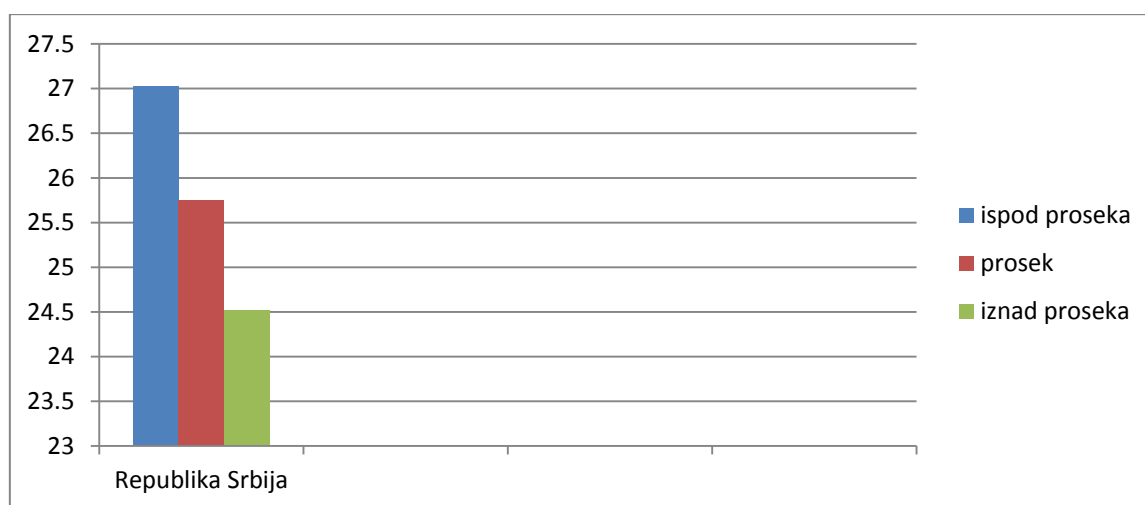


Figura 5. Razlike u prosečnim primanjima domaćinstva u odnosu na post-upotrebu proizvoda u Republici Srbiji

4. ZAKLJUČAK

Rezultati napred sprovedene studije ukazuju:

- nešto malo više od jedne četvrtine ispitanika „konzumira“ post-upotrebu proizvoda kao ekološki odgovorno ponašanje potrošača;
- da žene pokazuju tendenciju ka većoj post-upotrebi proizvoda u odnosu na muškarce (postojeća razlika je vrlo mala);
- da je post-upotreba proizvoda najzastupljenija u starosnoj kategoriji ispitanika između 61-70 godina dok je najmanje zastupljena u starosnoj dobi ispitanika između 18-30 godina (razlike između starosnih dobi nisu velike);
- da je post-upotreba proizvoda najzastupljenija kod ispitanika koji imaju završeno osnovno obrazovanje dok je najmanje zastupljena kod ispitanika koji imaju završen master, magistraturu ili doktorat (značajnije razlike postoje između ispitanika koji imaju završeno osnovno obrazovanje i svih drugih analiziranih grupa, u korist ispitanika sa osnovnim obrazovanjem);
- da je post-upotreba proizvoda najzastupljenija kod ispitanika koji imaju ispod prosečna mesečna primanja domaćinstva dok je najmanje zastupljena kod ispitanika koji imaju iznad prosečna mesečna primanja domaćinstva (značajnijim razlikama se može smatrati razlika između ispitanika koji imaju ispod i iznad prosečna mesečna primanja domaćinstva).

S obzirom na napred navedene rezultate zaključuje se da je:

- H1: Zastupljenost post upotrebe proizvoda u Republici Srbiji je na niskom nivou – potvrđena.
- H2: Ispitanici različitih polova u istoj meri primenjuju post-upotrebu proizvoda u Republici Srbiji – delimično opovrgnuta.
- H3: Ispitanici različite starosne dobi u istoj meri primenjuju post-upotrebu proizvoda u Republici Srbiji - opovrgnuta
- H4: Ispitanici sa višim stepenom stručne spreme su angažovaniji u post-upotrebi proizvoda od ispitanika sa nižim stepenom stručne spreme u Republici Srbiji – opovrgnuta.
- H5: Ispitanici iznad prosečnih mesečnih primanja domaćinstva su angažovaniji u post-upotrebi proizvoda od ispitanika sa prosečnim i ispod prosečnim mesečnim primanjima domaćinstva u Republici Srbiji – opovrgnuta.

Praktična primena rezultata omogućiće adekvatnije upravljanje životnom sredinom tako što će napred dobijeni rezultati poslužiti za kreiranje i prilagođavanje strategije povećanja post-upotrebe proizvoda kao ekološki odgovornog ponašanja potrošača.

Teorijska primena rezultata odražava se u primeni rezultata kao sekundarnim podacima za druge studije odnosno, kreiranju profila potrošača koji se ekološki odgovorno ponašaju putem post-upotrebe proizvoda.

Predlozi za buduća istraživanja jesu: da se sprovede komparativno istraživanje na temu post-upotrebe proizvoda u Srbiji sa drugim državama, da se sprovede longitudinalno istraživanje za 10 godina sa istim instrumentom istraživanja i sličnim uzorkom i da se sprovede istraživanje koje uključuje i nove varijable u smislu grupe proizvoda u okviru kojih se post-upotreba proizvoda realizuje odnosno, ne realizuje.

REFERENCE

1. Ukenna, S., Nkambe, A.D., Nwizugbo, I.C., Moguluwa, S.C. & Oliseh, M.C, Profiling the Environmental Sustainability-Conscious (ESC) Consumer: Proposing the S-P-P Model, *Journal of Management and Sustainability*, 2 (2), (2012), 197-210. DOI: 10.5539/jms.v2n2p197
2. <https://www.pinterest.com/pin/331929435012463022/>
3. <https://www.pinterest.com/pin/298433912793780044>
4. Granzin, K.L. & Olsen, J.E., Characterizing participants in activities protecting the environment: A focus on donating, recycling and conservation behaviors, *Journal of Public Policy and Marketing*, 10 (2), (1991), 1–27.
5. Schultz, W.P., Oskamp, S. & Mainieri, T., Who recycles and when? A review of personal and situational factors, *Journal of Environmental Psychology*, 15 (2), (1995), 105–121. DOI:10.1016/0272-4944(95)90019-5.

6. Niva, M. & Timonen, P., The role of consumers in product-oriented environmental policy: can the consumer be the driven force for environmental improvements?, *International Journal of Consumer Studies*, 25 (4), (2013), 331–338. DOI: 10.1046/j.1470-6431.2001.00204.x
7. Smallbone, T., How can domestic households become part of the solution to England's recycling problems?, *Business Strategy and the Environment*, 14 (2), (2005), 110–122. DOI: 10.1002/bse.442
8. Tilikidou, I. & Delistavrou, A., Types and influential factors of consumers' non-purchasing ecological behaviors. *Business Strategy and the Environment*, 17 (1), (2008), 61–76. DOI: 10.1002/bse.500
9. Essoussi, L.H. & Jonathan, D.L., New or recycled products: how much are consumers willing to pay?. *Journal of Consumer Marketing*, 27 (5), (2010), 458–468. DOI:org/10.1108/07363761011063358
10. European Parliament, Workshop - Plastic Waste, European Parliament, Brussels, 2013.
11. Raletić Jotanović, S., Sudarević, T., Katić, A., Kalinić, M., Kalinić, Č., Environmentally Responsible Purchasing – Analysis of the Ex – Yugoslavian republics, *Applied Ecology and Environmental Research*, 14 (3), (2016), 559-572, DOI: http://dx.doi.org/10.15666/aeer/1403_559572.
12. Raletić Jotanović, S., Milijanka, R., Zakić, N., Pro-Environmental Activities of Consumers, *Polish Journal of Management Studies*, 16 (1), (2017), 55-66, DOI: 10.17512/pjms.2017.16.1.05.



A CONTRIBUTION TO THE IMPROVEMENT OF A MANAGEMENT PROCESSES IN MAINTENANCE OF RAILWAY VEHICLES

Zoran Antić¹, Zoran Nešić², Đorđe Mihailović³

¹Organization of Serbia railway inventors, Belgrade; ²University of Kragujevac, Faculty of Technical Sciences Čačak; ³High Technological School of Applied Studies, Aranđelovac, Serbia

Abstract: The railway system represents a very complex technical and technological system in which the organization of maintenance of rolling stock is one of the most important places. The paper defines the structure of the railway system and the management of maintenance processes for railway traction vehicles. By the analytical approach, through the management of the process of regular and extraordinary maintenance, are provided guidelines for improving the organization of the maintenance of towing vehicles and the fulfillment of its basic strategy, to ensure that towing vehicles are in constant working order and reliable in operation.

In order to achieve the desired quality of maintenance, in the paper are considered all factors of influence, whose control and management can be clearly seen in the quality improvements of the maintenance of railway vehicles. The paper links the process of holding traction devices with reference to the quality of maintenance, because it guarantees the reliability and regularity of rail traffic.

Also, the contribution of the paper is identification of the various factors of influence in the maintenance of vehicles used on a railroad and segments of organizational structures which contribute to the improvement of maintenance technology and consequently the quality of maintenance. All these elements together make the availability of traction vehicles for traffic at a high level, which is a contribution to improving the operation of the railways.

Keywords: management of organizational processes, maintenance management, railway vehicles, maintenance strategy

1. INTRODUCTION

The maintenance task is to provide rail vehicles in the proper condition for safe, orderly and economical operation in exploitation. Maintenance has a preventive character, where maintenance work is foreseen in the context of periodic inspection and regular work. The frequency of these inspections is experimentally determined depending on the time spent by the vehicle in the operation, the number of kilometers traveled by the vehicle, or any other suitable criterion. When the opportunity arises, regular maintenance is supplemented by the execution of extraordinary repairs. Depending on the scope and importance, the maintenance of the railway vehicles is carried out in repair workshops, depot workshops, car workshops and in railway stations and construction sites of railway infrastructure, when conditions for

this exist. It was written in the previous railway regulations [1]. Due to the understanding of the importance of maintaining railway vehicles, tradition and experience, it is not perhaps the above mentioned regulations, but also to strictly respect and apply what is stated in the most recent modern regulations, that "the maintenance of a railway vehicle is a set of pre-planned works as part of regular maintenance as well as unplanned works as part of the emergency maintenance of vehicles, which are performed on the vehicle, its systems, devices, assemblies and parts with the purpose that during use the railway vehicle meets the technical requirements for the safety of the railway traffic " [2].

The railway system in Serbia has been operating for more than 130 years (the first railroad between Belgrade and Nis was put into operation in 1884), and as far as transport vehicles are concerned, the use of steam, diesel and electric towers has been used today. With the towing system, the work of the maintenance system of the railway vehicles is closely linked, which also has the mentioned tradition. Thus, in this paper, a system of maintenance of rolling stock, from the transition period to the present day, is present in a certain form, with particular emphasis on the quality of maintenance.

The area of maintenance of rolling stock has always been implemented by legal regulations and in particular railway regulations through regulations and instructions issued by LRU.

In today's reorganized railways of Serbia, in line with European integration, the maintenance of rolling stock is carried out in two independent joint stock companies "Srbija Voz" and "Srbija Kargo" ad, with the division of property (rolling stock, depots, workshops and business premises) . The companies started working 10.08.2015. It is only now that the analysis of business results confirms the justification of the new organization of Serbian Railways and certain organizational structures. The Law on Railways ("Official Gazette of RS" No. 91/15), Law on Safety and Interoperability of the Railway ("Official Gazette" RS No. 92/15) has been adopted and what is especially important for maintenance of rolling stock, Regulation on the maintenance of railway vehicles, passed by the Railways Directorate of the RS, as well as maintenance instructions, which each company brought independently.

This work deals exclusively with the maintenance of towing vehicles (diesel and electric locomotives and diesel and electric motors), which, due to their own operation, represent much more complex rail vehicles than towed vehicles (passenger and cargo vehicles), and final conclusions regarding quality maintenance of towing vehicles, certainly to a great extent be applicable to towed vehicles.

2. MAINTENANCE OF RAILWAY VEHICLES

In accordance with the Rulebook on Maintenance of Railway Vehicles of the Railway Directorate of the RS, Instructions for maintenance of towing vehicles "Srbija Kargo" ad [3] and Instructions for maintenance of towing vehicles "Srbija voz" ad [4], the criteria for instructing the towing vehicle for inspection or repair are the time period of exploitation or the number of kilometers traveled, or the number of hours worked by individual series of towing vehicles:

2.1. VEHICLE CONTROL IN EXPLOITATION - CONTINUOUS CONTROL

The name itself indicates that during the operation of the towing vehicle, a constant control of the functionality of the towing vehicle is required (before the commencement of

operation, during operation and after the end of operation), for which traction staff (for locomotives) are to be trained, ie, traction and trainee staff for motor kits). It follows that the constant mobility of towing vehicles and their permanent availability for the development of rail transport is necessary.

2.2. SERVICE OVERVIEW

Service inspection is a type of inspection ranging from daily to weekly overview of particular types of vehicles, is performed in depots where visual inspection is possible from the channel and on the roof of the vehicle and includes an overview of the lower machine of the towing vehicle, braking system, roof equipment and safety and protection devices , with necessary replenishment of supplies of propulsion material. It is important to note that a towing vehicle that has not been used for more than 5 days must be inspected before reuse.

2.3. PERIODIC CONTROL EXAMINATIONS

The most important segment of the maintenance of towing vehicles is the periodic inspection of towing vehicles. It is performed to periodically check the correctness of the subsystems, circuits and devices of the towing vehicle according to the cycles given in Figure 2 for a period of one year and to the extent determined by the instructions "Srbija Kargo" ad and "Srbija Voz" ad and included in the lists of periodical inspections for mechanical , electrical, pneumatic and other parts of the vehicle, in particular equipment related to the safety of rail transport.

It is undoubtedly that the order of reference for the periodic inspection, which is determined by the mileage criterion or the previous calendar days, is undoubtedly important, with the criterion that was first fulfilled. The periodic inspection review criterion may be reduced or increased by 15%.

The aforementioned optimal criteria for electric locomotives came primarily through the empirical method (the long-term monitoring of the functioning of the locomotive in exploitation), which can be generalized for each series individually according to its specificities. It is normal for new towing vehicles to be respected by the manufacturer's recommendations.

2.4. REGULAR REPAIR

A very important role in the improvement of the quality of the maintenance of towing vehicles, is that they have regular work on towing vehicles, which also represent a special concept of maintenance of railway vehicles. As pointed out, the criteria for the towing vehicle to be regularly repaired are the time period of exploitation or the number of kilometers traveled, or the number of hours worked by individual series of towing vehicles. In accordance with the above, the planning of vehicle repairs on a regular basis is the basis for this type of maintenance. The selection of removals (in the country and abroad through tenders), provision of material resources (spare parts and materials), financial resources with the assessment of the optimal availability of the remaining vehicles for execution of the order of goods and goods are a very complex system of timely planning and contracting of the regular repairs of all series vehicles within the joint-stock companies "Srbija Kargo" and

"Srbija Voz". In accordance with the criteria, regular repairs can be medium-sized (SO) and large-scale repair (VO).

It is also important to note that the determined volume of works in the secondary repair (SO), which is annex to the contract, includes, after checking the operation of assemblies, repairs or replacement of certain parts, assemblies and devices, which ensure the reliable functioning of the towing vehicle until the next regular deal.

In case of large repair (VO) to bring the vehicle into the correct state for long-term exploitation, the work in relation to the middle repair is expanding, as the possibility of replacement of electrical installations is anticipated, obligatory anticorrosive protection.

Great repair (VO) is carried out when determining the economic failure of the vehicle maintenance due to its durability and obsolescence of technical solutions, and when the repair quality can not be achieved with a mean repair.

In the previous text, the importance of regular maintenance of towing vehicles was mentioned. It is evident that the criteria were based on many years of maintenance experience and it is not possible to systematically determine whether the regular repair is more frequent to the towing vehicles based on the towing device (electric or diesel towing vehicles) in favor of a more modern electric traction, or longer periods or age (years of exploitation).

2.5. WASHING, CLEANING, DISINFECTION AND DERATIZATION

The washing and cleaning of towing vehicles in accordance with the regulations is paid special attention as part of the periodic maintenance. As for the special instructions, in the case of electric motors and motor kits owned by "Srbija Voz" ad, outdoor and internal cleaning and washing are primarily done for the removal of impurities inside both on the outside and above all on the maximum satisfaction of the needs of users in passenger traffic, on locomotives owned by "Srbija Voz" and "Srbija Kargo" ad, in addition to washing and cleaning the steering column and front glasses, special attention is paid to cleaning, washing and degreasing of the machine space and those assemblies, which in specific exploitation conditions, due to dirt can be potential causes of fire.

It is evident that a special washing and cleaning regime for the steering column and the front glass of electric motors and motor sets is carried out at each periodic inspection [5], while washing and cleaning the outer form of the locomotive is done at least once every three months.

It is widely known that disinfection, disinfection and deratisation destroy bacteria and bacteria, insects and rodents according to the need. For eventual services, joint-stock companies hire through the tender of a professional company. The tender selection is also valid for regular washing and cleaning of diesel-motor and electric motors.

2.6. EXTRA MAINTENANCE

One of the types of non-avoidable maintenance vehicles is the maintenance of towing vehicles. Its purpose is to eliminate any deficiencies observed in exploitation, which are presented in written form by the towing staff on a special request form / order form (EV 63) [6], either during the delivery of a towing vehicle by the maintenance personnel of the maintenance service to a regular periodical inspection or emergency service, upon arrival of the vehicle from the road in running order or delivered by the towing staff after the declared defect on the open line. Also, the extraordinary maintenance includes the elimination of

defects observed during the performance of the works in the periodic inspection, which is one kind of corrective action for regular maintenance and preventive action to prevent the cause of possible future defects of towing vehicles in exploitation.

It should be noted that for the purpose of rationalization of maintenance costs, during the execution of extraordinary repairs, the works of a regular periodical inspection review may be carried out if the same follows in the next 15 days.

3. INDICATORS OF QUALITY OF MAINTENANCE

In principle, the optimal realization of the order in the passenger traffic (without significant delay and cancellation of trains), and not so much compliance with the timetable in transport of goods, what is the optimal realization of the operational plan in transport of goods without the rest, would meet the criteria of successful and quality business of the railways of Serbia. Participation in this, as far as traction funds are concerned, depends on their optimum availability, which indicates that attention should be paid to the organizational segment of the Serbian Railways, regarding the maintenance itself, and especially the quality of traction maintenance.

Operators in exploitation need exact data regarding the maximum availability of towing vehicles for traffic and maintenance is to meet the conditions for this to happen. For this purpose, all methods for improving the quality of the maintenance of towing vehicles must be improved. Thus, the percentage of immobilisation of towing vehicles, the number of defects per 100,000 km and the number of emergency services per 100,000 km of crossed road, are unambiguous indicators, based on which the quality of traction maintenance in the observed period can be determined. Periodic analysis can consider the negative impact of many factors and the possibility of their removal in order to improve quality. In this paper, the above mentioned indicators are based on the data of the professional services of the railways of Serbia and the knowledge of the experts in the field of rail transport, who mostly dealt with the above mentioned topic. It should be noted that in addition to the above main indicators for the reliability of traction means, there are indicators of the second, (for example, the number of kilometers traveled between the two defects of the observed towing vehicle for monitoring the frequency of defects, etc.), but due to the volume of work, other indicators are not included.

3.1. IMOBILIZATION

In strict adherence to Guideline 236 [6], under the immobilization of towing vehicles means all towing vehicles that are in the monitoring period, emergency service and regular service, ie are out of traffic. The preliminary condition arises from the disputing of the expert railway public whether the time period when towing vehicles are in the planned inspections and repairs should in general be taken into account when calculating immobilization, which will be discussed in further consideration of the controversial issue.

However, the aspects of retaining a towing vehicle on a repair service or an outboard repair shop can be of a very broad spectrum. Immobilization of the towing vehicle due to regular maintenance (periodic inspection and regular services), minor and large-scale redundancies (irregularities detected during periodic inspection or accident, fire, open-line defects), waiting for inspection for inspection or repair, waiting the purchase of spare parts, as well as the immobilization of a towed vehicle at standby or for the removal of the complaint

within the guarantee period, are cases that make the analysis of the structure of the immobilization of towing vehicles complex.

It can be concluded that the time of retention of towing vehicles in the planned periodic inspection and regular repair should not be included in the calculation of the percentage of immobilization of traction means.

The real goal for the leading series of electric locomotives should be to reduce the immobilization at the current level of towing of towing vehicles below 30% and in the coming period strive towards, for the present conditions, optimal of 20%.

3.2. THE NUMBER OF DEFECTS PER 100,000 KM

The definition of the defect of the towing vehicle indicates that under the defect of the towing vehicle, according to Directive 36, it is understood that the traction vehicle is not able to pull out the train and is replaced by another towing vehicle regardless of the delay, that is, if the traction of the towing vehicle causes the delay of the passenger train for more than 30 minutes or the delay of the freight train for more than 60 minutes, regardless of whether or not the towing vehicle has been replaced or replaced with another towing vehicle.

There is an established procedure to indicate that defects are recorded through EV-37 (Traction Vehicle Injury Report) forms, which are filled in and signed by the Towing Controller and the towing manager and EV-67 (Minutes on the determined extent of damage to the towing vehicle), which after the commission inspection the towing vehicle and determining the cause of the defect shall be signed by the members of the commission.

On the basis of all available data from the mentioned records and records and the delivery of data to the computer centers of the joint stock companies "Srbija Voz" ad and "Srbija Kargo" ad, data on the reliability of towing vehicles can be analyzed. By grouping the causes of defects, it can be working on enhanced control of maintenance technology and maintenance quality improvement.

3.3. NUMBER OF EXTRA REPAIRS AT 100,000 KM

Regarding the number of emergency repairs on the 100,000 km, based on the EV-63 Forms (Order / Demand Request), EV-64 (Input Document for Repair and Analysis of Tractor Damage) and EV-65 (Daily Report on towing vehicles on maintenance in the depot workshop and waiting for maintenance) [6], records of all extraordinary small and large-scale workshops may be recorded in the workshop, by individual number or by series of towing vehicles. With the available track record number, available for the respective towing vehicles (EV - 64 form), the number of extra services per 100,000 km can be analyzed over a certain period (for example, at monthly and annual levels), similar to defects of towing vehicles.

From the analysis of the cause of emergency services of towing vehicles per series and number of towing vehicles, the name of the fault that is the cause of the extraordinary repair, the date of occurrence - failure detection and the method of removing the failure, can be formed relevant data on the reliability of towing vehicles [7].

As with defects, a set of causes or system errors can be made in the initial period of exploitation of new towing vehicles, and on the basis of the analysis of data and the frequency of emergency services, suggest proposals for improving the construction of towing vehicles or improving maintenance technology.

However, due to the lack of an adequate data tracking procedure, and due to the lack of a timely record of extraordinary exploitation, without justification, as there is not enough number of executives in the technical technical qualification, only to monitor this type of data, this indicator is not kept continuously. Although it is very important for assessing the reliability of towing vehicles for the above reasons, it can not be considered a reliable parameter and does not represent an example of good practice.

4. OTHER FACTORS OF THE IMPACT ON QUALITY OF MAINTENANCE OF VEHICLES

The quality of the maintenance of towing vehicles, which can be improved by taking measures based on the reliability of towing vehicles, can be contributed by the analysis of other factors of influence, such as the professional competence of the staff, respect for the established maintenance technology, adequately provided with quality spare parts, and control of quality execution of works on maintenance of towing vehicles.

Let's start with human resources. Experience has shown that on the railways, in terms of maintenance of rolling stock, employees from the citizens are employed, who in some period from perhaps three to five years of experience, become educated and expert in carrying out maintenance tasks, in particular traction vehicles. Such personnel are not trained by railway secondary and high schools. Engineers who complete three-year vocational studies are more inclined to occupations which directly cover rail traffic rather than the maintenance of rolling stock. Successful training and training of workers in maintaining and raising the level of their expertise affects the high level of quality of traction maintenance. Worker training programs and occupational training should be permanently applied, as it has been proven in practice to give undeniable effects on raising the quality of the maintenance of towing vehicles.

In particular, the quality of maintenance is affected by strict compliance with the established maintenance technology [8]. First of all, the valid regulations and instructions for the maintenance of towing vehicles must be observed. Train and maintenance services on timely delivery of towing vehicles should be consistently designed for periodic scheduled inspections and eventual emergency services (waiting for repair improves immobilization) and upon completion of works on quality handover of towing vehicles for inclusion in regular traffic. The process control must strictly control the execution of the works, contained in the control lists, and its representative confirms the signature after the signed list by the immediate executor and the manager, and thus guarantees the quality of the maintenance.

The technical service must pay special attention to the quality of spare parts, assemblies and aggregates, which are installed in towing vehicles in periodic inspection, regular and extraordinary repairs with smaller and larger volumes. Spare parts are purchased by tender procedure for public procurement. Quality control on receipt and supporting documents, is only the initial control for installation permit in towing vehicle. By monitoring their quality of functionality in exploitation and possibly pointing to the necessary improvements in the performance of parts and assemblies, the quality of maintenance of towing vehicles can be significantly influenced. Certainly, the percentage of immobilization will be reduced to an objective measure (below 30%), that is, the reliability and availability of towing vehicles will increase.

The search for the best organizational structure and the organization of work on the maintenance of towing vehicles, which can affect the reduction of maintenance costs, but also to increase the level of quality of the maintenance of towing vehicles, is a very delicate task of

research for an optimal solution and the application is reduced to a long-lasting, experienced approach. The rail system operates 24 hours continuously, which requires that the maintenance segment should also ensure the optimum availability of traction vehicles continuously at that time interval and permanently onwards. Practice has shown that periodic inspections and regular work are performed exclusively during the day (exceptionally at night review of the smaller volume) and servicing (daily inspections) is stable both day and night.

The current state of the organization of work may provide good quality of maintenance, but it can certainly work on improvement if some of the observed shortcomings are eliminated in everyday work.

Rajković (2004) concludes [9]: “No good operating directions, nor the fact that all the operations and works are entered into the book can not help much, because not all workers are proficient in writing, so it may happen that they write non-essential things, or to skip important because they imply“.

An important reminder is that quality control is permanently carried out in maintenance workshops by sections where traction vehicles are maintained. At the level of the Sector at the headquarters of joint stock companies, where there are technical quality control departments, more work must be done to improve their organization in terms of independence, as a kind of regulatory body, without any impact on their work [10].

In the end, it should be highlight that one of the most important factors contributes to the quality maintenance of towing vehicles is a control of the quality of execution of works on periodic inspection, regular and extraordinary repairs. Of vital importance is the organization and position of controlling the quality of the maintenance of towing vehicles in the maintenance process itself, and at the same time, the importance of which is attributed to the quality control itself

5. CONCLUSION

Maintenance of towing vehicles is a complex process that requires the use of technical knowledge resources from a wide range of professions. Maintenance of the percentage of immobilization and the number of defects and emergency repairs at 100,000 km on a low level guarantee that the maintenance is quality and that the traction means have a high reliability. Additionally, the availability of towing vehicles is higher than 90%. In order to achieve the desired quality of maintenance, it is necessary to consider all factors of influence, whose control and management can lead to a noticeable improvement in the quality of the maintenance of towing vehicles.

With the adoption of instructions by the joint stock companies "Srbija Kargo" and "Serbia voz", for the development and management of railway vehicle records, all conditions for monitoring the condition of each towing vehicle were achieved, from its acquisition to the present time of exploitation. Thus, by engaging professional staff (possibly with new employment) for daily keeping of records, it can especially count on the promptness of keeping records and making analyzes related to indicators of the reliability of towing vehicles, immobilization, number of defects and emergency repairs on 100,000 km, as their numerical reduction shows the essence that the quality of the maintenance of rolling stock has been significantly improved. The improvement of the level of quality of maintenance must certainly be provided by the management by finding a solution for acting on all the mentioned factors of influence on the quality maintenance of towing assets.

Acknowledgment: Research presented in his paper was supported by Ministry of Education and Science of the Republic of Serbia, Grant III-44010.

REFERENCES

1. Rulebook on Maintenance of Railway Vehicles, *Želnicid*, Belgrade, 241, (1995). (in Serbian: Pravilnik o održavanju železničkih vozila)
2. Rulebook on the Maintenance of Railway Vehicles, Official Gazette of the Republic of Serbia, 101, (2015) and 24, (2016). (in Serbian: Pravilnik o održavanju železničkih vozila, Službeni glasnik Republike Srbije)
3. Instructions for maintenance of towing vehicles "Srbija Kargo" ad, Official Gazette of the Railways of Serbia " 32, (2015). (in Serbian: Uputstvo za održavanje vučnih vozila "Srbija Kargo" ad, Službeni glasnik Železnice Srbije)
4. Instructions for the maintenance of towing vehicles "Srbija Voz" ad, Official Gazette of the Railways of Serbia, 7, (2016). (in Serbian: Uputstvo za održavanje vučnih vozila "Srbija Voz" ad, Službeni glasnik Železnice Srbije)
5. Regulation 258 on the carriage of railroad cars and motor trains, Official Gazette of the Community of JŽ, 6, (1988). (in Serbian: Pravilnik 258 o nezi železničkih kola i motornih vozova, Službeni glasnik Zajednice JŽ)
6. Guideline 236 for keeping records of the distance of traction of trains and maintenance of towing vehicles at JŽ, Institute for Newspaper-Publishing and Propaganda Activity of JŽ, Belgrade, 1984. (in Serbian: Uputstvo 236 za vođenje evidencije dalatnosti vuče vozova i održavanje vučnih vozila na JŽ, Zavod za novinsko-izdavačku i propagandnu delatnost JŽ)
7. Rajković D, Methodology for assessing the quality and efficiency of work on the maintenance of traction means, *Railways*, 3-4 (2003), 146-148. (in Serbian: Rajković D, Metodologija za ocenjivanje kvaliteta i efikasnosti rada na održavanju vučnih sredstava, Železnice)
8. Rajković D, Consideration of influencing factors on the quality of locomotive maintenance, *Railways*, 49(3), (1993), 445-446. (in Serbian: Razmatranje uticajnih faktora na kvalitet održavanja lokomotiva, Železnice)
9. Rajković D, Analysis of the organization of work of current maintenance of towing assets, *Railways*, 5-6, (2004), 376-378. (in Serbian: Analiza organizacije rada tekućeg održavanja vučnih sredstava, Železnice)
10. Rajković D, Quality Control of Rolling Stock, *Railways*, 7, (1992) 747-748. (in Serbian: Kontrola kvaliteta održavanja voznih sredstava, Železnice)



MANAGEMENT OF ECOLOGICAL PROCESSES IN RAILWAY TRANSPORTATION OF HAZARDOUS MATERIALS

Zoran Antić¹, Zoran Nešić²

¹Organization of Serbia railway inventors, Belgrade; ²University of Kragujevac, Faculty of Technical Sciences Čačak, Serbia

Abstract: This paper presents an analysis of the situation in the field of organization of environmental protection in the railway system of Serbia. Determining the risk factors and analyzes for its preventive elimination will be used in the paper for making recommendations for the improvement of the organizational segments of railways that cover the area of transport of dangerous materials, with the aim to encourage the railways management to bring strategic documents for all segments of environmental protection in rail traffic on the territory of Serbia.

Through consideration of the management of environmental processes, the paper defines, in the case of transport of dangerous materials by rail car tank, all procedures and possible risks during transportation, as well as treatment in case of a chemical accident.

Serbian Railways in particular attach importance to the transportation of dangerous goods. All previous research in practice has confirmed that rail transport by all criteria has the least harmful effects on human health and the environment. However, despite the comparative advantages of the railway, extensive measures must be taken to implement and improve the environmental management system.

In a new strategy of development, business and transport policy, it is necessary to incorporate all principles, measures and intentions, which in everyday practice will improve all aspects of ecological requirements on the railways of Serbia.

Keywords: strategic regulations, strategy development, environmental management, transport of dangerous goods

1. INTRODUCTION

The issue of ecology and environmental protection in Serbia's railways can be realized by implementation of environmental protection in a large range of facilities (facilities, depots, warehouses) distributed on the railway network throughout Serbia, which requires huge investments. At the same time, there are also times when measures should be taken, in addition to purification of wastewater and oil, and the disposal of solid and liquid waste and for the reduction of noise, vibration, air pollution.

In 2001, for the needs of the then ŽTP "Beograd", the traffic institute "CIP" prepared a study entitled "Basic concept of previous activities for the introduction of the EMS (Environmental Management System) on the railway". It was in the study that special attention was paid to the problems of soil and water pollution, the impact of noise, vibration and non-ionizing radiation on employees, users of railway services and the population in the

vicinity of railway facilities, the disposal of waste (especially hazardous), the impact of facilities - polluters on flora and fauna, the risk of accidents and the consequences of chemical accidents on the railway lines on the environment, the identification of the state of the work environment in the facilities of the company and the health vulnerability of employees, the personnel potential (the existing engagement of employees in the field of environment and occupational safety), the mutual relationship of transport services, and safety in railway traffic, as well as compliance of operations and activities with domestic and EU legislation in the field of environmental protection [1]. However, there was no special realization of the study and plans in this and later period.

Also, in 1997, the CIP Institute of Traffic Engineering, at the request of the STC, Belgrade, prepared a study titled: "Defining the needs of wastewater treatment in cell facilities on the ŽTP Beograd network". The recorded situation and proposals of certain solutions due to the lack of funds could not be realized, except for the construction of a system for wastewater treatment and waste oils in the Railway Maintenance Section Belgrade.

In the later phases of railway restructuring, the adoption of the new Railway Act and the establishment of the Public Railway Company "Serbian Railways", the Center for Sustainable Development was responsible for ecology and environmental protection, which managed to raise this area to a significantly higher level of practical application in practice. First of all, implementation of the Solid Waste and Liquid Waste Disposal Plan, harmonization of company regulations with legislative frameworks in the field of environmental protection, training of professional staff and organization of international conferences. In addition to the management of the company, considerable support was provided by the line ministry of the Government of the Republic of Serbia.

Now, in the most recent relationship, when the rail system was transformed into four separate joint stock companies "Serbian Railways" ad (limited expiration date), "Infrastructure of the Serbian Railways" ad, "Srbija voz" ad and "Srbija kargo" ad for the area of ecology and environmental protection were made through individual departments in the Sector for Security "Railway Infrastructure of Serbia", in the Sector for legal and general affairs "Srbija voz" and in the Sector for human resources and general affairs "Srbija kargo" ad.

Nevertheless, in terms of rail transport of dangerous goods and environmental impacts, regardless of the circumstances of high risks, the Serbian Railways have been successfully operating in this type of transport for decades, primarily strictly complying with strict domestic and European regulations and thanks to highly trained and internationally licensed railway experts. Thus, the paper will consider an example of the transport of dangerous goods in special rail tank cars.

2. RAILWAY TRANSPORT OF HAZARDOUS MATERIALS AND EFFECT ON ENVIRONMENT

As the international community has determined by law that dangerous goods can only be transported when there is a guarantee for the greatest security of its transportation, mirrored in adequate packaging, professional handling and safe means of transport, the railways of Serbia, while complying with these regulations, have proven highly guaranteed in the decades-long practice safe level of transport of dangerous goods. The RID Rule Regulations regulate the substance for all types of dangerous goods transport through three main areas: Classification of dangerous goods, manner of marking and transport conditions [2].

It is very important to point out that it is in order to separate the term of dangerous goods and dangerous goods by law [3] it is prescribed that dangerous goods are substances and articles whose transport is prohibited, or allowed if they are carried out under the conditions of ADR / RID / ADN [4] a dangerous cargo is a dangerous goods that are properly packed, marked with certain features and marks, with properly filled documents and loaded into a means of transport.

The display of dangerous goods by RID classes, with their characteristics and possible dangers in the event of failure to meet the prescribed conditions of transport, contained in the additional instructions for the engineers on the hazardous characteristics of dangerous goods by classes and on the measures to be taken depending on the prevailing circumstances, is provided in the Rule book on international transport of dangerous goods [2]. Only the classification and classification of dangerous goods has been carried out according to the degree of danger, and the basic characteristics that characterize dangerous goods are exactly their physical and chemical properties: Flammability, toxicity, radiation hazard, corrosive properties, volatility, properties of easy mixing with water and burning.

Due to the main theme and limited space, in this paper we will not deal in detail with each feature (available in professional literature), but only their comprehension, indicates a multidisciplinary approach in the transport of dangerous goods, so as not to endanger human health and the environment in the event of possible chemical accidents.

2.1. TECHNICAL AND ECOLOGICAL REQUIREMENTS FOR RAILWAYS CARRIED OUT FOR HAZARDOUS MOVEMENTS

Access to the transport of dangerous goods must be seen by two independent entities [5]:

- Preparation for the transport of dangerous goods, which means strict application of the packaging regulations in the appropriate packaging and the execution of all necessary actions for loading or loading, unloading or leaking and forwarding or transshipment.
- Transport of dangerous goods, a process dependent on the previous stage of preparation and implementation of technical and other regulations related to the characteristics of dangerous goods.

Let's start first of packing dangerous goods in the appropriate packaging, or tank for transportation by rail. The process is defined by international regulations. The packaging itself for the transport of dangerous goods by rail must meet strict requirements in terms of seal, the tank's resistance must not be damaged in contact with dangerous goods and resistance to mechanical impact. In other words, preventive study and strict application of regulations and procedures must always be present, which, with appropriate process control, provides a guarantee of transport safety.

Regulations are described that the transport in railway cars is carried out exclusively if they meet certain technical characteristics depending on the dangerous goods and their specificity (degree of danger, aggregate state, physical and chemical properties). It must be strictly paid attention, because for example liquid gas expands with increasing temperature, increasing pressure on the walls of the vessel. Therefore, it can only be loaded up to the maximum permissible weight of the charge, which depends on the spread of the liquid gas. This maximum permissible mass of the charge is calculated and indicated on a separate plate and is at the head of the tank cistern.

Special mention should be made of radioactive substances, if their transportation by rail is allowed, can be packed and transported only in packaging intended for a particular type of

radioactive material, depending on the size and strength of the source, aggregate state and other properties.

Taking into account the technical solutions applied in practice, the vessels of the railway cars of the cistern are constructively placed longitudinally on the car. They are usually circular or oval. During the construction, the constructor had to deal with the strength according to the technical regulations for the construction of pressure vessels, to check the durability of the structure in terms of the operation of the longitudinal, lateral and vertical force of pressure.

In order to avoid the risk of leakage it is of utmost importance that the construction of the vessel is performed well with all the necessary connections for charging, discharging, ventilation and safety elements. It depends on which of the materials will be made the vessel of the tank, because the required strength must be provided. It should be emphasized that from the aspect of ecological requirements and protection of the eco-system, the material for the construction of vessels of railway carriages must be chemically stable in relation to the transported liquid and resistant to temperature variations in order to avoid spraying and ecological disaster in the event of an accident [5].

Another important fact in the preventive action to prevent the risk of any kind in the transport of dangerous goods is that the Rule book on the carriage of dangerous goods by rail - RID, prescribed periodic tests of the state of the vessels, both inside and outside, and which necessarily include test for pressure, hydroprobe. All tests shall be carried out at the competent institution under the supervision of the authorized bodies of that institution. The pressures must be indicated in the vessel's marking plate.

Special attention is paid to specially designed cars for safe transportation of explosive materials and articles filled. For this purpose measuring devices - level meters are installed, so that at any moment there is the possibility of controlling the quantity of matter in the vessel tank. Tank inspection is mandatory and it can only be charged with the dangerous goods it has been assigned for.

In the example, for the transport of methanol, in which only one technical means for the transport of dangerous goods is shown, one can see how much attention must be paid to the systematic supervision of one of the segments of the transport of dangerous goods. The point is on timely preventive inspection of the vehicle and eventual elimination of any omission, giving a contribution to the safe transport of dangerous goods.

In addition to the regular instructions on safety and security measures, in the transport of dangerous goods, the Special Safety Measures Directive for the transport of methanol (methyl alcohol) - liquid hydrocarbon with a flash point below 21 ° C is particularly applicable.

2. 2. MARKING OF TANKS AND WARNINGS TABLE ON THE LEVEL OF DANGER

In order to know immediately which types of liquid the tank is, the tank boiler is painted in a certain color. Visible warning that in the tank vehicle there are gases in liquid state, deep-cooled gases in liquid state, as well as dissolved gases, according to regulations, is marked with a continuous strip in orange color (non-refillable), about 30 cm wide, placed around the tank.

As already mentioned on both sides of the tank, there are identical orange plates of identical inscriptions, with legible labels In the lower half of the orange The table contains the

UN number, which identifies dangerous goods that are transported by tank cars and in the upper half of the table is a hazard identification number. In our case, it concerns gasoline or fuel for OTO engines, warning that a flammable liquid substance with an ignition point below 21°C is transported, Figure 1.

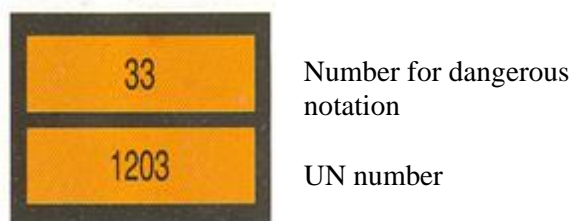


Figure 1. Orange table [2]

The UN number, identifying the four-digit number of dangerous goods, is one of the most important labels for marking hazardous substances and objects in accordance with the United Nations regulations [6].

In accordance with RID Regulations, the hazard identification number (class 2 to 9 materials) [2]. It consists of 2 or 3 digits, which generally observe certain danger.

It is important to note that the doubling of the digits indicates an increase in danger. In order not to be mistakenly understood that hazardous substances of class 1 (explosive substances) are missing, due to the risk of causing extreme danger, they are especially treated, and the classification code of the Regulation is used as the hazard identification number.

2.3. METHOD OF TRANSPORT AND MONITORING OF DANGEROUS GOODS

The method of transport and operational monitoring of dangerous goods in railway traffic was regulated by law [3] and accompanying rules [7], which elaborate the comprehensive matter contained in the aforementioned RID Rulebook [2].

The process of transporting dangerous goods takes place in the logical chain from the sender, through the carrier to the recipient. Other participants, with significant roles, are the loader, the packer, the charger and the unloader. What concerns the railways, it is in this chain as the carrier, as one of the operators in the liberalized Serbian market. As the only operator in the past, the railway is in the advantage on the future ones, because, although all its regulations have been ad acta, it has adapted very quickly to new regulations harmonized with EU legislation and regulations. Specifically, the multi-yearly practice on the railway is precisely compatible with the operations of the regulations governing the transport of dangerous goods. Although the disintegration of the railway now involves the transportation of dangerous goods, two joint stock companies "Železnička Infrastruktura" and "Srbija Kargo", their operational managers and direct executors in the field, in very synchronized cooperation, respect each other's responsibilities, carry out tasks in the transport of dangerous goods and hazardous goods cargo.

These are the following related processes: firstly, loading dangerous goods into the car, or loading a tank of a tank or putting containers loaded with dangerous cargo, along with the necessary organization of transport, is followed immediately, with the operational monitoring of dangerous goods on the entire transport route, dangerous goods by rail from

loading to unloading place, with the organization of eventual retention of dangerous goods in the car before and after the transport, as well as during the journey, its temporary disposal, unloading of dangerous goods from the railway vehicle or overloading for the purpose of changing the way of the traffic or the transport medium on the manipulative road [7].

The regulations prescribe that all actions for loading, unloading and transshipment of dangerous goods are carried out at manipulative sites (in particular locations) in individual stations in the railway network of Serbia, excluding Belgrade - Ranžirnu (for the manipulative site is the Topčider station) due to the source of the drink water and avoiding the risk of pollution. Nevertheless, the takeover of vehicles with dangerous goods is done mainly by loading vehicles and tank cars through industrial tracks within the factories or production facilities of the dangerous goods shipper, all regulated by mutual agreement. An important note is that during the handling of hazardous materials in particular are taken prescribed safety measures. The speed of the railway vehicle on the adjacent track is limited to 10 km / h and the use of any type of flame source is prohibited.

Operational monitoring is carried out by the on-duty operational service of the operator of the joint stock company in direct contact with the participants in the field of traffic, with at any moment possible access to the necessary information and above all on the composition of the train (the number of individual cars and series of cars), and the UN number for each car individually.

The regulations also describe the obligations of all participants in traffic, contained in the RID Rules and the Law on the transport of dangerous goods. Regarding regulations, experienced norms indicate that the two most important actions in the overall transport of dangerous goods are the reception of the train and the installation of cars in the train. If strict compliance with the regulations by the participants, related to the presented actions, it can be safely claimed that all of them are automatically eliminated potential risks related to the transport of dangerous goods, or the transport itself could then be routinely performed.

2.4.EXTRAORDINARY EVENT

In the event of an accident in the railway traffic and the potential threat of a chemical accident extensive measures are taken to protect the safety and health of people, as well as the environment itself. Trained railway personnel for transport of dangerous goods must promptly undertake a series of actions and measures in order to promptly reduce possible consequences of the incident.

The most important role at the moment of the occurrence of an emergency event has a machine operator with complete documentation concerning the transport of dangerous goods, who works closely with the infrastructure manager to put the train at the appropriate place for the intervention of professional teams.

As a priority, prior to the arrival of the intervention team, the railway staff first determines what dangerous goods are (from the classification according to the RID Rulebook).

At the railway station, the personnel responsible for the transport of dangerous goods contact with the dispatcher, who, among the first, receive information on the emergency event and in a proven way, by submitting reports to the competent authorities, act in accordance with the regulations. The head of the station is urgently informed by the dispatchers of the regional operational service (the management of the railway), who is in charge of the Center for internal security and protection within the "Srbija Kargo" ad, as well as all professional

competent services and above all fire department and police. In particular, the presence of an infrastructure service (workers for railway and electrical plant maintenance) is required to undertake actions to train tracks and to exclude or execute works on training the contact network.

In the event of an accident of greater volume and more intensive leakage of dangerous goods RID, when it is not possible to collect in the intervention vessels, the management of the company, the municipal civil protection headquarters and the sanitary municipal service shall be notified.

Special attention is being paid to the fact that all participants in the elimination of the consequences of an emergency event must strictly adhere to the prescribed measures of protection and be supplied with protective personal equipment.

3. CONCLUSION

Through this paper is discussed the situation in the field of environmental protection in the railway system of Serbia. In the past, there was a clear intention of the top management to seriously approach the solution of priority ecological problems. Specific studies have been carried out in which programs for achieving the desired ecological and economic effects have been defined, through the business plan, the dynamics of the realization of the activities, but significant progress, except for the treatment of wastewater and the disposal of solid and liquid waste, were not achieved in some locations. With the new organization of the Serbian Railways, new challenges in solving the problems are expected, primarily financing.

This paper is dedicated to the subject of organization in the field of environmental protection is the transport of dangerous goods. Legislative regulations, the training of employees in strict compliance with regulations, the permanent need for professional development in terms of monitoring EU standards may be talking about the need to change the awareness of all other employees. There is no alternative in preserving a healthy human environment. With the change of awareness, the interest in education and training of professional staff in the field of environmental protection will increase. After all, with the help of newly built environmental awareness and ethics, it is much easier to choose which organization and technical improvements should improve the state of the environment. In the new development, business and transport policy strategy, all three newly established joint stock companies should incorporate all principles, measures and intentions, which in everyday practice will improve all aspects of ecological requirements on the railways of Serbia. It is also necessary that professional staff in the field of ecology on the railways must be at the top of the management structure.

Acknowledgment: Research presented in his paper was supported by Ministry of education and Science of the Republic of Serbia, Grant III-44010.

REFERENCES

1. Business Plan ŽTP Beograd 2003 - 2007., March 2003, Belgrade. (Biznis plan ŽTP Beograd 2003 – 2007)

2. RID - Regulations concerning international carriage of dangerous goods, Official Gazette of the Republic of Serbia, 7(17), (2017). (RID - Pravilnik o međunarodnom prevozu opasne robe, Službeni glasnik Republike Srbije)
3. Law on the Transport of Dangerous Goods, Official Gazette of the Republic of Serbia, 104(16), Article 3. (Zakon o transportu opasne robe, Službeni glasnik Republike)
4. ADR - European Agreement on the International Carriage of Dangerous Goods by Road, ADN - European Agreement on the International Carriage of Dangerous Goods on Inland Waterways (ADR - Evropski sporazum o međunarodnom drumskom prevozu opasne robe, ADN - Evropski sporazum o međunarodnom transportu opasnog tereta na unutrašnjim plovnim putevima)
5. Šubara N.: Ecology in Traffic, Želnid, Belgrade, (2006) (Ekologija u saobraćaju)
6. Rulebook on the mode of transport and mandatory operational monitoring of dangerous goods in railway traffic, as well as obligations of participants in the transport of dangerous goods in railway traffic and in extraordinary events, Official Gazette of the Republic of Serbia, 81, (2015) (Pravilnik o načinu transporta i obaveznom operativnom praćenju opasnog tereta u železničkom saobraćaju, kao i obavezama učesnika u transportu opasnog tereta u železničkom saobraćaju i u vanrednim događajima, Službeni glasnik Republike Srbije)



THE INFLUENCE OF SOME SOCIO-DEMOGRAPHIC CHARACTERISTICS AMONG HIGH SCHOOL STUDENTS FROM R. MACEDONIA ON THE SELECTION OF EXTRA-CURRICULAR SPORTS TOURISM ACTIVITIES

Liza Pantekovska¹, Dalibor Dimkovski²

¹*FON University, Faculty of sports management, Skopje;* ²*High school „Goce Delchev“ – Kumanovo, Macedonia*

Abstract: The management of sport in the education field has become a challenge and has a market oriented value in terms of increased competitiveness. Likewise, it is still a factor of quality spare time and the simplest form of this type of realization is through the education system. The extra-curricular activities question about certain specific areas of interest as they promote individual development of creative skills and ideas (Andrijasevic M., 1996, Rosic, V., 2005). On the other hand, sport oriented activities affect the overall functional status of the student enabling high productiveness and better quality life.

Anonymous questionnaire was distributed to 90 high school students from Kumanovo with different socio-demographic characteristics. It was used to evaluate (assess) the extra-curricular sport activities according to Likert scale from one to five in relation to their agreement for being part of the program. The aim of the study is to determine the impact of socio-demographic characteristics on extra-curricular sports contest. Regression analysis showed insignificant conditionality in extracurricular activities of the examined socio-demographic characteristics, with the exception of sports camps. Of the partial impacts that occurred in three of the six evaluated extra-curricular activities, the parental degree of education as well as monthly family income showed a statistical significance in the assessment of the activity. These findings should not only assist in creating a program as a common policy with the tourism sector for the development of sport and educational tourism, but should also emphasize the role of the teaching staff as a promoter and motivator for involvement in such activities.

Keywords: Likert Scale, sport camps, winter camps, mountain tour

1. INTRODUCTION

The management of sport in the education field has become a challenge and has a market oriented value in terms of increased competitiveness. Likewise, it is still a factor of quality spare time and the simplest form of this type of realization is through the education system. “The school is a place where professional staff exist - professors, facilities and appropriate work conditions, so this fact should be recognized and respected by society” (Martiničević, J., 2010).

Co-curricular and extra-curricular activities question about specific areas, encouraging the individual development of creative ideas and interests (Andrijasevic M., 1996, Rosic, V., 2005). The activities that involve sport, however, generate skills that affect the overall functional status of the student, forming standards that enable more productive life in general. The study conducted in northern part of Finland, among 3664 men and 4130 female subjects, also demonstrate that regardless of the social status, there is a positive long-term effect obtained because of the habits established through school activities (Tammelin at all, 2003). Moreover, the US research conducted by the Mottova Foundation emphasizes the interest of as much as 90% of parents for involvement of their children in co-curricular and extra-curricular activities, with 80% of them showing readiness for higher taxes in order for the government to assign larger financial means for this purpose (Cromwell, 2005 cited by Šiljkovič, Ž at all, 2007). The interest for involvement of students in such activities varies from one social environment to another. It mostly depends of the material and technical conditions of the school organizer and the devotion of the teaching staff as a promoter, initiator and motivator (Telebar, B, 2013). Sport extracurricular activities proved to be a priority choice for the first four years of education in 1411 young subjects of 65 schools in central Croatia (Šiljkovič, Ž at all, 2007). Similar results were conducted in a study in Denmark (Mehlbye and Jensen, 2003). What Telebar 2013 asserts is that the participation of sports extra-curricular activities is declining with age, so the highest interest show students in the first year, and the lowest students in fourth year. This is opposite of the findings generated among the high school students from Kumanovo, where the interest for participation in the extracurricular activities increases with years. (Dimkovski, 2016).

Essential for the extracurricular sport activities is the fact they can be completed in multiple days, require certain level of psychophysical preparation, most often are realized outside the place of residence and associated with a certain financial budget (Dimkovski, 2016). Therefore, the selection of the participants is related to a series of socio-demographic characteristics of the families, so their management should be adapted to some special selective criteria. In this direction Torre at all, 2006, submitted an anonymous survey to 2411 junior high school students in the central part of Italy. Extra curriculum physical activity was evaluated considering whether or not the number of hours of activity was carried out weekly. Results showed that 71.1% of students reported to participate in extra - curricular physical activity. Parent educational level and work activity plays a vital role in predicting students physical activity, with more remunerative activities and higher education levels being more predictive. These data authors claim will be useful for school administrators and for politicians in order to reduce the gap between adolescents from the least and most disadvantaged families. Actually, different criteria gives importance of involving in physical activity in students with low socioeconomic status (SES). Proximity, cost, facilities, and safety are the most important, something that did not appeal in students with high SES. (Humbert Louise. M at all, 20016)

An optimal offer of activities should be given in accordance to the socio-demographic structure as well as funding opportunities, so that these extra-curricular activities can mainly be used by those for whom they are anticipated.

Tourism is a phenomenon that binds its beginnings and its duration with leisure time. Indeed, many theorists connect tourism as a classic form of leisure time (Jagič, 2005). The same author states that the total leisure time of children and young people is an important factor in tourism, even more so that students through the forms of extra-curricular and co-curricular organization use this time more often for tourist purposes than those who are in employment. These activities define sports tourism through its various forms, whereby their

influence on the intellectual development of the participants, their self-discipline, socialization, development of the communication skills and creation of a healthy lifestyle are established. (Skrida, 2014). Also, the author cites the findings of a survey conducted among parents in Russia that the camp as an extracurricular form is the most popular, and the type of camp where the children are most deprived is connected with a healthy lifestyle and sport. In fact, from all the possible activities that a camp can provide sports activities are most popular. Almost every form of valued sport extracurricular activities is an opportunity for students to experience life without their parents or other members of their families (Carr 2011, 144).

Such forms are also recognized in the Macedonian tourist system through their detection as the primary product of sports tourism (Sub-strategy for development of sports tourism in the Republic of Macedonia, 2014). As a result of education and awareness of sports tourism through the adoption of a sub-strategy for its development, the sports events are also included in the system of subsidizing the events by the Agency for Promotion and Support of Tourism. The application also includes sports associations, including municipal school unions.

2. METHODS AND MATERIALS

Anonymous questionnaire was distributed to 90 students from one high school „Goce Delchev” in Kumanovo (R. Macedonia), with different socio-demographic characteristics (**Table 1**). It was used to evaluate the extra-curricular sport activities according to ranking from one to six in relation to their agreement for being part of the program. The activities that have resources for a potential start as well as activities that are already active in the high school from Kumanovo (R. Macedonia) are: excursions (IZL), winter camps (ZLOG) (skiing, sledding), summer camps (LOG) (swimming, kayaking, sailing) mountain tours (PLTUR), sports camps (SPAMP), bicycle tours (VELTUR).

Table 1. Socio-demographic characteristics of high school students

Gender (POL)		Student year (GOD)				Parents Education (OBRAZ)				Physical activity (NFA)		Family monthly income (MPRIM)			Average spare time (PSV)			
M	F	first	second	third	fourth	high school	college	University	Other (master, PhD)	yes	no	under	average	above	none	Up to 2 hours	3 and 4 hours	More than 4
44	56	27	24.7	26	22.5	49	14	29	8	73	27	27	43	30	8	18	42	32

The data shows a heterogeneous structure of students in each category (**Table 1**). Female members are more prevalent, students are evenly distributed by the school year they attend (fully completed questionnaires are taken into account), families of which parents are with secondary and higher education, with the average monthly income according to the reports of the SSO (State Office For Statistics). We have incorporated weekly physical activity into features as it is important for the subject of the research and the representativeness of the sample. The results show 73% of students practice physical activity as recreation which indicates that high school students from Kumanovo (R. Macedonia) are

aware of the importance of physical activity and have tendency to follow the higher developed countries regarding this issue. Most of them have a daily average free time of 3 to 4 hours, some even more than 4 hours per day.

The aim of the study is to determine the impact of socio-demographic characteristics on extra-curricular sports content. To accomplish the objective, the following tasks were imposed:

- to determine the reliability of the variables for evaluating extra-curricular sports content
- to determine the homogeneity of the variables of extra-curricular sports content and their distribution
- to determine the impact of the applied system of socio-demographic characteristics and their partial impacts on the criteria of extra-curricular activities in the sample.

Based on the aim and the tasks defined, the following hypotheses have been generated as expected:

H1: reliability is expected in all variables for assessment of extra-curricular sports content

H2: heterogeneity between the variables of extra-curricular activity and their systemic normal distribution is expected;

H3: the applied system of socio-demographic variables significantly affects the majority of criteria of extra-curricular activities, allocating statistically significant partial impacts such as education and average monthly incomes.

Data processing was performed with the statistical package "Statistica 7.0." Basic descriptive statistical parameters of the central tendency and dispersion were used, the reliability was tested with the Cronbach - α coefficient and the influence of the socio - demographic characteristics on the variables of extracurricular activities was determined by linear regressive analysis

3. RESULTS AND DISCUSION

Table 2. Reliability of the item - Cronbach $-\alpha$

Variables	Itm – total cor	Cronbach - α
IZL	0.12	0.8
ZLOG	0.44	0.76
LLOG	0.65	0.72
PLTUR	0.72	0.7
SPKAMP	0.7	0.7
VELTUR	0.26	0.79

Based on the sample size and the way in which variables are evaluated, reliability of the items as a metric feature was examined. Based on the **Table 2**, to which Cronbach - α has a value greater than .70 indicating reliability, shows that the variables / items are consistent, hence the evaluation of the same variables in same or similar conditions will give same values. Therefore, same values can be used for further research, giving results scientifically valid.

This confirms the first hypothesis.

Table 3. Basic descriptive statistical parameters for the variables of extracurricular activities

Variables	X	Sd	KV%	Sk	Kurt	K-S
						(p-level)
IZL	4.5	1.99	44.22	-1.12	-0.15	p > .05
ZLOG	4.24	1.73	40.74	-0.16	-0.96	p > .20
LLOG	4.95	1.43	28.88	-0.68	0.34	p > .20
PLTUR	3.82	1.59	41.49	0.57	0.22	p < .20
SPKAMP	3.64	1.65	45.22	0.5	-0.47	p > .20
VELTUR	3.44	1.84	53.51	0.44	-1.04	p > .20

The central tendency and dispersion of extra-curricular sports activities shown on **Table 3**, organized by the schools and subject teachers of sports and sports activities, provides heterogeneous results about the importance of these activities. Homogeneous group is only the one of summer camping (swimming, kayaking, sailing) (LLOG, KV% = 28.04). This unification of attitudes is related to a high level of importance or priority in relation to other offered activities. Only excursions (IZL) as an activity have highest scores in the degree of importance (Sk = - 1.12). The rest are within the bounds of skewness i.e values within the limit of = / - 1 that indicate a normal distribution. Values of kurtosis are less than 3, referring to values that generally point to a partial or complete consent. Of the other activities, winter camping is third in the degree of importance rated by the students. The testing of normality after Kolmogorov - Smirnov, distribution by Lilliefors, shows 5 out of 6 variables that systematically lead to normal distribution and explains the possibility for further statistical processing.

This confirms the second hypothesis.

In relation to the aim of the paper, regressive analyzes of those extra-curricular activities, where systematic and individual statistically significant influences have appeared, are set out below.

Table 4. Regression analysis of winter camp variable (ZLOG)

Variables	R	part - R	BETA	St. err. BETA	t - test	Q (BETA)
GOD	-0.06	-0.05	-0.06	0.11	-0.51	0.61
POL	0.09	0.09	0.10	0.12	0.85	0.40
OBRAZ	0.12	0.12	0.13	0.11	1.14	0.26
MPRIM	0.17	0.16	0.37	0.11	2.56	0.05
NFA	-0.07	-0.06	-0.07	0.12	-0.60	0.55
PSV	0.16	0.16	0.16	0.11	1.51	0.14
RO = .32	DELTA =.10				F=1.52	Q = .18

Table 4, which shows the regression analysis of extra-curricular winter camp (ZLOG), indicates that the system of variables statistically does not affect the criteria ($Q = .18$). The coefficient of multiple correlation $RO = .32$, explains the common variability by 10%. Remaining 90% are explained by parameters not relevant in this paper. Partially statistically significant impact was the monthly income variable (MPRIM) of the student's family, whereby those students with high monthly incomes ranked higher in winter camps. Since this activity is financially dependent, the group formed is expected to be by students with family incomes above average. Thus related indirectly with the finding that parental income is inversely related to sedentary behavior, or absence of participation in physical activities (Ferreira, I at, all, 2007, cited by Drenowats, at all, 2010).

Table 5. Regression analysis of mountain tours variable (PLTUR)

Variables	R	part - R	BETA	St. err. BETA	t - test	Q (BETA)
GOD	0.21	0.20	0.21	0.11	1.90	0.06
POL	-0.01	-0.01	-0.01	0.12	-0.11	0.91
OBRAZ	0.21	0.21	0.22	0.11	1.96	0.04
MPRIM	-0.04	-0.03	-0.04	0.11	-0.33	0.74
NFA	-0.02	-0.02	-0.02	0.12	-0.15	0.88
PSV	0.08	0.08	0.08	0.11	0.72	0.48
RO = .28	DELTA =.08				F=1.20	Q = .31

From the quantitative data in Table 5, the regression analysis of hiking tours (PLTUR) does not depend on the socio-demographic characteristics that are subject of research ($Q = .31$). From the coefficients of partial regression, statistically significant influence has the degree of education of the parents (OBRAZ). Hence, the higher the education is, the better the rank of this extra-curricular activity is. It is expected that such a family environment has a highly developed awareness of sports activities, offering greater financial stability. Similar kind of findings is stated by Marco – Garcia at all, 2010 among Spanish students, where in addition, age and father's education (in both sexes) were associated with the participation of their offspring in extra-curricular sports during adolescence.

Table 6. Regression analysis of sport camps variable (SPKAMP)

Variables	R	part - R	BETA	St. err. BETA	t - test	Q (BETA)
GOD	-0.23	-0.21	-0.22	0.10	-2.10	0.04
POL	-0.25	-0.23	-0.27	0.11	-2.32	0.02
OBRAZ	-0.22	-0.21	-0.22	0.11	-2.09	0.04
MPRIM	0.18	0.16	0.18	0.11	1.63	0.11
NFA	-0.07	-0.06	-0.07	0.11	-0.60	0.55
PSV	-0.16	-0.15	-0.15	0.10	-1.46	0.15
RO = .43	DELTA =.18				F=3.10	Q = .00

The variables shown in **Table 6**, have statistically significant impact on the Sport Camp criteria (SPKAMP) at the level of significance .00. The coefficient of multiple correlation is $RO = .43$, whereby the percentage of the explained variance is 18%.

Statistically significant partial impact is shown by three variables: year, gender, and education at the level of .02 to .04. The inverted placement of BETA coefficients presents the

following conclusions: higher interest in sports camps is shown by male students, under-age students and students whose parents have lower level of education. Sports camps like sports and tourism activities are primarily intended for students that are active athletes or for those who have a desire to become one. In such activities and their ranking, educative base should be taken into account, which will indicate the true values of sporting involvement and the possible positive or negative implications.

From the statement above, the third hypothesis is partially confirmed.

If we consider that all sport activities take part in the **domain of sports tourism**, and the activity of the two sectors - sport and tourism is highly dependent of one another, than a financial subsidy for a complete realization of these programs is required for creating a joint developmental strategy, educational - touristic. In fact, it can be part of a broad policy for creating programs of extra-curricular activities in order to develop a sports-educational tourism where initiators would also be the professional teaching staff.

The curriculum of extra-curricular activities, based on their specificity, clarified in our paper in relation to the highly financially dependent activities, is insignificant to the examined socio-demographic characteristics, with the exception of sport camps given in the research paper Torre at all. Regarding the extracted partial influences, their findings do not deviate from ours, meaning that the level of education of the parents and monthly family incomes are the factor that defines their choice of sport activity (Torre at all, 2003).

Furthermore, the results show the role of teaching staff in the motivational process of the students to get interested about a specific activity. Same findings were confirmed by Telabar, 2013, taking into account that most of them show an interest in recreational physical activity in everyday life.

4. CONCLUSION

What is imposed as a general conclusion is that the results generated in our research paper using the students from Kumanovo, R. Macedonia as subjects, about their behavior and involvement in different sport activities do not differ from the statistic evidences on a global level, nor does the role of the teaching staff in the process of creating conditions for realization of the extracurricular sport activities. In general, such findings would refer to a wider population of high school students from other cities in the Republic of Macedonia, which certainly would be a challenge for a new, similar kind of research.

REFERENCES

1. Агенција за промоција и подршка на туризмот (2014). Потстратегија за развој на спортски туризам со акционен план 2015 – 2018. [Sub-strategy for development of sports tourism in the Republic of Macedonia, with action plan 2015 – 2018. In Macedonian]. Изработена од Глобал Проект Консалтинг, Октомври, Скопје.
2. Andrijašević, M. (1996). Sportska rekreacija u mjestu rada i stanovanja [Sport recreation at work and home. In Croatian.] Zagreb: Fakultet za fizičku kulturu.
3. Carr Neil. (2011). Children's and Families' Holiday Experiences, London and New York, Routledge.

4. Cromwell, Sh. (2005). Boom time for After-School Programs. *Education World*. Retrieved July 20, 2017 from: <http://www.educationworld.com/index.shtml>
5. Димковски, Д. (2016). Улогата на воннаставните и вонучилишните спортско – туристички содржини во креирањето на слободното време кај учениците од гимназиското образование во Куманово [The role of co-curricular and extra-curricular sports and recreational contents in creating free time among students of high school education in Kumanovo. In Macedonian] (Unpublished Master's thesis, FON University, Skopje) Скопје: Факултет за спортски менаџмент.
6. Drenowats, C., Eisenmann, J., Pfeiffer, K., Welk, G., Heelan, K., Gentile, D., Walsh, D. (2010). Influence of socio-economic status on habitual physical activity and sedentary behavior in 8- to 11-year old children. *BMC Public Health*. 2010; 10: 214. Published online 2010 Apr 27. doi: 10.1186/1471-2458-10-214
7. Humbert Louise, M., Chad E. K., Muhajarine, N.S., Anderson, D.K., Bruner, MW., Girolami, MT., Odnokon, P., Gryba, KG. (2006). Factors That Influence Physical Activity Participation Among High- and Low-SES Youth. *Qualitative Health Research (QHR) Journal*, Volume: 16 issue: 4, p. 467-483. Issue published: April 1, 2006, <https://doi.org/10.1177/1049732305286051>
8. Jegič, S. (2005) Turizam i slobodno vrijeme: mogućnosti i načini provodjenja [Tourism and leisure: possibilities and ways of spending free time. In Croatian] . *PEDAGOGIJSKA istraživanja*, 2 (1), str. 101 — 111. Pregledni članak. Primiten 18. 12. 2004, UDK 338.48:316.728
9. Marco – Gracia, L., Tomàs C. , Vicente-Rodríguez, G., Jiménez-Pavón, D., Rey-López, JP., Ortega, F. (2010). Extra-curricular participation in sports and socio-demographic factors in Spanish adolescents: The AVENA Study. *Journal of Sports Sciences*, Volume 28, 2010 - Issue 13, p. 1383-1389, Accepted 21 Jul 2010, Published online: 27 Oct 2010, doi: 10.1080/02640414.2010.510846.
10. Martiničević, J. (2010). Provodjenje slobodnog vremena i uključenost učenika i izvannastavne aktivnosti unutar škole [Providing free time and involvement of students and extracurricular activities within the school. In Croatian]. *Život i škola*, 56 (2), 19-34.
11. Mehlbye, J, & Jensen, U. (2003). *Children and Young People's Leisure Time Activities in the Municipality of Frederiksberg*. Copenhagen: Danish Institute of Governmental Research.
12. Ostojić, N, Plavša, Radaković (2016). A Student's Attitude towards Sports and Recreational Tourism at the School. *Research Journal of Educational Studies and Review* Vol. 2 (4), pp. 43-49, October, 2016. ISSN: 2449-1837. Full Length Research Paper retrieved May, 2017 from <http://pearlresearchjournals.org/journals/rjesr/index.html>
13. Rosić, V. (2005). Slobodno vrijeme – slobodne aktivnosti [Spare time – spare activity. In Croatian]. Rijeka: Žagar.
14. Skrida, M. (2014). Recommendations for the creation of a program for children's camps in Rantasalmi, Finland. Bachelor's thesis of Torusm. MAMK University of Applied

Sciences.https://www.theseus.fi/bitstream/handle/.../PDFthesis_skirda_02.05.2014.pdf?...1...y

15. Tammelin, T, Nayha, S, & Laitinen, J. (2003). Physical activity and social status in adolescences predictors of physical inactivity in adulthood. *Prev. Med.*, 37, 375–381.
16. Telebar, B (2013). Angažiranost učenika u izvannastavnih i izvanškolskih sportsko – rekreativnih aktivnosti [Engagement of students in co-curricular and extracurricular sports and recreational activities. In Croatian.] *Proceedings, 22 Ljetna škola kineziologa Hrvatske. Poreč, 2013, “Organizacijski oblici rada u područjima edukacije, sporta, sportske rekreacije i kineziterapije”* (pp. 378 – 384.). Hrvatski kineziološki savez.
17. Torre, G., Masala, D., De Vito, E., Langiano, E., Capelli, G., Ricciardi, W., PHASES (Physical activity and Socio – Economic Status)collaborative group (2006). Extra – curricular physical activity and socioeconomic status in Italian adolescents. *BMC Public Health* 6:22, doi: 10. 1186/1471-2458-6-22. Retrived April 2014 from <http://www.biomedcentral.com/1471-2458/22>
18. Šiljaković, Ž., Rajić, V., & Bertić, D. (2007). Izvannastavne i izvanškolske aktivnosti [co-curricular and extracurricular activities. In Croatian.] *Odgojne znanosti*, 9(2), 113 -145.



STUDY OF THE ENERGY CONSUMPTION AND THE WETTED AREA USING DRIPPERS WITH DIFFERENT FLOW RATE

Dimitar Georgiev, Yordan Gerinski

Faculty of Hydraulic Engineering, University of Architecture, Civil Engineering and Geodesy, Sofia, Bulgaria

Abstract: The percentage of the wetted area under drip irrigation is an important indicator affecting the consistent crop yield. This percentage is connected on one side to the area occupied by the root system of the respective crop, and on the other side, to the number of drippers (emitters), the volume of water discharged by one dripper, and its flow rate. Taking into account that many companies offer series of similar drippers with different flow rates, and the existing literature data for the percentage of the wetted area at different flow rates and soil types, the paper studies the energy consumption in different cases, since this indicator is an essential part of the operating costs of the irrigation system. The results of the investigations show that the energy consumption diminishes with the increase of the flow rate of the drippers, and this reduction is more strongly expressed with the increase of the distance between the driplines.

Keywords: drip irrigation, optimization of irrigation systems, wetted area, uniformity of flow rate distribution

1. INTRODUCTION

The percentage of the wetted area under drip irrigation is an important indicator affecting the consistent crop yield. This percentage is connected with the area occupied by the root system of the respective crop, the soil type as well as with the number of drippers, water delivery volume and intensity, i.e. with the flow rate of the drippers. For the time being, there are no investigations for the optimal percentage of wetting but there is data [1] indicating that in case of wetting of 50% of the root area of the plants the transpiration falls to 88% without deterioration of growth, while in case of wetting of less than 1/3 of the root area the transpiration falls considerably, making the irrigation useless.

There is enough data in the literature for the diameter of the wetted area when delivering certain volume of water to different types of soils but there is scarce data and methodological instructions for the flow rate. Besides, it should be noted that the flow rate of the drippers is an important indicator in the formation of the wetted area, as far as the spacing between the drippers and driplines (laterals) for different soil types and crop is concerned.

On the other hand, the magnitude of the flow rate is directly related to the energy consumption which is part of the operational costs of the irrigation system and, at the same

time is connected to the energy power of the feed sources as well as to the organization of irrigation in a comparatively larger irrigation area. Having in mind this, the subject of the present investigation is to find out how the energy consumption will change with the use of drippers having different nominal flow rate (flow rate at a pressure of 1 atm.), and in case of different spacing between the driplines, under the same irrigation norm.

2. MATERIAL AND METHODS

2.1. INVESTIGATIONS

There is data from international investigations {[2], [3]} about the percentage of wetting from driplines with a continuous scheme of wetting, for different flow rates and soil types (**Table1**), and this data is used for the development of the methodological instructions for design of drip systems by the former institute “Vodproekt” [4]. In parallel to this, it should be noted that a number of companies offer series of similar drippers with different flow rate in the market, most often built in driplines with equal diameter.

2.2. WHY INVESTIGATE THE EFFECT OF DRIPPERS’ FLOW RATE

The following question stands before the irrigation and drainage engineer, designer and operator: if we have to provide certain percent of wetting, i.e. certain wetting area for a defined soil type and crop, how the different flow rate of these drippers will affect the operational costs, and especially the energy consumption per unit wetted area, respectively per one percent of this area, having in mind the experimental data in **Table 1**. Besides, for a certain relation between the percentage of wetting and crop yield, an optimization problem could be composed and solved, concerning the receiving of maximum additional net income from the irrigation. Undoubtedly, the irrigation with a larger flow rate will bring about some organizational benefits like the availability of more non-irrigation technological (free) time which is related in turn with other operational benefits. But how this will concern the energy consumption for wetting of unit area?

2.3. METHOD OF INVESTIGATION

In order to carry out this analysis, let’s take as an example the series of similar drippers of the Greek company EURODRIP, examining the series of similar drippers (driplines) **GR 16**. Four modifications of drippers are offered – with nominal flow rate 1.7, 2.2, 4.2 and 7.5 l h⁻¹ for a head of 10 m, and at the same time, for the purpose of the design and investigation, the respective values of the key curve’s parameters are presented – the proportionality coefficient K and the exponent index of X . Let’s make this analysis for three different distances between the driplines at the table – through 1 m, 2m and 3 m, and for a different flow rate of the drippers.

Table 1. Determination of the water discharge and the space between the drippers in order to reach the necessary percentage of wetting

Distance between driplines, <i>m</i>	Water discharge of the drippers, $l\ h^{-1}$														
	Less than 1.5			2			4			8			More than 12		
	Space between the drippers in sandy (S), clayey-sandy (CS) and clayey (C) soils, <i>m</i>														
	S 0,2	CS 0,5	C 0,9	S 0,3	CS 0,7	C 1,0	S 0,6	CS 1,0	C 1,3	S 1,0	CS 1,3	C 1,7	S 1,3	CS 1,6	C 2,0
0.8	38	88	100	50	100	100	100	100	100	100	100	100	100	100	100
1.0	33	70	100	40	80	100	100	100	100	100	100	100	100	100	100
1.2	25	58	92	33	67	100	100	100	100	100	100	100	100	100	100
1.5	20	47	73	26	53	80	53	80	100	100	100	100	100	100	100
2.0	15	35	55	20	40	60	40	60	80	60	80	100	80	100	100
2.5	12	28	44	16	32	48	32	48	64	48	64	80	64	80	100
3.0	10	23	37	13	26	40	26	40	53	40	53	67	53	67	80
3.5	9	20	31	11	23	34	23	34	46	34	46	57	46	57	68
4.0	8	18	28	10	20	30	20	30	40	30	40	50	40	50	60
4.5	7	16	24	9	18	26	18	26	36	26	36	44	36	44	53
5.0	6	14	22	8	16	24	16	24	32	24	32	40	32	40	48
6.0	5	12	18	7	14	20	14	20	27	20	27	34	27	34	40

Since some of the flow rates in the table differ insignificantly from the flow rates of the drippers **GR 16**, it will be correct to introduce a small interpolation between the table data. For a basic unit of investigation let's take a wetted area of 1 *da*, with clayey sandy soil, where the driplines will be placed. For such a case, the calculated number of drippers in this unit area, the recommended spacing between the drippers and the percentage of wetting are presented in **Table 2**.

Table 2. Technological parameters for operation of driplines with a series of similar drippers **GR 16** in 1 *da*, clayey sandy soil

Flow rate of drippers, q_k $l\ h^{-1}$	Parameters of operation	Distance between the driplines, m		
		1	2	3
1.7	Spacing between drippers, m	0.58	0.58	0.58
	% of wetted area,	74	37	24
	Number of drippers per da , n	1552	863	517
2.2	Spacing between drippers, m	0.73	0.73	0.73
	% of wetted area	84	42	27
	Number of drippers per da , n	1233	686	411
4.2	Spacing between drippers, m	1.02	1.02	1.02
	% of wetted area	100	61	42
	Number of drippers per da , n	882	418	294
7.5	Spacing between drippers, m	1.26	1.26	1.26
	% of wetted area	100	77	51
	Number of drippers per da , n	714	398	238

If we assume that for one irrigation session an irrigation norm m (in $m^3\ da^{-1}$) will be delivered, then the time for realization of this irrigation session t_n will be obtained from the formula

$$t_n = \frac{m \cdot 1000}{q_k \cdot n} [h] \quad (1)$$

where n is the number of drippers in 1 *da*;
 q_k - flow rate of the drippers in $l\ h^{-1}$.

The energy consumption E for the realization of the set irrigation norm m may be obtained from the formula:

$$E = 9.81 \cdot n \cdot q_k \cdot \frac{1}{3600000} \cdot H \cdot t_m, \text{ [kwh]} \quad (2)$$

where H is the operating head of the drippers for delivering the set flow rates for drip irrigation – 10 m.

3. RESULTS AND DISCUSSION

Since by its physical essence the energy consumption in the considered options represents the work necessary for ascending of one and the same volume of water m to an equal height (elevation), then this indicates that also the energy consumption E will be the same for this unit area for the different options, namely

$$E = 0.0272 \cdot m \text{ [kwh]} \quad (3)$$

This can be easily proved by calculation and indicates that in this case 27.2 Wh energy is consumed for delivery of 1 cubic meter of water. It follows from this that knowing the percentage of wetting in the various options of the flow rate and the distance between the driplines given in **Table 1**, we can obtain the energy consumed for the wetting of 1% of this area (**Table 3**), which is an indicator of considerable importance showing how much cost-effectively and rationally the consumed energy is used in these cases, and how much it could concern indirectly the yield if the relation between the wetted area and the yield has been presented by the respective agronomists.

Table 3. Consumption of energy in Watthours (Wh) for wetting of 1% of the irrigated area depending on the irrigation norm m in cubic meters, flow rate of the drippers and the distance between the driplines

Flow rate of drippers, $q_k, \text{ l h}^{-1}$	Distance between driplines, meters		
	1	2	3
1.7	0.37. m	0.73. m	1.13. m
2.2	0,32. m	0,64. m	1,0. m
4.2	0,27. m	0,44. m	0,65. m
7.5	0,27. m	0,35. m	0.53. m

This energy consumption in the irrigation season, as a whole, doesn't depend on the realized magnitude of the irrigation norm, i.e. it is the same if the irrigation sessions will be more with smaller doses or the opposite – less but with higher norms.

If we consider the hydraulic processes in detail, it would be correct to note that the energy consumption will be higher to a less extent with the drippers with higher flow rate compared to the drippers with smaller flow rate, due to the fact that the hydraulic losses in the

driplines will be slightly larger but this is insignificant and is not the subject of this paper. Besides, it should be noted that if during the operation and also in the design phase a limited time for irrigation of this unit area, i.e. $t_n = const.$, under one and the same irrigation norm is assumed, it could be easily proved that the energy consumption would be higher if drippers with less flow rate are used. The reason for this is the necessity of increasing the operating pressure, respectively the flow rate for the realization of the irrigation in this fixed time, but this study is also not the subject of this paper.

Besides, the analysis of the above table indicates that for one and the same flow rate, the energy consumption for wetting of unit area increases with the increase of the distance between the driplines, which is important, especially for drip irrigation of corn, sunflower and other crops with non-nested planting scheme but at the same time the number of driplines in unit area diminishes, which represents an optimization problem.

Data from the above table may be used also for planning of the necessary energy obtained from non-traditional sources – solar panels, diesel-electric plants and wind turbines.

4. CONCLUSIONS

- For one and the same distance between driplines, the energy consumption for wetting of unit area diminishes with the increase of the operational flow rate of the drippers, and this reduction is more strongly expressed with the increase of the distance between the driplines, i.e. if there are no other limitations, it is recommended to use drippers with larger nominal flow rate.
- This reduction of the energy consumption may reach 50% and more, with a distance between the driplines of 2 meters and more, and increase of drippers' flow rate from $1.5 \div 2.0 \text{ l h}^{-1}$ to $7.0 \div 8.0 \text{ l h}^{-1}$.

REFERENCES

- [1]. Belchev, I., Ivanov, St., Petkov, Pl., 1979. "Drip Irrigation", Zemizdat, S.
- [2]. Keller, I., Karmeli, D., 1974. "Trickle Irrigation Design". California.
- [3]. Bucks D. A., Myers, E., 1973. "Trickle Irrigation Uniformity from Simple Emitters". Transaction of the ASAE, vol.16, № 6, St. Joseph, Michigan.
- [4]. Guidebook for Design of Irrigation Areas, volume III. "Drip Irrigation", Institute of Design "Vodproekt", issue 37.



OPPORTUNITIES FOR SUSTAINABLE TOURISM DEVELOPMENT OF SERBIA

Jelena Premović, Predrag Vukadinović¹, Violeta Milićević²

¹University Singidunum; ²College of Professional Studies Blace, Serbia

Abstract: Serbia has a resource potential for the development of sustainable tourism, which are primarily based on natural resources. According to data from the Institute for Nature Protection, Serbia has 1106 natural resources that belong to a protected natural heritage. However, these resources are not adequately valued. The authors believe Serbia, as a potentially new tourist destination, has to revitalize and, in a far more efficient way, use its significant natural potentials in the function of securing sustainable tourism development.

Based on the research of the most realistic opportunities for the development of the tourism sector in Serbia, it was concluded that a global turnaround in the tourism, the potential of tourism products, changes in the profile of tourists and the general market growth, are key assumptions that represent real opportunities for future sustainable tourism development in Serbia.

In order to successfully positioned on the tourist market, Serbia should use its own resource potential and the experience of other countries, create tourism products and its market position in line with the latest trends and requirements of sustainable development, timely and actively works with given the inherited infrastructure and organization in tourism and to invest in continuous education and development of human resources that are employed in the tourism sector.

In the analysis of real opportunities for sustainable tourism development of Serbia, were used: a method of analysis and synthesis, induction and deduction, historical as well as the description method.

Keywords: tourism potentials, natural resources, sustainable tourism, tourism development

1. UVOD

Jedan od preduslova razvoju turizma jeste zdrava prirodna i životna sredina, što implicira i koncept održivog razvoja. „Životna sredina je naš suštinski imetak, ključna komponenta kvaliteta proizvoda i rastući prioritet za naše potrošače“.¹³ U kontekstu ostvarivanja održivog i odgovornog razvoja u cilju očuvanja životne sredine kao resursa turističkog proizvoda, danas dominira koncepcija održivog turističkog razvoja pod kojom se podrazumeva razvoj turizma koji zadovoljava potrebe sadašnjih turista, turističkih destinacija i svih učesnika u turizmu, uz istovremeno očuvanje i uvećanje potencijala za korišćenje

¹³ Geoffrey H. Lipman, predsednik Svetskog saveta za putovanje i turizam -WTTC.

turističkih resursa u budućnosti, bez ugrožavanja mogućnosti budućih generacija da zadovolje sopstvene potrebe.

U dostizanju ciljeva održivog turističkog razvoja svake države, autentični prirodni resursi imaju posebnu važnost. Komparativne prednosti za razvoj održivog turizma Srbije su prvenstveno zasnovane na prirodnim potencijalima budući da, po podacima Zavoda za zaštitu prirode, Srbija poseduje 1106 prirodnih resursa koji pripadaju zaštićenoj prirodnoj baštini.

U Strategiji razvoja turizma Republike Srbije 2016.-2025. koju je donela Vlada Republike Srbije novembra meseca 2016. godine, definisana je vizija turizma Srbije kao i ciljevi razvoja i modeli rasta turističke delatnosti u Srbiji za period od 2016. do 2025. godine na sledeći način:

„1) u 2025. godini Republika Srbija će postati globalno prepoznata turistička destinacija kao rezultat uspostavljenog sistema razvoja i održivog upravljanja resursima i koordinaciji aktivnosti svih subjekata od značaja za razvoj turizma;

2) turizam i sa njime povezane delatnosti će postati jedna od dominantnih privrednih grana koja efikasno obezbeđuje novu dodatnu vrednost i održivo zapošljavanje i bitno doprinosi lokalnom i regionalnom razvoju;

3) sektor turizma Republike Srbije će biti u stanju da efikasno i fleksibilno usklađuje svoju ponudu sa savremenim trendovima na globalnom turističkom tržištu i ponudi autentična iskustva, doživljaje i proizvode visokog kvaliteta, što će, uz tradicionalno gostoprimstvo, biti osnova prepoznatljivosti u odnosu na konkurenciju;

4) turizam će postati vodeći promoter imidža Republike Srbije u svetu kao moderne i za posete, odmor i poslovanje - poželjne destinacije, ostvarujući stalnu inovativnu funkciju u primeni savremenih standarda, novih tehnologija i zaštiti prirode;

5) svojim stalnim osavremenjavanjem, prihvatanjem i preuzimanjem globalnih standarda i modela poslovanja i upravljanja, turizam će postati poželjan sektor za zapošljavanje i razvoj karijere, posebno za mlade;

6) Republika Srbija će na svetskoj lestvici konkurentnosti turizma postati visokorangirana i popularna kao destinacija“ (Strategija razvoja turizma Republike Srbije 2016-2025, 2016, str. 43).

Istraživanja koja su vršena za potrebe izrade Strategije razvoja turizma Republike Srbije su pokazala da Srbija raspolaže mogućnostima za tržišnu valorizaciju i razvoj određenih turističkih proizvoda. Nakon analize i prognoza ekonomskih kretanja u svetu, Evropi, regionu i Republici Srbiji, trenda kretanja tražnje na relevantnim tržištima, kao i brojnih sastanaka sa predstavnicima privatnog i javnog sektora u turizmu, definisani su turistički proizvodi od posebnog značaja za razvoj turističke delatnosti u Srbiji.

Jedanaest turističkih proizvoda na kojima bi Srbija trebalo da gradi svoju turističku ponudu su:

- 1) turizam gradova;
- 2) manifestacije/događaji (kulturni, sportski i dr);
- 3) planinski turizam;
- 4) spa&wellness u banjama/zdravstveni turizam;
- 5) tematske rute;
- 6) ruralni turizam;
- 7) nautički turizam;
- 8) sastanci, podsticajna putovanja, konferencije i izložbe/događaje (MICE turizam);
- 9) kulturno nasleđe;
- 10) specijalni interesi;

11) tranzitni turizam [Strategija razvoja turizma Republike Srbije 2016-2025, 2016, str. 34].

2. STRATEŠKE PREDNOSTI I NEDOSTACI TURISTIČKOG SEKTORA SRBIJE

Na osnovu istraživanja najrealnijih mogućnosti za razvoj turističkog sektora u Srbiji koje je vršilo resorno ministarstvo se može zaključiti da su globalni zaokret u turizmu, potencijal turističkih proizvoda, promene u profilu turista i opšti rast tržišta ključne pretpostavke koje predstavljaju realne mogućnosti budućeg turističkog razvoja Srbije. Ove četiri pretpostavke koje bi trebale da dominantno utiču na planirani turistički razvoj Srbije su opisane u Tabeli 1.

Tabela 1. Pretpostavke turističkog razvoja Srbije

PRETPOSTAVKE TURISTIČKOG RAZVOJA SRBIJE:	OPIS:
GLOBALNI ZAOKRET U TURIZMU	- podrazumeva ubrzan ulazak na turističku mapu sve većeg broja manjih (novih) destinacija, usled već potvrđene navike da turisti sve više traže i prihvataju nova iskustva i destinacije. To se posebno ispoljava u uslovima kada takve destinacije nude nova iskustva na profesionalan način.
POTENCIJAL TURISTIČKIH PROIZVODA	- Srbija ima šanse u svim proizvodima zasnovanim na iskustvima, osim u „turizmu sunca i mora”, čije je učešće tokom poslednjih 30 godina u globalnom turizmu smanjeno za više od 50%. Pri tome, posebno treba istaći mogućnosti Srbije u proizvodima povezanim sa korišćenjem prirode i ekoturizma, zdravljem, aktivnostima specijalnih interesa, ruralnim i kulturnim turizmom, rečnim krstarenjem, kao i kongresnim poslovnim turizmom.
PROMENE U PROFILU TURISTA	- svi ključni trendovi na polju promene profila turista u budućnosti, takođe idu u korist Srbije. Posebno je reč o trendovima prema obrazovanim posetiocima u potrazi za autentičnim iskustvima, kao i aktivnim turistima zainteresovanim za kulturu i prirodne resurse destinacija u koje putuju. U tom pravcu idu i funkcionalni trendovi, kao što su više putovanja tokom godine i izražen osećaj za novac i napor.
OPŠTI RAST TRŽIŠTA	- tradicionalne emitivne zemlje i dalje imaju trend rasta, uz sve veću raznovrsnost interesa u skladu sa današnjim socio-kulturnim promenama u tim zemljama. Sa druge strane, ubrzano se otvaraju nova tržišta koja su sve izbirljivija. Evropske integracije posebno idu na ruku lakšem pristupu ukupnjem tržištu za svaku receptivnu zemlju. Ako se shvati da danas, uključujući Rusiju i zemlje Balkana, u Evropi ima blizu 700 miliona stanovnika (ne računajući druge zemlje bivšeg SSSR-a) koji ostvaruju oko 400 miliona putovanja, odnosno između 1,6 i dve milijarde noćenja, Republika Srbija se, uz potreban profesionalni napor, može brzo i uspešno probiti na ovo veliko tržište.

Izvor: Tabela autora adaptirana na osnovu Strategije razvoja turizma Republike Srbije 2006 i 2016.

Primenom SWOT analize su utvrđene osnovne strateške prednosti i nedostaci turističkog sektora Srbije koji su predstavljeni u narednoj tabeli.

Tabela 2. Strateške prednosti i nedostaci turističkog sektora Srbije

PREDNOSTI:	NEDOSTACI:
<ul style="list-style-type: none"> • ljudski resursi i pozitivan odnos stanovništva prema turizmu 	<ul style="list-style-type: none"> • neprepoznatljivost turističke ponude Srbije i nepostojanje nacionalnog turističkog brenda
<ul style="list-style-type: none"> • geostrateški položaj Republike Srbije i Beograda 	<ul style="list-style-type: none"> • neusklađenost regionalnih i lokalnih strategija turističkog razvoja sa nacionalnom strategijom i vizijom
<ul style="list-style-type: none"> • neiskorišćeni potencijal podzemnih i nadzemnih voda 	<ul style="list-style-type: none"> • neusklađenost prostorno-urbanističke regulative većine sadašnjih i potencijalnih turističkih destinacija i centara, nedovoljna zaštita i održavanje glavnih nacionalnih, prirodnih i kulturnih resursa-atrakcija, ilegalna gradnja, kao i neprimenjivanje zakona, kontrole i kaznene politike kod incidenata na području životne sredine (divlje deponije)
<ul style="list-style-type: none"> • nedirnuta prostranstva planina, šuma, agrarnih područja, vinograda i lovno-ribolovnih zona 	<ul style="list-style-type: none"> • nedovoljna svest i razumevanje važnosti sistema turističkih iskustava i uspostavljanja celokupnog lanca vrednosti kod većine sadašnjih proizvoda srpskog turizma
<ul style="list-style-type: none"> • bogato arheološko, arhitektonsko i kulturno-istorijsko nasleđe srednjovekovnih manastira 	<ul style="list-style-type: none"> • nedovoljno razvijena saobraćajna infrastruktura, (mali broj funkcionalnih aerodroma, nedostatak niskobudžetnih avioprevoznika, mali broj savremenih autoputeva i loše stanje drumske, železničke i rečne infrastrukture) • nedostatak međunarodno kvalifikovanih hotelskih i turističkih menadžera, kadrova u novim turističkim zanimanjima, niska mobilnost radne snage i nefleksibilnost sistema zapošljavanja

Izvor: Tabela autora adaptirana na osnovu Strategije razvoja turizma Republike Srbije 2006. i 2016.

Aktuelnom Strategijom su markirana i strateška turistička tržišta za turističku privredu Republike Srbije i to: EU 28; zemlje bivše Jugoslavije i regije sa kojima se Republika Srbija graniči; tržišta zemalja van EU – pre svega Turska i Rusija; ostale vanevropske zemlje iz kojih imamo uzlazni trend dolazaka: Kina sa Hong Kongom, SAD, Indija, Južna Koreja i Japan; kao i domaće tržište.

Sa druge strane, kao glavni konkurenti Srbije na turističkom tržištu Jugoistočne Evrope (Južno-Mediterranske Evrope u koju se svrstava Republika Srbija)¹⁴ označene su sledeće države: Slovenija, Hrvatska, Albanija i Crna Gora kao i pogranične zemlje Mađarska, Rumunija i Bugarska. U odnosu na svoju glavnu konkurenciju, „Republika Srbija je u periodu od 1989. do 2014. godine investirala svega 560 miliona USD, dok su u tom periodu ostale

¹⁴ Strategija razvoja turizma Republike Srbije 2016-2025, 2016, str. 34.

zemlje konkurenti ulagali: Bugarska 2,9 milijardi USD, Češka 3,36, Mađarska 2,7, Rumunija 8,86 i Slovačka 1,45 milijardi USD. Da bi Republika Srbija dostigla i pretekla Slovačku kao svog prvog konkurenta, neophodno je da do 2025. godine ostvari kapitalna investiciona ulaganja od minimalno dve milijarde USD ili po 200 miliona USD godišnje” [Strategija razvoja turizma Republike Srbije 2016-2025, 2016, str. 43].

Najvažniji neiskorišćeni potencijali, kao i uočeni nedostaci zasnovani na realnom sagledavanju postojećeg stanja turističkog sektora Srbije i stanja turističkog sektora na konkurentskom turističkom tržištu su jasan signal i alarm za suštinske promene u pravcu strateškog upravljanja sferom turizma. Zbog toga je potrebno izvršiti preispitivanje i redefinisavanje ciljeva turističkog razvoja i definisanje onih ciljeva koji će na najbolji način omogućiti dostizanje željenog stanja celokupnog srpskog turističkog sektora. U tom smislu, „kao najvažnije ciljeve razvoja do 2025. godine, moguće je definisati sledeće:

- 1) rast udela hotelskih i sličnih ugostiteljskih objekata za smeštaju ukupnim smeštajnim objektima na 50%;
- 2) dostizanje ukupne popunjenosti smeštajnih kapaciteta (smeštajnih jedinica) od 30%;
- 3) povećanje turističkog prometa do 2025. godine do tri puta, odnosno za najmanje 50%;
- 4) povećanje jedinične potrošnje turista (po noćenju) za 50%;
- 5) povećanje udela stranih noćenja na 45% do 2020. i 55% do 2025. godine;
- 6) dvostruko povećanje direktnog udela turizma u BDP-u Republike Srbije;
- 7) povećanje broja direktno zaposlenih u turizmu za najmanje 50% i povećanje broja zaposlenih u turizmu i komplementarnim delatnostima do tri puta;
- 8) povećanje direktnih investicija.

Potrebno je ostvariti i sledeće ciljeve:

- 1) uspostavljanje efikasnog sistema upravljanja razvojem turizma uz jačanje JPP;
- 2) unapređenje i usaglašavanje metodologije i procedura za prikupljanje i obradu statističkih podataka sa međunarodnim standardima i praksom;
- 3) uspostavljanje Registra turizma na zakonski utemeljenim osnovama;
- 4) smanjenje sive ekonomije u turizmu“ [Strategija razvoja turizma Republike Srbije 2016-2025, 2016, str. 43-44].

Za konkurentno pozicioniranje turizma Srbije potrebno je da se kreiranje ponude turističkih proizvoda zasniva na praćenju promena i savremenih trendova u ponašanju i ključnim motivima turista. Kao što se može videti u Tabeli 1, posebno je reč o trendovima prema obrazovanim posetiocima u potrazi za autentičnim iskustvima, kao i aktivnim turistima zainteresovanim za kulturu i prirodne resurse destinacija u koje putuju.

U skladu sa proklamovanim ciljevima, izvršene su i projekcije rasta turizma u Srbiji do 2025. godine na sledeći način:

- polazeći od 2015. godinu kao osnovice, prosečna stopa rasta ukupnog broja noćenja u Republici Srbiji do 2020. godine je projektovana na 7,6%. Pri tom, za strane turiste se predviđa prosečna godišnja stopa rasta broja noćenja od 12,3%, a za domaće 4,1%;

- u periodu od 2020. do 2025. godine (uzimajući 2020. godinu kao osnovicu), procenjuje se da će prosečna stopa rasta ukupnog broja noćenja iznositi 9,1%. Broj noćenja koji bi ostvarili strani turisti 2025. godine dostigao bi 8,1 milion, što bi predstavljalo prosečnu godišnju stopu rasta od 13,5%. Broj noćenja domaćih turista u 2025. godini bio bi 6,6 miliona, odnosno prosečna stopa rasta u ovom periodu bi iznosila 4,8%;
- uzimajući 2015. godinu kao osnovicu za devizni prihod, do 2020. godine predviđa se prosečna godišnja stopa rasta od 19%, što treba da rezultira deviznim prilivom od oko 2,5 milijarde USD;
- evidentirani devizni prihod će u periodu od 2020. do 2025. godine da raste po prosečnoj godišnjoj stopi od 14,9%, te bi 2025. godine dostigao oko pet milijardi USD [Strategija razvoja turizma Republike Srbije 2016-2025, 2016, str. 50].

Novo turističko pozicioniranje Srbije je neophodno i ono mora biti zasnovano na profesionalnom sagledavanju faktora koji presudno utiču na imidž i željeni uspeh Srbije kao turističke destinacije.

Objektivna interpretacija definisanih strateških potencijala za turistički razvoj, analiza i ocenjivanje vrednosti aktuelnih i očekivanih trendova u globalnom turizmu i procena realnih šansi za tržišni prodor i razvoj Srbije, kao i analiza konkurencije čine tri prioriteta faktora koje treba detaljno sagledavati i uključivati u cilju što boljeg turističkog pozicioniranja Srbije na mapi turističkih destinacija Jugoistočne Evrope.

3. POJEDINI OBLICI ODRŽIVOG TURIZMA SRBIJE

Ekoturizam, sportski, izletnički, istraživački, gastronomski, obrazovni, kulturno-istorijski turizam su vrste turizma, pored održivog ruralnog turizma koje Srbija sa relativno malim finansijskim ulaganjima i u kratkom periodu može i treba da stavi u funkciju održivog turizma i kreiranja svoje autentične turističke ponude.

Savremeni uslovi života su usloveli promene u turističkoj tražnji. Sve izraženije potrebe i želje savremenih turista da provode slobodno vreme u prirodnom okruženju, ali i da aktivno učestvuju u različitim aktivnostima prilikom boravka u prirodi, uticale su na sve veću popularnost i zastupljenost sportskog turizma u ukupnom održivom turizmu.

Sportski turizam kao oblik održivog turizma predstavlja aktivno turističko putovanje koje može imati različite ciljeve: rekreaciju, aktivan odmor, takmičenje, avanturu, obrazovanje-edukovanje, istraživanje, zabavu, relaksaciju. Zbog toga su i konkretni proizvodi održivog sportskog turizma kompleksni i uključuju pored različitih elemenata sportskog turizma i druge oblike održivog turizma poput: izletničkog, istraživačkog, zdravstvenog, gastronomskog, obrazovnog, kulturno-istorijskog.

Najčešće aktivnosti turista u prirodi su: lov, ribolov, šetnje, pešačenje, biciklizam, jahanje, rafting, skijanje, alpinizam-planinarenje.

Obrazovni turizam ima značajnu ulogu u povećanju ekološke svesti turista, ali i lokalnog stanovništva o značaju prirode i životne sredine „ne samo“ za održivi turistički razvoj, već i za održivi društveno-ekonomski razvoj Srbije i opstanak društva u celini. Posebno je značajno istaći potrebu razvoja ovog vida održivog turizma i njegovog uvođenja u

predškolsko i osnovno vaspitanje i obrazovanje kao vid preventivnog delovanja na najmlađu populaciju koja će, kao buduća aktivna turistička populacija, znati da vrednuje prirodu i životnu sredinu i da se ponaša u skladu sa principima održivog razvoja.

Gastronomski turizam - turizam hrane i pića se zasniva na stvorenim vrednostima, odnosno, na proizvodnji hrane i pića na autentičan način. Kao takav, gastronomski turizam predstavlja specifičan deo tradicije određene turističke destinacije. Autentičnu gastronomsku ponudu jedne destinacije čine lokalni specijaliteti - izvorna jela specifična za destinaciju koja se spremaju na tradicionalan način u domaćoj proizvodnji.

Različite ture- putevi vina, rakije i tematske gastro-ture mogu biti sastavni deo sveobuhvatne ponude održivog turizma Srbije koja bi trebalo da obuhvata i ponudu održivog kulturno-istorijskog, istraživačkog, zdravstvenog, obrazovnog i sportskog turizma. Zahvaljujući bogatoj i raznovrsnoj ponudi gastronomskog turizma, Srbija je prepoznata kod stranih turista kao destinacija sa visoko kvalitetnom turističkom ponudom ovog vida turizma.

Posmatranje prirodnih pojava i fenomena, kao i aktivnija promocija avanturističkih putovanja, pešačkih tura i „staza zdravlja“, istraživačkog, sportskog, eko-lova i ribolova kao deo prepoznatljive turističke ponude uz adekvatnu valorizaciju mogu doprineti održivom turističkom razvoju Srbije i njenom boljem pozicioniranju na turističkom tržištu kao destinacije koja uvažava ekološke zahteve savremenih turista i ulaže u očuvanje svojih prirodnih, antropogenih i kulturno-istorijskih resursa.

Kao najbolje primere za prethodno iznete stavove o realnim mogućnostima za razvoj održivog turizma u Srbiji izdvajamo **tipične oblike ekoturizma**: posmatranje sova utina u Kikindi i kolonija čaplji i kormorana u Obetskoj i Carskoj bari.

Posmatranje sova u Kikindi predstavlja poseban fenomen po kome se Kikinda izdvaja u svetu kao apsolutno jedinstvena turistička destinacija. Naime, najveće zimovalište sova utina u gradskoj sredini se nalazi upravo u centru Kikinde zbog čega ovaj prirodni fenomen poslednjih nekoliko godina privlači ne samo ljubitelje prirode i ptica iz Srbije, već sve više postaje prava turistička atrakcija za ornitologe i poklonike zaštite prirode i održivog turizma širom sveta.

Po nekim procenama, sove tokom zime unište oko 12 miliona glodara, što donosi višestruku korist u milionima evra, pre svega, u poljoprivrednoj proizvodnji i agrobiznisu. Centar Kikinde je kao najveće zimovalište sova na svetu, zaštićen posebnom odlukom Skupštine opštine Kikinda kojom je zabranjena seča i orezivanje stabala u centru, a bine i svetleće reklame za različite društvene manifestacije moraju biti postavljene na udaljenosti od najmanje dvadeset metara od drveća na kojima su gnezda sova.

Obedska bara je jedno od **najbogatijih staništa** živog sveta u Panonskom basenu u kome se nalazi preko 30 vodenih, močvarnih, šumskih i livadskih biljnih zajednica. Registrovano je 180 vrsta gljiva, 50 vrsta mahovina, 500 vrsta viših biljaka, 200 vrsta zooplanktona, 222 vrste ptica, 50 vrsta sisara, 13 vrsta vodozemaca, 11 vrsta gmizavaca i 16 vrsta riba. Obedska bara je poznata i po vraćanju **evropskog dabra** u njegovo prirodno stanište.

Ovaj rezervat prirode predstavlja jedno od najstarijih zaštićenih prirodnih dobara u svetu čija prva administrativna zaštita potiče iz 1874. godine.

Obetska bara je kolonija 7 vrsta čaplji i kormorana čije posmatranje predstavlja redak prirodni fenomen koji može biti iskorišćen za kreiranje ekoturističke ponude ovog rezervata, odnosno, za kreiranje i promociju ponude održivog turizma i Obetske bare kao destinacije koja čuva i štiti svoj autentični prirodni ambijent. Na prostoru Obetske bare se nalaze i verski

i kulturno-istorijski spomenici: crkva Majke Angeline i stari grad Kupinik koji samo dodatno treba da upotpune i zaokruže turističku ponudu Obetske bare.

Specijalni rezervat prirode Stari Begej – **Carska bara** je prostor bogat florom i faunom koji je značajan „za razvoj tipičnih oblika ekoturizma kao što su: posmatranje ptica, slušanje kreketanja žaba, uživanje u čistoj prirodnoj sredini uz jedinstvenu specifičnost u Evropi, bez prisustva komaraca u priobalnim delovima“ [Milenković, S., Bošković, N., 2012. Razvojne tendencije ekoturizma Srbije, Teme, 2/2012, 483-499, Niš, str. 491].

Biljni svet čine brojne autohtone vrste, od kojih se po svojoj vrednosti izdvajaju: vodeni griz, vodena paprat, beli lokvanj. U livadskoj vegetaciji prisutni su: vranjemil, hajdučka trava, slez, pelen, livadska žalfija i druge, a u močvarnoj vegetaciji: zajednice tršćaka, vodoljub, barska perunika, ježenica, pačija trava, idirot i druge. Šumske površine zauzimaju značajne delove, a brojna stabla u okolini kolonije čaplji i kormorana imaju osušene vrhove, čineći ih tako interesantnim za posmatranje i za lov i ribolov.

Kada je reč o životinjskom svetu, u ovom rezervatu se mogu pronaći: divlja svinja, srna, lisica, zec, bizamski pacov, šišmiš, tvor, jež, tekunica, krtica, lasica, hrčak, barska kornjača, sivi gušter, belouška, zelena žaba i šareni daždevnjak. U vodama ovog rezervata prirode živi čak 24 vrste riba iz 16 familija.

Posebnu prepoznatljivost Carska bara je dobila zahvaljujući prisustvu oko 240 vrsta ptica, zbog čega je ovo dobro proglašeno za Ramsarsko područje, odnosno, upisano je u UNESCO listu močvarnih područja od međunarodnog značaja. Neke od retkih ptica koje se mogu videti u Specijalnom rezervatu prirode Stari Begej, poznatijem pod nazivom Carska bara su: orao belorepan, eja močvarica, livadska eja, kobac, mišar, čaplja kašikara, ali i mnoge druge.

Pored pomenutih prirodnih resursa ovog prostora, Carska bara poseduje i značajne arheološke i kulturno-istorijske resurse koji mogu biti veoma interesantni za unapređenje ukupne turističke ponude. Naime, dokazi pronađeni u humkama u okolini Mužije i Titela svedoče o prisustvu čoveka na ovom području od pre oko 6000 godina. Za burnu istoriju ovog rezervata prirode, vezuje se hunski vođa Atila - Bič božji koji je po brojnim legendama i tvorac imena Carska bara.

Imajući u vidu resursne potencijale sa kojima raspolaže i specifičnosti različitih oblika održivog turizma, u Srbiji postoje destinacije u kojima je moguće pored ekoturističke ponude razvijati i: sportski turizam u vidu lova, ribolova, pešačkih i biciklističkih tura, planinarenja, raftinga, kao i istraživački, obrazovni, kulturno-istorijski i gastronomski turizam. Pomenućemo samo neke od karakterističnih destinacija u Srbiji kao što su: Ludaško jezero, Specijalan rezervat prirode Zasavica, Subotička peščara, Peštarsko polje.

4. ZAKLJUČAK

Na osnovu analize stanja u turističkom sektoru Srbije i sagledavanju realnih mogućnosti za razvoj održivog turizam, došlo se do zaključka da Srbija poseduje značajne prirodne potencijale za razvoj turističke delatnosti. Ekoturizam, sportski, izletnički, istraživački, gastronomski, obrazovni, kulturno-istorijski turizam su vrste turizma, pored održivog ruralnog turizma, koje Srbija sa relativno malim finansijskim ulaganjima i u kratkom periodu može i treba da stavi u funkciju kreiranja svoje autentične turističke ponude i razvoja održivog turizma. Održivi turizam omogućava povezivanje prirodnih, antropogenih, kulturno-istorijskih i ljudskih resursa i pospešuje turistički i opšte privredni razvoj. Međutim, treba uvek imati u vidu činjenicu da turizam u zaštićenim prirodnim područjima može da doprinese obezbeđivanju razvoja tih područja i prihoda lokalnom stanovništvu i lokalnoj zajednici samo ukoliko je održiv, odnosno, samo ukoliko se uspostavi ravnoteža na duži period između

društveno-ekonomskog i ekološkog interesa – između privrednog razvoja i očuvanja životne sredine.

Europark federacija predstavlja najznačajniju organizaciju za zaštićena područja u Evropi, a dodeljivanje povelja za održivi turizam Nacionalnom parku Fruška gora i Specijalnom rezervatu prirode Gornje Podunavlje, najbolja je potvrda naših stavova da Srbija poseduje značajan resursni potencijal za promociju i razvoj različitih oblika održivog turizma.

Međutim, ovi potencijali još uvek nisu na najadekvatniji način prepoznati i tržišno valorizovani o čemu svedoči i zvanični podatak resornog Ministarstva trgovine, turizma i telekomunikacija Republike Srbije o učešće turističke delatnosti u BDP sa svega 2,3% u 2017. godini. Kao potencijalno nova turistička destinacija, Srbija mora da revitalizuje i na daleko efikasniji način iskoristi svoje značajne turističke predispozicije. Kako bi se što uspešnije pozicionirala na turističkom tržištu, Srbija bi trebalo da koristi sopstvene resursne potencijale, ali i iskustva drugih država, da kreira turističke proizvode i svoj položaj na tržištu u skladu sa najnovijim trendovima i zahtevima održivog razvoja, da pravovremeno i aktivno deluje s obzirom na nasleđenu infrastrukturu i organizaciju u turizmu i da ulaže u kontinuirano obrazovanje i razvoj ljudskih resursa koji su zaposleni u turističkom sektoru, a koji bi trebalo svakodnevno da afirmišu i sprovode u delo ideje održivog turizma u funkciji obezbeđivanja turističkog razvoja Srbije koji će biti održiv na duži period.

REFERENCE

1. Milenković, S., Bošković, N., Razvojne tendencije ekoturizma Srbije, Teme, Niš, 2/2012, (2012), 483-499.
2. Milenković, S., Turizam i ekonomija, monografija, Univerzitet u Kragujevcu - Ekonomski fakultet Kragujevac, 2009.
3. Premović, J., Ljudski resursi kao strateški potencijal održivog turističkog razvoja Srbije, Ekonomski fakultet Univerziteta u Kragujevcu, doktorska disertacija odbranjena 23.10.2015. godine u Kragujevcu, 2015.
4. Premović, J., Boljević, A., Arsić, LJ., Turizam u funkciji održivog razvoja Srbije, časopis: Agroekonomika- časopis Departmana za ekonomiku poljoprivrede i sociologiju sela Poljoprivrednog fakulteta Univerziteta u Novom Sadu, (2011), broj 51-52, str. 155-164.
5. Premović, J., Boljević, A., Vujović, S., Agenda 21 –Osnovni aspekti održive turističke privrede, časopis: Ecologica, Naučno-stručno društvo za zaštitu životne sredine Srbije „ECOLOGICA“, Beograd, godina XXI, No 75, (2014), str. 494-497.
6. Strategija razvoja turizma Republike Srbije, „Sl. Glasnik RS“, broj 91/2006, Beograd.
7. Strategija razvoja turizma Republike Srbije 2016.-2025., Vlada Republike Srbije, Ministarstvo trgovine, turizma i telekomunikacija, Beograd, novembar, 2016.
8. Vujović, S, Cvijanović, D., Štetić, S., Destinacijski koncept razvoja turizma, Monografija, Institut za ekonomiku poljoprivrede, Beograd, 2012.



INTANGIBLE VALUE OF CULTURE IN THE FUNCTION OF TOURIST OFFERS

Predrag Vukadinović¹, Jelena Premović, Nebojša Đokić²

¹University Singidunum; ²Faculty of Economics Kosovska Mitrovica, Serbia

Abstract: On the performance of the tourism industry and the creation of the tourism offer, is influenced by numerous factors and potentials that exist in a particular tourist destination, primarily natural, anthropogenic, human and cultural. In recent years, there is the tendency of increased interest of tourists for cultural events which led to the development of different forms of cultural and event tourism. Culture has become an important resource for development, and cultural and event tourism today is one of the key determinants of development of tourism industry, as one of the powerful modern industries. In this paper, the authors analyze the cultural resources and their role in the creation of tourism offer, with special emphasis on the intangible values of culture. All serious archaeological, ethnographic and historical analysis and elaboration indicate that the intangible values of culture had a fundamental importance during the historical development of all civilizations. From prehistory until nowadays, all human creations and value are the product of knowledge and skills of individuals, as members of certain nation at a given time and space. Research about importance of cultural facilities and cultural values in creating quality tourism offer in the function of tourism development, was conducted using the appropriate qualitative methodologies. In this research was applied: historical methods, the method of analysis and synthesis, induction and deduction, comparative and descriptive method.

Keywords: culture, intangible values, manifestations-events, tourism offers, tourism development

1. UVODNE NAPOMENE

Na obavljanje turističke delatnosti i kreiranje turističke ponude utiču brojni faktori i potencijali koji postoje u određenoj turističkoj destinaciji, pre svih, prirodni, antropogeni, ljudski i kulturni. Početkom novog milenijuma u svetu se događaju različiti procesi koji direktno i indirektno utiču i na fizionomiju turizma. Razvoj globalizacije i dominacija svetskog kapitala dovode do novih redistribucija turističkog dohotka, nove preraspodele turističkih kretanja i brzog rasta novih turističkih regiona. U isto vreme, struktura putnika menja i strukturu turističkih motiva, tako da se javljaju novi oblici turizma, naročito vezani za ponudu visokokvalitetnih proizvoda, turizma u zaštićenim oblastima sveta, što u isto vreme označava da turistička kretanja dobijaju epitete, s jedne strane elitizma, a s druge strane ekstremizma [Milenković, S. (2009). Turizam i ekonomija, monografija, Univerzitet u Kragujevcu - Ekonomski fakultet Kragujevac, str. 18].

Upravo je pod uticajem intenzivnog tehnološkog razvoja i globalizacije, izražena složenost i dinamičnost turističkog tržišta uslovala i promene u strukturi turističke ponude i tražnje. Naime, kako podsećaju pojedini naučni radnici [Theim, M., 1994; Bjeljic, Z.; 2006; Milenković, S., 2009; Vujović, S.; 2012] naučno-tehnološki razvoj je uslovio i više slobodnog vremena zaposlenih u gotovo svim privrednim i vanprivrednim delatnostima. Povećanje slobodnog vremena je direktno uticalo i na razvoj turističke delatnosti budući da se značajan deo slobodnog vremena reflektuje kroz različite oblike odmora i turističkih putovanja.

Kompleksnost turističke delatnosti sa svim svojim specifičnostima utiče na stalnu potrebu za preduzimanje novih akcija sa ciljem prilagođavanja turističkog proizvoda zahtevima turističke tražnje kroz prepoznavanje potreba turista u stvaranju turističkog proizvoda, njegovoj realizaciji i nastupu na turističkom tržištu [Vujović, S, Cvijanović, D., Štetić, S. (2012). Destinacijski koncept razvoja turizma, Monografija, Institut za ekonomiku poljoprivrede, Beograd, str. 9]. Analizirajući genezu nastanka i razvoja turističke delatnosti i slobodnog vremena koji se koristi za odmor i različite vrste putovanja, moguće je uočiti da, nasuprot slobodnom vremenu koji je u ranijem periodu korišćen za odmore i putovanja koja su u kontinuitetu trajala najčešće 15 dana, u novije vreme je sve prisutnija pojava korišćenja više kraćih putovanja u trajanju od po nekoliko dana (produženi vikend, vikend putovanje-odmor, verski i državni praznici i slično).

2. METODOLOGIJA

Kada je reč o održivom razvoju turizma, često se naglašava njegoa nematerijalna komponenta, kako sa aspekta ponude, tako i sa aspekta turističke tražnje. Sa aspekta ponude, reč je o nematerijalnom nasleđu koje se turistima plasira u vidu upoznavanja sa tradicijom konkretne destinacije, njenom prošlošću, lokalnim običajima, folklorom, muzikom, lokalnim legendama. Ovome svakako treba dodati i odnos domicilnog stanovništva prema turistima. Sa aspekta tražnje, primetno je da savremeni turisti očekuju od turističkog putovanja prvenstveno doživljaj, događaj, uzbuđenje, zabavu. Kaže se, i to sa puno prava, da turisti danas ne kupuju “letovanje”, “zimovanje”, “produženi vikend” već nova iskustva, nove doživljaje, nova saznanja. Oni tragaju za novim sadržajima, novim destinacijama sa akcentom na aktivan odmor pa se zato turizam posmatra i kao “experience economy” [Stojanović, R., (2016). Promocija novih turističkih destinacija na primeru beogradskih prigradskih opština (neobjavljena doktorska teza odbranjena 2016. godine na Departmanu za turizam PMF Univerziteta u Novom Sadu), Novi Sad, str. 100]. Nematerijalni aspekt turizma podrazumeva i imidž nosilaca turističke ponude, računajući stečenu reputaciju na destinacijskom nivou [Vujović, S., Premović, J., Spajić, J. (2017). Aspekti održivosti menadžment procesa stvaranja materijalne osnove turizma, časopis Ekonomski pogledi (u štampi) Kosovska Mitrovica].

Uzimajući u obzir ove činjenice, osnovni predmet istraživanja u ovom radu su kulturni potencijali i njihova uloga u kreiranju turističke ponude, sa posebnim akcentom na analizu nematerijalnih kulturnih vrednosti. Nakon terminološkog određenja pojmova kulture i nacionalne kulture, turističkih manifestacija i kulturnog i manifestacionog turizma, autori analiziraju turističke motive i preferencije savremenih turista. Na kraju, kao primeri korišćenja nematerijalnog kulturnog nasleđa u kreiranju prepoznatljive turističke ponude navedene su kulturne manifestacije hercegovačkog kraja i to: Nevesinjska olimpijada, Trojčindanski sabor kod manastira Dobrićevo u opštini Bileća i Ilindanski svesrpski narodni sabor “Nadanići” u opštini Gacko.

Istraživanje značaja kulturnih sadržaja i nematerijalnih vrednosti kulture za kreiranje kvalitetne turističke ponude u funkciji razvoja održivog turizma, vršeno je primenom

adekvatne kvalitativne metodologije. Primenjene su: istorijska metoda, metode analize i sinteze, indukcije i dedukcije, komparativna i deskriptivna metoda.

3. KULTURNO NASLEĐE I NACIONALNA KULTURA U FUNKCIJI RAZVOJA TURIZMA

Etimologija pojma kultura vuče korene iz latinskog jezika od reči “colere” što znači gajiti, negovati, poštovati, itd., dok u figurativnom smislu znači razvijanje, obrazovanje, usavršavanje, oplemenjivanje, bogaćenje duha, stručna, naročito opšta obrazovanost i načitanost.

Kultura se može definisati na različite načine. Na osnovu konsultovane domaće i inostrane literature, izdvajamo sledeće definicije:

- Kultura je pretpostavka za svaku temeljnu promenu u društvu i životu pojedinca, ističe Ratko Božović. Ako nešto komunicira sa svetom, to je ono iz kulture, a ne ono što čine osvajači vlasti, smatra on [Izvor: Premović, J., Pejanović, R. (2018). Cultural potentials in the function of the sustainable tourism development of Vrbas municipality, Thematic Proceedings (in press), Vrnjačka Banja].
- Po mišljenju E. Kalea (1983) “kulturu čini sve ono što su ljudi proizveli u svojoj povijesti, svi materijalni i duhovni proizvodi”. Isti autor navodi da se pojam civilizacije odnosi na kulturu onih zajednica, koje su u svom istorijskom razvoju ostvarile glavna kulturna dostignuća, pa se tako govori o grčkoj, kineskoj ili sumerskoj civilizaciji i kulturi Pueblo-indijanaca, Beninskoj kulturi i sl.
- Kultura je stečeno znanje i iskustvo koje ljudi koriste u razvoju svog društvenog ponašanja”, zatim “kultura je kolektivno programiranje uma, koje članove jedne grupe razlikuje od druge [Jovanović, M. (2001). Interkulturni menadžment, Megatrend Univerzitet, Beograd].
- Pojmom kultura, po mišljenju profesora Slavoljuba Vujovića, obuhvata se ukupan stvaralački efekat duhovnog i materijalnog delovanja čoveka od najsitnijih do najkrupnijih sfera u istoriji čovečanstva, determinisan kroz pretežno dve vrste atraktivnosti: etnološkog i umetničkog karaktera.

Kultura je satkana iz velikog broja elemenata. Tokom evolucije, elementi kulture stalno se menjaju, a javljaju se i mnogi novi elementi. Zaključak izvučen iz više različitih naučnih stavova koji se bave pitanjem strukture kulture, strukturu vidi kao:

- Mentifakta,
- Sociofakta i
- Artifakta.

Mentifakta su najvažniji elementi kulture (religija, jezik, okultizam, folklor, tradicija, umetnost), dakle svi oni elementi nastali kao rezultat umnog rada. *Sociofakta* podrazumijevaju regulisanje odnosa između jedinki u ljudskom društvu i između samih društava (politički

sistemi, ekonomski sistemi, sistemi obrazovanja, itd), dok su *Artifakta* rezultati kontakata čoveka sa materijalnim svetom ili životnom sredinom (hrana, stanovanje, sredstva informacija, sredstva za rad, odeća, itd.).

Pojam kulture se može posmatrati u užem i širem smislu reči. Tako se, pod kulturom u užem smislu reči, podrazumeva umetničko stvaralaštvo, dok u širem smislu reči, kultura obuhvata ukupan način života nacionalne i društvene zajednice.

Kulturno nasleđe obuhvata materijalno i nematerijalno kulturno nasleđe. U kulturno nasleđe, po UNESCO spadaju: manifestacione vrednosti (priredbe i festivali, sajmovi iz oblasti kulture, sportske manifestacije vezane za tradicionalne sportove) i folklorno nasleđe (zgrade i prostori, predmeti narodnog graditeljstva, nošnje, stari zanati, naivno slikarstvo, usmena tradicija, kulinarske tradicije, tradicionalni sportovi i igre). Od maja meseca 2006. godine svetska baština UNESCO-a postala je i nematerijalna baština o čijemu popisu i upravljanju vodi računa Međudržavni odbor za očuvanje nematerijalne svetske baštine.

Sve ozbiljne arheološke, etnografske i istorijske analize i elaboracije ukazuju da su nematerijalne vrednosti kulture imale temeljni značaj tokom istorijskog razvoja svih civilizacija. Od praistorije do danas, sve tvorevine i vrednosti su, ističe profesor Slavoljub Vujović, produkt znanja i umeća pojedinaca kao pripadnika određenog naroda, u određenom vremenu i prostoru.

Kultura, naime, ima značajan uticaj na ponašanje pojedinca i njihov doprinos procesu ekonomskog i socijalnog razvoja, kao i na njihove ekonomske izbore i donošenje poslovnih odluka. Kulturne vrednosti mogu, dakle, imati pozitivan ili negativan uticaj na društveno - ekonomski razvoj. Pri tom svaki društveno - ekonomski sistem postaje osoben „kulturološki kapital“. Ekonomski razvoj u svojoj suštini je kulturni proces, kaže ekonomista Veselin Vukotić. Odnos kulturnog i ekonomskog razvoja sve više postaje predmet rasprave u evropskim okvirima.

Proučavanje nacionalne kulture, „nacionalnog karaktera“, tj. „socijalnog genotipa“ mnogostruko je, dakle, značajno. Poznati ekonomista, nobelovac Daglas Nort smatra da su u „socijalnom genotipu“ bivših socijalističkih zemalja postoje mnogobrojni instrumenti („socijalni sindromi“) koji su smetnja afirmaciji moderne tržišne privrede. Teško se, naime, kod nas uspostavljaju nove institucije, a stare se lako ne uklanjaju. Reč je o inertnosti „socijalnog genotipa“, što je značajan uzročnik sporosti tranzicije i što je kočnica efikasnosti reformi. Razlozi su mnogobrojni: istorijski, geopolitički, religiozni, društveno - ekonomski itd. Svi ti faktori imaju svoj sintetički izraz u nacionalnoj kulturi.

Za nacionalnu kulturu je karakteristično da ima dugu tradiciju i da se menja vrlo sporo, mnogo sporije nego ideje [Videti opširnije: Pejanović, R., Premović, J. (2017). Resource potentials of the sustainable tourism development in the municipality of Vrbas, Thematic Proceedings II, Vrnjačka Banja pp. 219-235]. Nacionalna kultura počiva, dakle, na jasnoj predstavi o sopstvenom identitetu, ali i na mogućnostima širenja i otvaranja njenih razvojnih perspektiva i njene provere na međunarodnom, multikulturnom i transkulturnom polju.

4. KULTURNE MANIFESTACIJE KAO PREPOZNATLJIV TURISTIČKI PROIZVOD

Savremene tendencije u motivima i očekivanjima turista pokazuju sve veće interesovanje za upoznavanje sa različitim oblicima nematerijalne kulturne baštine. Povećava se broj poseta značajnim muzejima, galerijama, zaštićenim kulturno-istorijskim spomenicima, arheološkim lokalitetima, kao i brojnim proslavama i manifestacijama različitog sadržaja.

Turisti organizovano posećuju područja značajnih kulturno-istorijskih dešavanja, čuvenih bitaka i memorijalnih centara. Posledično, moguće je uočiti i sve veće učešće kulturnog i manifestacionog turizma u ukupno ostvarenom turističkom prometu.

Uočene tendencije povećanog interesovanja turista posebno za različitim kulturnim sadržajima, uticale su na razvoj kulturnog i manifestacionog turizma. Manifestacioni turizam predstavlja poseban oblik turističkih kretanja čiji je osnovni motiv poseta nekoj od manifestacija po čemu je i dobio naziv. Manifestacije su, dakle, ključna reč kada je u pitanju manifestacioni turizam.

Turističke manifestacije, priredbe, sajmovi, smotre, defilei, performansi, festivali, događaj - označavaju period održavanja programa sa različitim sadržajem koji je interesantan za turiste- posetioce. „Manifestacije turističkog karaktera označavaju javno izvođenje ili prikazivanje bilo u vidu izložbe, priredbe, ili više priredbi raznih kategorija ljudskog dostignuća, a koje se izdvajaju po svojoj specifičnosti, ostvarujući turističke efekte i ciljeve, a organizuju se u svim naseljima koja imaju svoj interes u tome“ [Bjeljac, Ž. (2006). Teorijsko-metodološke osnove manifestacionog turizma, Srpska akademija nauka i umetnosti, Geografski institut "Jovan Cvijić" - posebna izdanja, Beograd, str. 93].

Sve turističke manifestacije se mogu podeliti prema različitim kriterijumima. Najvažniji kriterijumi razvrstavanja turističkih manifestacija su: prema trajnosti, karakteru održavanja, sadržaju programa, brojnosti posetilaca, uložnim finansijskim sredstvima, prema, prema finansijskim efektima i zadovoljstvu posetilaca, motivima posetilaca.

Da bi manifestacija bila što uspešniji turistički proizvod, potrebno je izdvojiti osnovne elemente koji pospešuju proizvod. To su:

- atraktivnost i specifičnost,
- sadržaj,
- rang,
- tradicionalnost,
- kvalitet organizovanja,
- kvantitet posetilaca,
- mesto održavanja,
- vreme i
- trajanje manifestacije [Bjeljac, Ž. (2006). Teorijsko-metodološke osnove manifestacionog turizma, Srpska akademija nauka i umetnosti, Geografski institut "Jovan Cvijić" - posebna izdanja, Beograd, str. 93].

Proučavajući manifestacioni turizam i njegove direktne i indirektno privredne efekte, pojedini naučni radnici (Čomić, Đ., Romelić, J., Bjeljac, Ž.) su uočili da trajanje samih manifestacija najčešće određuje i dužinu boravka manifestacionog turizma, kao i da su program odvijanja manifestacije i sam sadržaj turističkog boravka najčešće unapred određeni. Što se tiče samih privrednih efekata manifestacionog turizma, oni se mogu unapred izračunati, što nije od beznačajnog uticaja. Naprotiv, veoma je značajno, kako podvlače autori. Imajući u vidu da se sve manifestacije ranije planiraju, kod manifestacionog turizma se ne može govoriti o sezonskim oscilacijama turističkog prometa. Poželjno je, i ekonomski i opšte privredni efekti određenih manifestacija su najbolji za lokalnu zajednicu ukoliko se turističke

manifestacije organizuju u vansezoni, naročito u destinacijama čiji turistički promet zavisi od sezone (planinske, primorske destinacije). Na taj način se produžava turistička sezona i obezbeđuje kontinuitet turističkog prometa.

Danas turisti traže životna iskustva koja se ne oglašavaju u zvaničnom promotivnom materijalu. Ako se osećaju dovoljno sigurno, vole da pitaju, razgovaraju bez određenog cilja, otkrivaju skrivene i još uvek ne "brendirane" delove grada i na taj način, učestvujući u svakodnevnom životu stanovnika datog grada, doživljavaju istinski duh grada. Kulturne navike i prakse koje mogu postati roba i usluge, naročito ako su kontekstualizovane i organizovane oko događaja, poput festivala, neiscrpn su resursi za (ponovnu) interpretaciju fizičkog okruženja grada (priroda, ulica, kuće, arhitektura, istorijska i moderna zdanja). Događaji, od porodičnih okupljanja i proslava do javnih festivala, kao „meke tkanine“ gradova, uvek daju drugačije značenje istom ili promenjenom fizičkom prostoru, a možda i pre svega drugog, daju najbolje „sertifikate“ o identitetu određene destinacije [Videti opširnije: Premović, J., Pejanović, R. (2018). Cultural potentials in the function of the sustainable tourism development of Vrbas municipality, Thematic Proceedings (in press), Vrnjačka Banja].

Svi građani, ako su ohrabreni da dele svoja osećanja i izraze svoje promenjive stavove, u mogućnosti su da osmisle svoje okruženje i stvore jedinstvena iskustva za svoje porodice, saradnike i prijatelje, a turisti uvek uživaju u takvim prilikama jer su svedoci i učestvuju u nečemu običnom i ekskluzivnom u isto vreme. Zbog toga, kako ističe profesor Radovan Pejanović, turistička politika koja želi privući zahtevne, ali produhovljene turiste, treba da bude fokusirana na partnerstvo sa organizacijama gradskog društva, umetnicima i kulturnim stvaraocima.

5. PRIMERI KORIŠĆENJA NEMATERIJALNOG KULTURNOG NASLEĐA U FUNKCIJI KREIRANJA PREPOZNATLJIVE TURISTIČKE PONUDE REPUBLIKE SRPSKES

5.1. NEVESINJSKE TRKE ILI NEVESINJSKA OLIMPIJADA

Jedna od najstarijih i ujedno najprepoznatljivih manifestacija koja se održava na području Republike Srpske još od daleke 1852. godine je Nevesinjska olimpijada ili Nevesinjske trke. Poštujući dugu tradiciju i danas se svake godine krajem avgusta meseca u Nevesinju, pod pokroviteljstvom Opštine Nevesinje i Ministarstva za porodicu omladinu i sport u Vladi Republike Srpske organizuje ova kulturno-sportska i turistička manifestacija u okviru koje se održava takmičenje-prvenstveno kao narodna svetkovina u oko petnaestak tradicionalnih i petnaestak modernih disciplina i desetak ostalih manifestacija.

Sve ove manifestacije: skok u dalj iz mesta, skok u vis iz mesta, penjanje uz konopac, penjanje na stub, skakanje na mijeh, trka u džaku, trka sa jajetom u kašici, boj na brvnu, trčanje po brvnu, potezanje klipa, bacanje kamena s ramena, potezanje konopa, trka bosansko-brdskih konja, trka arapskih konja, trka punokrvnih konja - predstavljaju tradicionalne nematerijalne kulturne vrednosti ovog dela Hercegovine.

Istovremeno se održava takmičenje ili nadmetanje u modernim disciplinama: atletski miting (bacanje kugle i koplja, trke svih uzrasta), takmičenje u streljaštvu, teniski turnir, turnir u malom fudbalu, liga mesnih zajednica, odbojkaški turnir i turnir u basketu.

U Crkvenoj opštini Nevesinje čuva se primerak plakata iz 1891. godine kojim se oglašavaju konjske trke, koji je potpisao carski izaslanik Austrougarske za BiH.

Kao prateći programi Nevesinjske olimpijade kao najstarijeg sabora tradicije i viteštva u Republici Srpskoj, održava se niz kulturnih i turističkih sadržaja: kao što su likovni susreti, zatim, otvoreno pojedinačno prvenstvo u šahu, olimpijski kviz, sajam prehrambenih proizvoda i ručnih radinosti, smotra pasa svih rasa, dok se prvenstvo mladih guslara i poetsko likovni susreti mogu izdvojiti kao nematerijalne vrednosti kulture od posebnog značaja. [<http://www.nevesinjeturizam.com/?p=229> 30.01.2018]

5.2. TROJČINDANSKI SABOR KOD BILEĆE

Trojčindanski sabor se tradicionalno održava kod manastira Dobrićevo, u selu Orah, pored Bilečkog jezera, u opštini Bileća. Manastir je na sadašnjoj lokaciji od 1965. godine, dok je izgrađen u XIII veku na drugoj lokaciji, na obali reke Trebišnjice poplavljenom jezerom od kada se po predanju održava i Trojčindanski sabor.

Takmičenja se odvijaju u više narodnih običajnih disciplina koje se, sudeći po sadržaju, načinu izvođenja i nematerijalnim vrednostima i porukama, mogu nazvati kulturno-sportskim manifestacijama.

Jedna od najstarijih ovih manifestacija je takmičenje u izvornom muškom pevanju. Pevačke grupe čini obično po pet učesnika, a može i više, do deset. Jedan od učesnika počinje pesmu i na kraju se uključuju svi opet ponavljajući celu pesmu.

Ostale manifestacije u kojima se odvija tradicionalno takmičenje su i žensko izvorno pevanje (grupe i izvođenje kao kod muškaraca), zatim, sviranje starih tradicionalnih instrumenata (sviranje u miješinu, dvojnica, diplo, frula, guslanje uz gusle-uvek po jedan izvođač), narodno kolo i bacanje kamena sa ramena.

Kod bacanja kamena sa ramena, jedan od veštijih učesnika bira kamen pogodan po težini i obliku za bacanje sa ramena i sa njim se takmiče svi učesnici, gde broj učesnika nije određen. Napravi se linija ili crta farbom ili zacrta na tlu iza koje takmičari bacaju kamen sa ramena, ko baci više u daljinu.

Trojčinski sabor organizuje Srpsko prosvjetno i kulturno društvo „Prosvjeta“ iz Bileće u saradnji sa Opštinom Bileća.

5.3. ILINDANSKI SVESRPSKI NARODNI SABOR, NADANIĆI-GACKO

Opština Gacko i Crkvena opština Gacko – parohija Nadanićka svake godine počevši od 1999. godine organizuju Ilindanski Svesrpski narodni sabor „Nadanići“. [<http://www.hercegovinapromo.com/gacko-15-ilindanski-svesrpski-narodni-sabor-nadanići->]. Ilindanski program je podeljen u dva dana po sadržajima koji su predviđeni i to: takmičarski program i kulturno – umetnički program.

U takmičarskom delu Sabora, nadmetanja se izvode u sledećim disciplinama:

1. takmičenje u skoku u vis;
2. takmičenje u sviranju dvojnica;
3. takmičenje u povlačenju klipa (dva takmičara sedu na zemlju, tabane u tabane upru a istovremeno sa obe ruke uzmu jako drvo i vuku ko će koga da podigne sa mesta ili prevuče na svoju stranu);
4. takmičenje u skoku u dalj (sa crte više takmičara skače ko će dalje skočiti);

5. takmičenje u izvornom pevanju žena;
6. takmičenje u izvornom pevanju muškaraca;
7. takmičenje u bacanju kamena s ramena;
8. takmičenje u potezanju konopa.

Kulturno-umetnički deo programa između takmičarskih pauza izvode:

- Etno grupa „Zora“ Bar;
- KUD „Zelengora“ Gacko;
- KUD „Sava Vladislavić Gacko“;
- KUD „Despot Đurađ“ Smederevo;
- Narodni guslari;
- Pesnici.

U Gacku se održava i Sabor guslara Hercegovine u kojem učestvuju brojna guslarska udruženja sa područja Hercegovine, ali i regiona [<http://www.hercegovinapromo.com/gacko-16-sabor-guslara-hercegovine>, pristupljeno sajtu: 30.01.2018].

6. ZAKLJUČAK

Promene u motivima i očekivanjima savremenih turista su uslovile i promene u strukturi turističke ponude i ostvarenog turističkog prihoda. Kulturni potencijali određene destinacije postaju sve značajniji element u kreiranju prepoznatljive turističke ponude. Posebno su značajne nematerijalne vrednosti i kulturna baština koje se turistima plasira u vidu upoznavanja sa tradicijom konkretne destinacije, njenom prošlošću, lokalnim običajima, folklorom, muzikom, lokalnim legendama. Nematerijalnu svetsku baštinu čini nematerijalna kulturna baština kao što je: usmena tradicija, umetničke izvedbe, društveni običaji, rituali, festivali, znanja i običaji vezani za prirodu i svemir, te znanja i umeća tradicionalnih obrta.

Može se konstatovati da kultura predstavlja važan razvojni resurs savremenog društva i da kulturni i manifestacioni turizam postaju sve više jedna od ključnih odrednica razvoja modernog turizma. Nevesinjska olimpijada, Trojčindanski sabor kod manastira Dobrićevo u opštini Bileća i Ilindanski svesrpski narodni sabor „Nadanići“ u opštini Gacko su samo neke od manifestacija sa značajnim nematerijalnim kulturno-istorijskim nasleđem i značajnim turističkim potencijalom, a koje mogu i treba da budu stavljene u funkciji kreiranja prepoznatljive turističke ponude i turističkog i privrednog razvoja Hercegovine i Republike Srpske.

REFERENCES

1. Bjeljac, Ž., Teorijsko-metodološke osnove manifestacionog turizma, Srpska akademija nauka i umetnosti, Geografski institut „Jovan Cvijić“ - posebna izdanja, Beograd, 2006.

2. Kale, E., *Povijest civilizacije*, Zagreb, 1983.
3. Milenković, S., *Turizam i ekonomija*, monografija, Univerzitet u Kragujevcu - Ekonomski fakultet Kragujevac, 2009.
4. Pejanović, R., Premović, J., *Resource potentials of the sustainable tourism development in the municipality of Vrbas*, Thematic Proceedings II: The Second International Scientific Conference: Tourism in function of development of the Republic of Serbia - Tourism product as a factor of competitiveness of the Serbian economy and experiences of other countries, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, ISBN 978-86-89949-21-6, ISBN 978-86-89949-23-0, Vrnjačka Banja, 1-3 June, 2017, pp. 219-235.
5. Premović, J., Pejanović, R., *Cultural potentials in the function of the sustainable tourism development of Vrbas municipality*, Third International Scientific Conference: Tourism in function of development of the Republic of Serbia - Tourism product as a factor of competitiveness of the Serbian economy and experiences of other countries, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, 31 May- 2 June 2018, Thematic Proceedings (in press).
6. Jovanović, M., *Interkulturni menadžment*, Megatrend Univerzitet, Beograd, 2001.
7. Stojanović, R., *Promocija novih turističkih destinacija na primeru beogradskih prigradskih opština* (neobjavljena doktorska teza odbranjena 2016. godine na Departmanu za turizam PMF Univerziteta u Novom Sadu), Novi Sad, 2016.
8. Vujović, S., Cvijanović, D., Štetić, S., *Destinacijski koncept razvoja turizma*, Monografija, Institut za ekonomiku poljoprivrede, Beograd, 2012.
9. Vujović, S., Premović, J., Spajić, J., *Aspekti održivosti menadžment procesa stvaranja materijalne osnove turizma*, časopis *Ekonomski pogledi* (u štampi), (2017), Kosovska Mitrovica.
10. Vujović, S., *Antropogene vrednosti i elementi kulture u funkciji materijalne osnove turizma*, Naučno-stručni časopis *Turizam*, br. 10. Departman za geografiju, turizam i hotelijerstvo, PMF Novi Sad, (2006), str: 81-84.
11. <http://www.hercegovinapromo.com/gacko-16-sabor-guslara-hercegovine>, pristupljeno sajtu: 30.01.2018.
12. <http://www.hercegovinapromo.com/gacko-15-ilindanski-svesrpski-narodni-sabor-nadanici>- pristupljeno sajtu: 30.01.2018.
13. <http://www.nevesinjeturizam.com/?p=229> pristupljeno sajtu: 30.01.2018.



INVESTIGATION ON THE INFLUENCE OF CORPORATE SOCIAL RESPONSIBILITY DIMENSIONS ON BUSINESS PERFORMANCES OF THE COMPANY

Andelka Stojanović, Sanela Arsić, Isidora Milošević, Snežana Urošević, Ivan Mihajlović

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Corporate Social Responsibility (CSR) is becoming an indispensable part of a sustainable business and the source of the company's competitive advantage. The aim of this research is to determine the implications of applying the CSR concept to employees and examine the impact of the conceptual CSR framework dimensions on business performances of the company. The defined model refers to improving company performance through the implementation of CSR activities based on five dimensions (environmental, social, economic, stakeholder and dimension of voluntarism). The survey is based on data of employee attitudes collected in Russia, Bulgaria and Serbia. A survey questionnaire was used as a data collection tool. Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were used to obtain and analyze the results. The results show that the awareness of employees about the realization of CSR activities in the company positively influences their satisfaction and commitment to the company and therefore the overall business performance of the company.

Keywords: Dimensions of CSR, employees, employee's satisfaction, business performances

1. INTRODUCTION

Dramatic changes of business environment in last years have caused some significant changes in the relation of companies to certain issues. To be socially responsible company doesn't mean just fulfilling the obligations prescribed by law, yet implies investments in human capital, environment and improving relationships with all stakeholders [1]. Nowadays, the primary focus of companies is moved from a profit toward sustainable development. By incorporating the CSR in business strategy and daily business operation, companies accomplish numerous benefits through strengthening connections with stakeholders, gaining better reputation, developing the ability to innovate, etc.

Corporate social responsibility isn't new business practice and the great number of approaches in research on CSR has been developed [2]. Some of the researchers dealt with the influence of CSR activities on the certain elements of business while others researchers were focused on factors that influenced the CSR implementation and results. Significant contribution in the field of defining CSR concept has been given with Triple Bottom Line approach [3] which, applied to CSR, addresses three pillars: the environment, the economy, and the society. Authors have been using this concept for defining various cause-consequence relations of CSR with other elements in business such as motivation, performances and

competitive success [4,5,6]. In addition to the aforementioned TBL concept, the concept presented by Carroll (1979) [7] has been often used, that comprises four responsibilities: legal, economic, discretionally and ethical, forming the Pyramid of corporate responsibility [8,9]. This set of responsibilities build the base for considering the nature of company responsibility. Further researches based on this concept showed the possibility of making a clear distinction between proposed responsibilities, therefore, it can be a useful instrument for measuring CSR [10]. By reviewing the literature, the dimensions which have been repeated in numerous definitions are being spotted: environmental, social, economic, stakeholder and voluntariness dimension [11,12].

One of the widely accepted CSR concepts is derived from stakeholder theory [8, 13] where the importance of different groups' interests, actively or passively connected to companies' activities, was emphasized. Stakeholder approach is the key to identifying and expanding the social role of the company that overcomes financial goals and prescribed norms [14]. The interest in attitudes of employees comes as consequence of opinion that CSR increases the loyalty of employees and thus engagement and productivity [15].

The main focus of this paper is a relationship between dimensions of corporate social responsibility and overall performances of the company as a result of employee satisfaction at work and dedication to company's values. The five dimensions of CSR defined by Dahlsrud (2008) have been used [11]: environmental, economic, social, stakeholder and voluntariness. As an independent variable, the perception of employees toward CSR activities classified through dimensions was defined. Dependent variables were the satisfaction of employees that has been encouraged by CSR activities, and overall performances of the company as a consequence of the greater dedication of employees to a company. The research carried out for the purpose of this paper has been related to employees from Russia, Bulgaria and Serbia, about the mode of implementing corporate social responsibility concept and its results.

2. REVIEW OF RELATED LITERATURE AND DEFINING OF CONCEPTUAL MODEL

Very important field of CSR research is responsiveness of stakeholders on different CSR actions. The employees represent significant actors in the company's business, therefore, their reactions on company's CSR are the crucial aspect of CSR studies.

In the research conducted in Australia, Fortier (2013) proved the strong positive relationship between CSR perception and job satisfaction among the employees[16]. Accordingly, the better perception of an employee about company's CSR activities increases the satisfaction the employee feels while performing daily operations. The research carried out in Pakistan also pointed to positive relationships between the dedication of employees and level of CSR activities as well as the positive influence of employees' organizational commitment on organizational performance [17]. Likewise, Brammer et al. (2007) were researching the connections in organizational commitment and employees perception of CSR, by using a model based on social identity theory[18]. The same theory was used by Turker (2009) in research carried out in Turkey which results were very similar to the others[19]. Lee et al. (2013) were examining how perceived belonging to the culture of the company and CSR affected on employees commitment and their performances[20]. Corporate culture becomes the resource for reaching competitive advantage by implementing CSR activities through which the coherence of employees and company is increased. Company's good CSR reputation can ensure the low employee fluctuation rate and draw the attention of the potential quality job seekers. This approach to CSR has roots in stakeholder theory [8] by which the

company's long-term value is based on knowledge, abilities and commitment of employees as well as relationships with investors, clients and other stakeholders. The research of Mueller et al. (2012) referred to the perception of employees toward CSR and organizational commitment [12]. The survey was cross-cultural, conducted in 17 countries, and results showed that CSR perception was connected with affective commitment (AC) of an employee. AC is an emotional response and identification with company's values, and it is much stronger in culture with a higher level of human orientation, institutional collectivism and orientation on future than in culture with a low level of previously mentioned strengths. Story and Neves (2015) investigated how employees were perceiving CSR motives of the company and how CSR efforts affect employee s' performances[21]. Attention is given to whether the employees make the difference between intrinsic and extrinsic motivations and impact of that perception on the performance of employees. Glavas and Kelley (2014) examined the influence of CSR on employees attitudes based on how companies treated other beyond the organization [22]. The results showed that employees' perception of CSR had been positively connected with organizational commitment and partially mediated by work meaningfulness and perceived organizational support.

2.1. DIMENSIONS OF CSR

Review of corporate social responsibility can be done through a certain number of interconnected dimensions that can create the solid base for defining company's attitudes toward the most important issues of the society and surrounding [6].

Significant global aspects of environmental care are the gasses emission reduction, energy efficiency, increasing the productivity while sustainable consumption of resources, yet these questions are considered on the high international institutional level. Environmental dimension refers to environmental protection and taking care of natural surrounding while performing everyday activities [12]. While planning of sustainable business, companies should take into consideration own share in addressing the environmental issues, in order to ensure enough resources and energy for present operational activities and at the same time preventing jeopardizing of the future activities. Some authors have been putting the environmental concerns in focus of socially responsible behavior and management of the company [23]. The activities which are to implement, first of all, should be in accordance with the adopted law, then, the awareness for support to environmental initiatives should be developed and policies and procedures for decreasing harmful influence created.

The company's attitude towards social vicinity in which operates has a dominant role in the determination of socially responsible behavior of the company. More appreciated is the company that is socially responsible and engaged in the local environment in a transparent manner [24]. Ansoff pointed that social dimension of CSR should reflect the interaction of the company with vicinity at all levels of strategic decision making [25]. By doing business in this way, companies should improve the social legitimacy of their work and deal with new challenges which refer: defining the role of the company in the society, new attitudes of consumers toward companies, new dimensions of social control [26] thereby affecting forming the attitudes of company's stakeholders toward strategic management [1]. Lim and Greenwood (2017) suggest social reporting, labor practice indicators, human capital development, talent attraction and retention, corporate citizenship and philanthropy as general indicators under the social dimension [27].

The economic aspect of CSR, among scientists, had been neglected for a long time when it comes to corporate social responsibility [28]. The economic responsibility of the company, as an aspect, has been developed contrary to theorists who oppose CSR concept [29]. It is presupposed that financial implications aren't the only matter of concerns of companies, already the direct and indirect influence the company accomplishes in the surrounding is been taking into account. As long as companies invest in CSR activities under the assumption of future profitability or competitive success, they fulfill both an economic and social role. For economic dimension Lim and Greenwood (2017) proposed corporate governance, risk and crisis management, and codes of conduct, compliance, corruption and bribery as general indicators [27].

Voluntarily directing interests of the company on people, planet and profit [30] draw attention to the stakeholders. Paying attention to all stakeholders doesn't just help the company to improve business performance and create greater value yet shows its moral values and business culture. The questions of choices between potential damage and benefit of certain groups, the resolution the conflicted interests of stakeholders, and harmonization of relationships between interested sides need to be considered [14].

The essence of CSR concept is voluntariness because of all company's activities connected to aforementioned dimensions should be implemented on the voluntary basis and beyond the fulfillment of obligatory level prescribed by the norms. Employee volunteerism is a common way of practicing of corporate social responsibility that is used by a company to strength employee affiliation to a company and, on the other hand, to improve corporate reputations and connections with other stakeholders. Companies include in business strategies support to involving of employees in CSR activities as the opportunity to connect internal and external efforts of the company [31, 32].

In this research the perception of employees toward five dimensions of CSR evaluated through the importance of CSR activities was used. The dependent variable was the employee's satisfaction on the job. Taking into consideration the results of previous researches and estimated importance of CSR dimensions, the following hypothesis is defined:

Hypothesis H1. Employees' satisfaction at work and their commitment are positively related to perceived CSR activities within CSR dimensions.

2.2. SATISFACTION OF EMPLOYEES

The satisfaction of employees is linked to various elements of the work environment that relate to social relationships, work atmosphere, personal affinities and job conditions. Especially in Western economies, job security is not guaranteed by work contracts, but continuous evaluation of employee performance is carried out, and partly employees are held responsible for their careers and development. Loyalty to a company is not implied, therefore, both employee and the employer have the responsibility to create a win-win relationship in which the values of people and companies will be in the same direction. CSR is a manner for influencing employees perception and in this way, creates a greater impact on the performance of the company [16].

It is very important to study how employees perceive the importance and implementation of CSR because on the basis of employee attitudes about the company the relationships in the workplace and attitudes towards work, loyalty and behavior, are being created. Organizational commitment arises from the fulfillment of employees expectation

concerning acting of the company in different areas. If the needs for learning and possibilities for career progression are fulfilled [18], if employees' abilities are enhanced and adequate utilized, and if all efforts are properly rewarded, employees feel fulfillment, completely dedicate themselves to work, and thus the organizational commitment is being significantly increased [19]. The large part of working climate comes from CSR [33], therefore, through CSR activities working surrounding should be made safe in a physical and psychological sense. The attitudes about organizational support to employees are the consequences of the manner the company contribute to wellbeing and development of employees. Demonstrated organizational justice contributes to the perception of righteousness [20], equality and a fair distribution of resources [22].

Interest in social engagement of companies and participation in socially responsible activities that concerns others issues eg. social and environmental also affects a sense of belonging and identification which develops among employees. A significant element in connecting an employee with company represent values company promote through CSR activities. In order to identify employees with company's values, it is necessary that those are aligned with their personal ethical attitudes. Employees are proud of companies that are making efforts to build positive relationships with the environment and thus build a business reputation that is considered prestigious in society [20].

Affiliation with the organizational social group and identification of employees with company values can influence the building of the identity of employees as socially responsible members of the community [19]. For the above mentioned reasons, companies have the interest of ensuring the loyalty of their employees, involving employees in the efforts of the organization and building a unique identity. Through the positive influence on the employees, the positive influence of the company on the entire social community is being made [34, 35, 6].

By applying CSR, the company affects the performance of its business through employee satisfaction and the identification with the values of the company and, consequently, the more intense engagement, thus the following hypothesis can be defined:

Hypotesis H2. Business performances of the company are positively related to satisfaction and engagement of employees at work.

2.3. BUSINESS PERFORMANCE

The importance of understanding established relations between employees and CSR efforts of the company is subject of many articles. Authors Yu and Choi (2016) assumed and tried to prove the hypothesis that CSR activities represent mediators among companies and employees' commitment to the company [36]. Likewise, it is assumed that greater dedication and loyalty of worker reflects on their personal performance and consequently on the overall performance of the company. Findings of those researchers pointed positive connections between employees attitudes and companies results. Lindgreen et al. (2009), who explored CSR activities in the fields of ecology and philanthropy, also confirmed a positive impact on the company's performance [37]. Peters and Mullen (2009) have investigated the relationship between the company's financial performance and CSR and concluded that, over time, the financial performance of companies that implement CSR is getting better [38].

In addition to financial results, a significant role in measuring the success of the business is been played by non-financial performance. The competitive advantage of the

company is reflected through [39]: increasing sales and market share, strengthening brand positions, strengthening corporate image and impact, strengthening the company's ability to attract and retain a qualified workforce and reduce operating costs. By developing connections between the employees and the organization, the perception of the overall performances of the company has been positively influenced [20] because the fact that employees belong to a company that is socially responsible positively affects the attitudes about their job.

Based on the stated hypothesis H1 and H2, one can define a theoretical model for the influence of certain parameters of CSR on the business performance of the company, which is shown in Figure 1. The model shows the indirect influence five dimensions of CSR as well as direct influence of satisfaction of employees on the business performance.

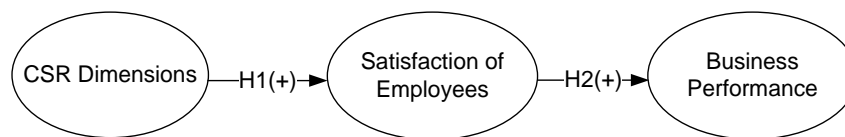


Figure 1. Conceptual model of the impact of CSR dimensions on business performance of companies

3. METHODOLOGY

The target population for this research were employees working in different companies in Russia, Bulgaria and Serbia, where research was conducted from December 2016 to March 2018. The tested sample is heterogeneous and includes a very similar number of employees from each country, employees in private and state-owned companies, different industrial sectors and level of education of respondents.

The questionnaire used in the research fundamentally consists of three groups of questions. The first group of questions refers to the general knowledge and significance of the CSR concept. The second group of questions in the questionnaire is focused on the knowledge of CSR dimensions (environmental, economic, social, dimensions of stakeholders and volunteerism), their importance for the business, and how much employees are familiar with the activities related to these dimensions. The third group of questions is related to the demographic characteristics of the respondents and the companies in which they work (gender, education, time of engagement in the company, workplace, size of the company, number of employees, industry sector, etc.).

The advantage of using a questionnaire, from the formal point of view, is that it ensures anonymity and confidentiality of data, as well as complete standardization of the collected data. The survey covered a total of 467 respondents which correctly filled out the questionnaire.

For the analysis of the obtained results presented in the paper the software package SPSS v.17 was used, and for the analysis of the measurement and structural model, the structural equation model (SEM) and software package LISREL v.8.0 were used [40].

3.1. THE DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

In Table 1 the data that enable acquisition of an image of the sample structure in the studied countries are presented.

Table 1. The demographic characteristics of the sample

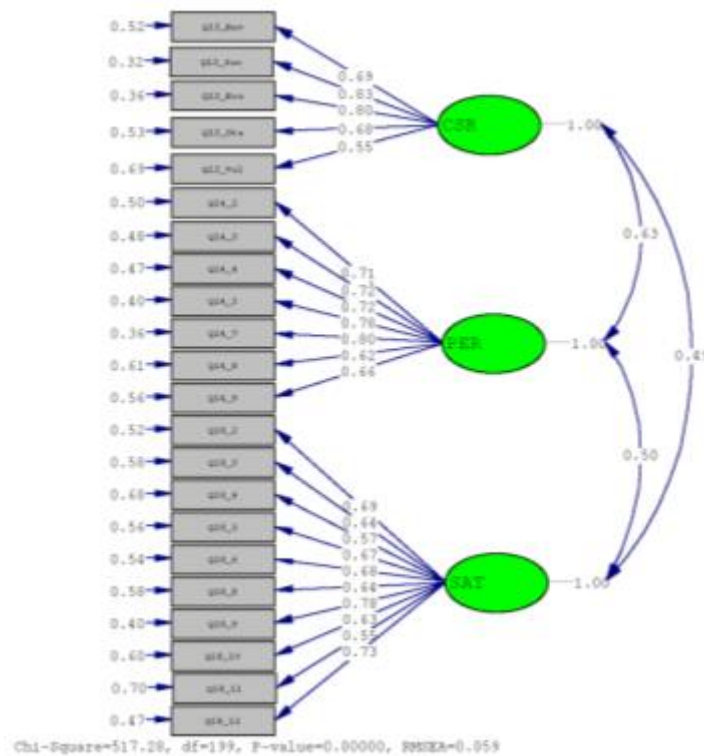
Variables	Category	Percentage (%)
Country	Russia	36.19
	Bulgaria	24.41
	Serbia	39.40
Age	18-25	18.6
	26-35	41.8
	36-45	19.5
	46-55	17.8
	55-65	1.3
	Over 65	1.1
Gender	Male	38.5
	Female	61.5
Level of education	High school diploma and under diploma	7.1
	Diploma of the Vocational Education	39.8
	BSc	26.1
	MSc	18.2
	PhD	4.3
	Other	4.5
Position in the company	Worker	61.0
	Headworker	28.5
	Supervisor	10.5

4. ANALYSIS OF THE RESULTS

Measurement model is estimated by using confirmatory factor analysis (CFA). The analysis of the measurement model has resulted in the indices of the fitting model ($\chi^2/df=2.599$, CFI=0.98, IFI=0.98, NFI=0.96, RMR=0.064, RMSEA=0.059), which are in accordance with the recommended, that is, with values that indicate good model fitting. The obtained results of the indices of the fitting model were presented in Table 2 and Figure 2.

Table 2. Fit indices for the measurement model

	χ^2/df	RMSEA	RMR	CFI	NFI	NNFI	IFI	RFI	GFI
$\chi^2=517.28$ df=199 (p<0.05)	2.599	0.059	0.064	0.98	0.96	0.97	0.98	0.96	0.91
Accepted fit	< 3	< 0.08	< 0.10	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90



Slika 2. Measurement model

Based on confirmatory factor analysis, discriminant and convergent validity were tested. All load factor indicators are higher than 0.50, as shown in Table 3, their structures are statistically significant ($p < 0.01$), indicating that the convergent validity was achieved [41], i.e. that the indicators used in this study adequately represent concepts to which they refer.

Table 3. Assessment of convergent validity

Construct	Standardized Regression Weights	Critical ratio t-value	Average Variance Extracted (AVE)	Discriminant Validity
CSR Dimensions	0.55 - 0.83	12.01 – 19.47	0.514	0.717
Satisfaction of Employees	0.55 - 0.78	12.12 – 19.22	0.437	0.661
Business Performance	0.62 - 0.80	14.12 – 20.00	0.516	0.718

The coefficient of internal consistency Cronbach α [42,43] also indicates the reliability of measurement scales. All values for all groups are shown in Table 4.

Table 4. Internal consistency group of statements

Construct	n	Mean	Variance	Cronbach's alpha
CSR Dimensions	5	3.381	1.688	0.842
Satisfaction of Employees	10	3.896	1.203	0.885
Business Performance	7	3.690	1.481	0.877
Total		3.714	1.402	0.914

Before testing the structural model, it is necessary to define the correlation model (Table 5), which establishes correlational connections among defined groups of questions, in order to confirm that the 22 measurable variables reflect the 3 latent variables in a reliable manner.

Table 5. Correlation Matrix and Discriminant Validity

Construct	CSR Dimensions	Satisfaction of Employees	Business Performance
CSR Dimensions	0.717		
Satisfaction of Employees	0.745	0.661	
Business Performance	0.758	0.817	0.718

The bold numbers on the diagonal in Table 5 represent the square root of the AVE, while the off-diagonal elements represent the correlation. Correlation is significant at the 0.01 level.

Given the satisfactory parameters structural models fitting and the conditions of validity of the concepts met, in the next phase, the structural analysis was conducted. In Figure 3 a structural model is shown.

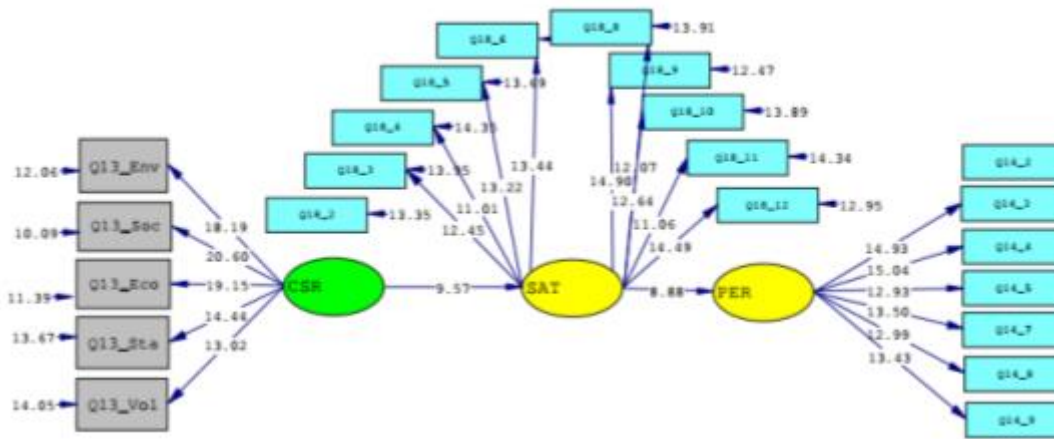


Figure 3. Structural model

Evaluation of structural model indicated a satisfactory indexes model fitting (Table 6), all load factors and chi-square goodness-of-fit statistics of the structural model $\chi^2 = 545.73$, $df = 199$, $\chi^2/df = 2.74$, have statistical significance ($p < 0.000$).

Table 6. Fit indices for the structural model

	χ^2/df	RMSEA	RMR	CFI	NFI	NNFI	IFI	RFI	GFI
$\chi^2=517.28$ $df=199$ ($p < 0.05$)	2.739	0.061	0.087	0.97	0.96	0.97	0.97	0.95	0.90
Accepted fit	< 3	< 0.08	< 0.10	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90

After that, followed testing of structural relations between concepts. The findings, presented in Table 7, are showing a statistically significant influence of CSR dimensions on employee satisfaction ($\beta=0.53$, $t=9.57$, $p < 0.01$), thus confirming the hypothesis H1. Realization of the CSR activities within dimensions causes a positive impact on the satisfaction of the employees, who were the target group in the research. The research results show the motivation of employees as an important determinant of perceived value, which has direct and also the most significant influence on business performance ($\beta=0.51$, $t=8.88$, $p < 0.01$), thus confirming the hypothesis H2.

Table 7. Path Coefficients and t-Values of the Hypothesis

The relationship or path	Standardized regression coefficient	Critical ratio or (t-value)	Casual relations
(H1) CSR → SAT	0.53	9.57	R1: yes
(H2) SAT → BP	0.51	8.88	R1: yes

(a) significance at the level of 99%

5. CONCLUDING REMARKS

Results of the path analysis show that both hypotheses have been confirmed. Corporate socially responsible business is a business practice applied by more and more modern companies in order to gain a competitive advantage on the market. For companies that operate socially responsible is not enough just to develop and implement specific activities, but also to spread and promote achieved results [45], in order to make a transparency of mission of corporate social responsibility. Through the proposed model the impact of five dimensions of corporate social responsibility on the satisfaction of employees has been examined. Employees are the driving force of any organization. For this reason, each company's management should introduce the employees to the concept of CSR and involve them in the implementation of these activities. The obtained results show that the implementations of the activities within the most important CSR dimensions have a very favorable influence on the satisfaction of employees and thus contribute to the business performance of the company. Through this business practice, companies reduce all the harmful activities that their business has on the community and strive to provide more value to society, showing concern for the benefit of the entire community [46]. Due to rapid social changes, globalization, information flows and increased transparency, CSR will become an even more important factor in connecting companies and surrounding.

REFERENCES

1. Moyeen A., CSR Management Strategies, Stakeholder Engagement and MNE Subsidiaries Efforts to Foster Sustainable Development, In book: *The Goals of Sustainable Development*, Springer, 2018, 43-54.
2. Carroll A., Corporate social responsibility: Evolution of a definitional construct, *Business & Society*, 38(3), (1999), 268-295.
3. Elkington J., *Cannibals with Forks: the Triple Bottom Line of 21st Century Business*, second ed., Capstone Publishing Ltd., Oxford, UK, 1997.
4. Gallardo-Vázquez D., Sanchez-Hernandez M., Measuring Corporate Social Responsibility for competitive success at a regional level, *Journal of Cleaner Production*, 72 , (2014), 14-22.
5. Nikolaou I.E., Tsalis T.A., Development of a sustainable balanced scorecard framework, *Ecological Indicators*, 34,(2013), 76-86.
6. González-Rodríguez M., Díaz-Fernández M., Simonetti B., The social, economic and environmental dimensions of corporate social responsibility: The role played by consumers and potential entrepreneurs, *International Business Review*, 24, (2015), 836-848.
7. Carroll A., A Three-Dimensional Conceptual Model of Corporate Performance. *Academy of Management Review*, 4(4), (1979), 497-505.
8. Carroll A., The Pyramid of Corporate Social Responsibility: Toward the Moral Management of Organizational Stakeholders, *Business Horizons*, (1991).

9. Carroll A., Carroll's pyramid of CSR: taking another look, *International Journal of Corporate Social Responsibility*, 1(3), (2016).
10. Calabrese A., Costa R., Menichini T., Rosati F., Sanfelice, G., Turning Corporate Social Responsibilitydriven Opportunities in Competitive Advantages: a Twodimensional Model, *Knowledge and Process Management*, 20(1), (2013), 50–58.
11. Dahlsrud A., How Corporate Social Responsibility is Defined: an Analysis of 37 Definitions, *Corporate Social Responsibility and Environmental Management*, 15(1), (2008), 1-13.
12. Mueller K., Hattrup K., Spiess S., Lin-Hi N., The Effects of Corporate Social Responsibility on Employees' Affective Commitment: A Cross-Cultural Investigation, *Journal of Applied Psychology*, 97(6), (2012), 1186–1200.
13. Freeman E., Velamuri S.R., Moriarty B., *Company Stakeholder Responsibility: A New Approach to CSR*. Business Roundtable Institute for Corporate Ethics, 2006.
14. Parmar B.L., Freeman R., Harrison J., Purnell A.C., De Colle S., Stakeholder Theory: The State of the Art, *The Academy of Management Annals*, 3, (2010), 403-445.
15. Godkin L., Mid-Management, Employee Engagement, and the Generation of Reliable Sustainable Corporate Social Responsibility, *Journal of Business Ethics*, 130 (1), (2015), 15-28.
16. Fortier A., *The Effects of Corporate Social Responsibility on Employees' Job Satisfaction: An Empirical Study with Cross- Cultural Dimensions*, Curtin University. 2013.
17. Ali I., Ur Rehman K., Ali S., Yousaf J., Zia M., Corporate social responsibility influences, employee commitment and organizational performance, *African Journal of Business Management* Vol. 4(12), (2010), 2796-2801.
18. Brammer S., Millington A., Rayton B., The contribution of corporate social responsibility to organizational commitment, *The International Journal of Human Resource Management*, 18(10), (2007), 1701-1719 .
19. Turker D., How Corporate Social Responsibility Influences Organizational Commitment, *Journal of Business Ethics*, 89, (2009), 89–204.
20. Lee E., Park S., Lee H., Employee perception of CSR activities: Its antecedents and consequences, *Journal of Business Research*, 66, (2013), 1716–1724.
21. Story J., Neves P., When corporate social responsibility (CSR) increases performance: exploring the role of intrinsic and extrinsic CSR attribution, *Business Ethics: A European Review*, 24(2), (2015), 111-124.
22. Glavas A., Kelley K., The Effects of Perceived Corporate Social Responsibility on Employee Attitudes, *Business Ethics Quarterly*, 24(2), (2014), 165-202.
23. Oleszko-Kurzyna B., *Corporate social responsibility towards the environment – the involvement of polish enterprises in the implementation of the idea of CSR*. Maria Curie – Skłodowska University in Lublin, 2014.
24. Margolis J.D., Walsh J.P., Misery Loves Companies: Rethinking Social Initiatives by Business, *Administrative Science Quarterly*, 48(2), (2003), 268-305.

25. Ansoff H. I., *Strategic Management*, John Wiley & Sons, New York, 1979.
26. Nazari J.A., Hrazdil K., Mahmoudian F., Assessing social and environmental performance through narrative complexity in CSR reports, *Journal of Contemporary Accounting & Economics*, 13(2), (2017), 166-178.
27. Lim J., Greenwood C., Communicating corporate social responsibility (CSR): Stakeholder responsiveness and engagement strategy to achieve CSR goals, *Public Relations Review*, 43(4), (2017), 768-776.
28. Uddin M., Hassan M., Tarique K., Three Dimensional Aspects of Corporate Social Responsibility, *Daffodil International University Journal of Business and Economics*, 3 (1), (2008), 198-212.
29. Friedman M., The Social Responsibility of Business is to Increase its Profits, *The New York Times Magazine*, 13 (32-33), (1970), 122-124.
30. Kanji G., Chopra P., Corporate social responsibility in a global economy, *Total Quality Management*, 21 (2), (2010), 119-143.
31. Aguinis H., Glavas A., What we know and don't know about corporate social responsibility: A review and research agenda, *Journal of Management*, 38(4), (2012), 932—968.
32. Cycyota C., Ferrante C., Schroeder J., Corporate social responsibility and employee volunteerism: What do the best companies do?, *Business Horizons*, 59, (2016), 321-329.
33. Aguilera, R. V., Rupp, D. E., Williams, C. A., & Ganapathi, J. 2007. Putting the s back in corporate social responsibility: A multilevel theory of social change in organizations. *Academy of Management Review*, 32: 836–63.
34. Carroll A. B., Shabana K. M., The business case for corporate social responsibility: A review of concepts, research and practice, *International Journal of Management Reviews*, (2010), 85- 105.
35. Fontaine M., Corporate Social Responsibility and Sustainability: The New Bottom Line?, *International Journal of Business and Social Science*, 4 (4), (2013), 110-119.
36. Yu Y., Choi Y., Stakeholder pressure and CSR adoption: The mediating role of organizational culture for Chinese companies, *The Social Science Journal*, 53(2), (2016), 226-235.
37. Lindgreen A., Swaen V., Johnston W., The supporting function of marketing in corporate social responsibility, *Corporate Reputation Review*, 12(2), (2009), 120–139.
38. Peters R., Mullen M. R., Some evidence of the cumulative effects of corporate social responsibility on financial performance, *The Journal of Global Business Issues*, 3(1), (2009), 1–14.
39. Kotler P., Lee N., *Social marketing: Influencing behaviors for good*, Sage Publications, New York, 2007.
40. Nunnally J.C., *Psychometric Theory*, Second ed. McGraw-Hill, New York, 1978.

41. Hair J. F., Anderson R. E., Tatham R. L., Black, W.C., *Multivariate data analysis* (5th ed.), Prentice Hall, New Jersey, 1998.
42. Cronbach L.J., Coefficient alpha and the internal structure of test, *Psychometrika* 16, (1951), 297-334.
43. Milijic N., Mihajlovic I., Štrbac N., Živkovic Ž., Developing a Questionnaire for Measuring Safety Climate in the Workplace in Serbia, *International Journal of Occupational Safety and Ergonomics*, 19 (4), (2013), 631-645.
45. Prates C., Pedrozo, E., Silva T., Corporate Social Responsibility: A Case Study in Subsidiaries from Brazil and China, *Journal of Technology Management & Innovation*, 10(3), (2015), 131-142.
46. Bonsón E., Bednárová M., CSR reporting practices of Eurozone companies, *Revista de Contabilidad - Spanish Accounting Review*, 18(2), (2015), 182-193.



BENCHMARKING AS A TOOL FOR COMPARISON OF FROZEN PASTRY PRODUCTS BETWEEN LOCAL PRODUCER AND “BEST-IN-CLASS” PRODUCERS

Andrea Dobrosavljević, Snežana Urošević

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Organizations are faced with a constant effort to improve competitiveness and to work on performance improvement in a business environment characterized by a high level of uncertainty and risk. In order to reach and maintain competitive advantage on the market, organizations, in all business areas, tend to achieve best practice in business. Thereby, implementation of best practice can be considered as a continuous process of improvements. Benchmarking is a technique of comparative analysis, a tool for company's business improvements. By learning from other organizations, which have established best practice, own business can be improved. According to that, benchmarking means finding the methods, also, finding the reasons, why some organizations perform the same tasks better than others. The aim of this paper is seen in analysis of ideas and business methods of leading organizations in frozen pastry class. Comparisons carried out determine the differences on which should be paid attention and which manufacturer should work on in order to improve and approximate its own position to the position of the best on frozen pastry market.

Keywords: benchmarking, benchmarking process, best practice, competitive advantage, best in class, performance gaps, continuous improvement process

1. UVOD

Poboljšanje performansi, budžetiranje, testiranje ideja, rešavanje tehničkih problema i rešavanje nesuglasica samo su neki od razloga zašto kompanije danas koriste benčmarking [1]. Posmatrajući benčmarking kao praksu koja pospešuje samoprocenu organizacija, može se reći da on predstavlja alat za poboljšanje organizacionih performansi [2]. Sistematskim poređenjem elemenata performansi jedne kompanije nasuprot onih koje su razvile najbolju poslovnu praksu, dolazi se do informacija koje pomažu kompaniji koja vrši sagledavanje ovih elemenata da identifikuje i primeni neophodna poboljšanja [3]. U savremenim uslovima pojačan interes kompanija za primenu benčmarking tehnike može se smatrati rezultatom globalne konkurencije, pojačanog interesa za nagrade kvalitet i potrebe za radikalnim poboljšanjem u poslovanju [4]. U literaturi je moguće naći veliki broj definicija, u osnovi, benčmarking se definiše kao efektivan alat za iznalaženje najbolje prakse druge organizacije u cilju primene u sopstvenoj organizaciji radi sticanja određenih koristi. Ostale definicije se fokusiraju na to kako benčmarking može poboljšati performanse organizacije koja ovu praktikuje ovu tehniku pronalaženjem, odabirom i adaptacijom najboljih praksi i procesa onih organizacija koje važe za najbolje u klasi [5]. Osnovna svrha benčmarkinga ogleda se u

dobijanju povratnih informacija o stvarnom stanju i specifičnih informacija o faktorima uspeha, oblastima poteškoća i razočarenja. Rezultati benčmarkinga imaju veliku vrednost, ne samo u svrhu korektivnih akcija organizacija, već i za, na primer, pomoć pri donošenju taktičkih i strateških odluka [6]. Benčmarketing je razvijen kao rešenje problema. Iako je praksa slična benčmarketingu bila prisutna dugi niz godina za formalizaciju i razvoj samog benčmarkinga, kao krucijalnog alata za poboljšanje performansi, zaslužna je kompanija Xerox [1]. Posle II. svetskog rata benčmarketing je pod pojmom "Dantotsu", tj. težiti prema najboljima, postao široko primenjivana poslovna praksa u Japanu [7]. Pomenuta Japanska reč označava težnju da se postane najbolji od najboljih. Ona obuhvata suštinu benčmarkinga, što bi bio proaktivan proces promene operacija na strukturiran način kako bi se postigao superiorni učinak [8]. Prva sistematska vežba benčmarkinga sprovedena je od strane firme Xerox, 1970-ih godina. Xerox je na ovu tehniku gledao kao na "poređenje kvaliteta i karakteristika proizvoda". Zapravo, formalizovana benčmarketing praksa je otpočela kada je Xerox započeo poređenje sopstvenih kopir aparata sa onima iz Japanskih kompanija. Od tada se uspešna primena benčmarkinga postepeno proširila i na druge operacije. Do 1981. uspešno je primenjivana u svim delovima organizacije [9]. Osnovnim karakteristikama benčmarkinga mogu se smatrati učenje na osnovu tuđeg iskustva i poboljšanje postojećih poslovnih procesa. Pritom, od posebnog interesa u cilju poboljšanja efektivnosti i efikasnosti organizacije je postavljanje pitanja kroz sam benčmarketing proces, koja se tiču toga zašto su drugi bolji, kako su to postigli, šta možemo naučiti od njih, kako ih možemo dostići, te kako postati najbolji u svojoj branši [10]. Među direktnim ciljevima koje ispunjava upotreba benčmarketing tehnike ističe se identifikacija boljih procesa, samo poređenje sa drugima, pritom identifikacija snaga i slabosti u odnosu na idealni model, učenje od drugih i na bazi stečenih saznanja poboljšanje sopstvene prakse. Kao posledica ispunjenja direktnih ciljeva, javljaju se i indirektni ciljevi koji se dostižu upotrebom benčmarkinga, i to: razvoj menadžerskih veština, prevazilaženje otpora novih ideja van organizacije, uvećanje zadovoljstva kupaca i napokon postizanje konkurentne prednosti [11].

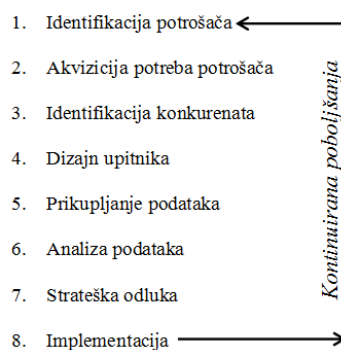
Attiany [12] navodi tipove benčmarkinga na osnovu toga šta se poredi i sa kime se vrši poređenje. Posmatrajući predmet poređenja možemo razlikovati benčmarketing performansi, benčmarketing procesa i strategijski benčmarketing, dok sagledavajući sa kime se vrši poređenje može se upotrebiti interni benčmarketing, konkurentski benčmarketing, funkcionalni benčmarketing i generički benčmarketing.

Cilj ovog rada ogleda se u analizi ideja i načina poslovanja vodećih organizacija u klasi proizvođača smrznutih testa, ispitivanjem segmenata u kojima lokalni proizvođač prepoznaje slabosti u sopstvenoj praksi. Izvršenim poređenjem utvrđuju se razlike na koje je potrebno obratiti pažnju i na kojima treba raditi u cilju poboljšanja i približavanja poziciji najboljih na tržištu smrznutih testa.

2. KONTIURANA POBOLJŠANJA UZ BENČMARKING ZADOVOLJSTVA POTROŠAČA

Mera satisfakcije potrošača je jedna od najvažnijih stavki koje se tiču poslovnih organizacija svih tipova, što je izjednačeno sa filozofijom orijentacije na kupce i osnovnim principima kontinuiranih poboljšanja modernih organizacija. Satisfakcija potrošača mora biti prevedena u određene merljive parametre koji su u direktnoj vezi sa poslom ljudi, odnosno sa faktorima koje ljudi mogu da razumeju i na koje mogu da utiču. Štaviše, mera satisfakcije potrošača obezbeđuje osećaj dostignuća i uspeha za sve zaposlene koji su bili uključeni u bilo kojoj fazi procesa pružanja usluga potrošačima. Na ovaj način, mera satisfakcije motiviše ljude

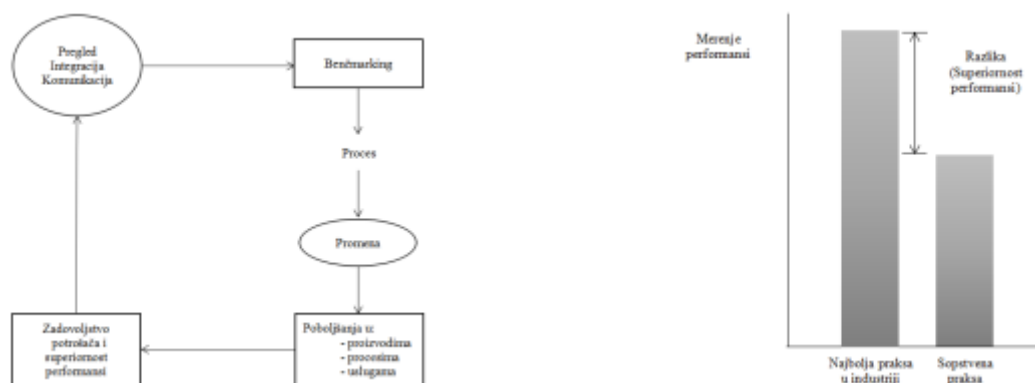
da ostvaruju i dostižu viši nivo produktivnosti. Ovaj pristup pruža mogućnost izvođenja segmentacije potrošača i benčmarking analize kroz procenu kritičnih dimenzija satisfakcije i opredeljenosti potrošačkih grupa sa prepoznatljivim preferencijama i očekivanjima [13]. Prema tome, dalje je moguće razmatrati benčmarking zadovoljstva potrošača. Benčmarking zadovoljstva potrošača je kontinuirani proces procene trenutnih performansi, postavljanja budućih ciljeva i identifikacije oblasti u kojima su poželjna poboljšanja. Kroz kontinuirani benčmarking mogu se dostići kontinuirana poboljšanja [14].



Slika 1. Benčmarking zadovoljstva potrošača u cilju dostizanja kontinuiranih poboljšanja [14]

Sajjad i Amjad [15] na osnovu sopstvenog istraživanja navode da postoji jaka veza između benčmarkinga i zadovoljstva kupaca, što znači da benčmarking igra jaku ulogu u zadovoljstvu kupaca. Odnosno, ukoliko kompanija praktikuje benčmarking dolazi do poboljšanja i inovacija a na taj način i do boljeg zadovoljenja potreba kupaca. Poređenjem razlike u zadovoljstvu kupaca pre i posle sprovedenog benčmarkinga, jednostavno je identifikovati da li je cilj postignut. Benčmarking je koristan alat kada se koriste proizvodi sa karakteristikama najboljih u klasi za poređenje. Najbolji u klasi označava najbolji proizvod ili uslugu u sličnoj cenovnoj klasifikaciji i tržišnom segmentu [14].

Ilustracije koje slede na slici 2. na veoma jednostavan način opisuju cilj sprovođenja benčmarkinga u okviru organizacije i same razlike u superiornosti performansi organizacija koje praktikuju najbolju praksu u industriji u odnosu na ostale organizacije. Proces benčmarkinga, zapravo, izaziva promene koje vode do očekivanih poboljšanja koja odgovaraju potrebama potrošača i pomažu organizaciji da dostigne superiorne performanse [16].



Slika 2. Osnovni cilj benčmarkinga i razlike u superiornosti performansi u odnosu na najbolju praksu u industriji [16]

3. LITERATURNI PREGLED PRIMENE BENČMARKINGA

Brojna su istraživanja domaćih i inostanih istraživača usmerena na benčmarking. Prema tome, mogu se sagledavati specifične primene i slučajevi benčmarkinga u svrhu pružanja uvida u rast i razvoj koncepta benčmarkinga, od njegovog iniciranja 1989. godine od strane Xerox kompanije, kako se često navodi u literaturi [17]. Efikasna i frekventna upotreba benčmarkinga primetna je i u polju upravljanja projektima. Zwikael i Globerson [18] vrše poređenja među različitim granama industrije kako bi identifikovali industriju u kojoj se najbolje sprovode i planiraju projekti. Rezultati, na osnovu podataka prikupljenih od 280 projektnih menadžera, su ukazali na to da je kvalitet planiranja projekata na najvišem nivou u građevini i inženjerstvu a na najnižem nivou u proizvodnim organizacijama. Nunes i Bennet [19] predstavljaju primenu benčmarkinga regulativa zaštite životne sredine u okviru autoindustrije koji je izveden uz pomoć prikupljenih podataka iz tri poznate kompanije u ovom polju, Toyota Motor Company u Japanu, General Motors Corporation USA i Volkswagen Group Nemačka, ukazuje na to da tri svetska proizvođača automobila primenjuju različite ekološke inicijative koje uključuju poštovanje Zelene Operativne Prakse: zelene zgrade, ekodizajn, zeleni lanci snabdevanja, zelena proizvodnja, inverzna logistika i inovacije. Ismail i ostali [20] predstavljaju predlog bečmarking procesa za model najbolje prakse upravljanja znanjem koji pogoduje institucijama za visoko obrazovanje. Medaković i ostali [21] navode da se razlozi za neprimenjivanje benčmarkinga kao savremenog menadžerskog alata u okviru malih i srednjih preduzeća u Srbiji nalaze u nedovoljnoj informisanosti o osnovnim karakteristikama samog koncepta, o razlozima za primenu, kao i u nedostaku finansija. Razmatrajući upotrebu menadžerskih tehnika, a među njima i benčmarkinga Đoković i Kulović [22] su sagledavajući strategijsko odlučivanje u hotelijerstvu došli do podataka da 39% ispitanika, odnosno menadžera hotela, ne koristi ni jednu od upitnikom ponuđenih menadžerskih tehnika, među kojima se nalazi i benčmarking.

Benčmarking analizu na studiji slučaja kompanije “Terranova” u Srbiji predstavljaju Jovanović, Mihić i Damjanović [23]. Za benčmarking analizu odabran je “NewYorker”, kao glavni međunarodni konkurent, zbog neosporive sličnosti ponude i ciljne populacije sa kompanijom “Terranova”. Kao glavni domaći konkurenti izabrani su “Mona”, “Đak” i “MontoBene” na bazi prodaje koju ostvaruju, dužine prisustva na tržištu i pozicije koju zauzimaju na tržištu odeće i obuće u Srbiji. Na bazi informacija koje su dobijene ovim istraživanjem, kao bitan element koji može doneti značajnu konkuretnsku prednost na lokalnom tržištu pokazala se adaptacija ponude. Primenu benčmarkinga u okviru javnog sektora možemo uvideti na osnovu razvoja modela za strateško upravljanje poštanskom infrastrukturom i resursima, usmeren na razvoj skladišne usluge. Model je razvijen u skladu sa karakteristikama JP “Pošta Srbije” za međusobno pozicioniranje poštanskih operatora korišćena je benčmarking metoda [24].

4. PREDMET I METODOLOGIJA ISTRAŽIVANJA

Od velike je važnosti razumeti šta treba benčmarkovati, razumeti kakve su trenutne performanse, odnosno biti svestan trenutne pozicije, planirati buduće akcije, učiti od drugih, učiti iz prikupljenih podataka i iskoristiti izvedene zaključke za sprovođenje poboljšanja. Da bi se radilo na kontinuiranom poboljšanju strategija usmerenim na satisfakciju potrošača, menadžeri skreću svoju pažnju na evaluaciju zadovoljstva potrošača proizvodima i uslugama. Naravno, potrošači odlučuju ko nudi najbolje proizvode ili usluge, odnosno, potrošači

određuju kvalitet proizvoda ili usluga. Međutim, od velike važnosti za uspeh je identifikacija kritičnih faktora performansi proizvoda i usluga koji geneišu zadovoljstvo potrošača [25]. Upitnici zadovoljstva potrošača često uključuju prikupljanje globalnih i parcijalnih procena zadovoljstva na osnovu seta kriterijuma/atributa/karakteristika. Benčmarking analiza zahteva da ovaj kvalitativni set podataka bude proširen kako bi se uključila procena zadovoljstva na osnovu seta konkurentnih organizacija [26].

Rad ima za cilj da utvrdi koji su atributi najbolje poslovne prakse na osnovu percepcije potrošača i percepcije rukovodioca. Da se kroz istraživanje uoči stav lokalnih potrošača u vezi sa proizvodima lokalnog proizvođača u odnosu na proizvode najboljih u klasi na teritoriji Srbije i utvrdi da li se na osnovu stavova potrošača mogu uočiti kritične tačke koje zahtevaju prilagođavanje radi sticanja konkurentske prednosti.

Procenom proizvoda jedne kompanije u odnosu na proizvode konkurenata koji imaju vodeće rezultate, odnosno izvršenim benčmarkingom, dolazi se do informacija koje omogućuju procenu položaja te kompanije na tržištu [27] a mogu značajno doprineti u planiranju budućih akcija za poboljšanja u segmentu razvoja proizvoda.

U svrhu ovog istraživanja prikupljena su dva seta podataka, od toga prikupljanje prvog seta podataka obavljeno je pomoću prilagođenog anketnog upitnika na čija pitanja su odgovore davali sami potrošači. Anketni upitnik za istraživanje zadovoljstva kupaca smrznutim proizvodima kreiran je u kombinaciji sa upitnicima za proveru stilova donošenja odluka pri kupovini [28] i percepcije potrošača koja utiče na zadovoljstvo proizvodom [29], te na taj način adaptiran ovom istraživanju. Prvi set podataka je obrađen i analiziran uz pomoć softverskog paketa SPSS 20, u okviru koga su primenjene analize deskriptivne statistike podataka, i odgovarajući testovi za testiranje postavljenih hipoteza istraživanja, među kojima su ANOVA test i T test za nezavisne uzorke. Dok je drugi set podataka dobijen pomoću upitnika koji je prilagođen za prikupljanje odgovora predstavnika “Žitopromet” AD, Zaječar za potrebe određivanja značaja kriterijuma i podkriterijuma primenom AHP metodologije.

Rezultati istraživanja koje je sprovedeno u ovom radu mogu poslužiti za razumevanje trenutne pozicije posmatranog privrednog subjekata i mogu poslužiti kao indikatori za uspešno sprovođenje benčmarkinga u okviru posmatranog privrednog subjekta, “Žitopromet” AD iz Zaječara. Smatra se da su u klasi smrznutih proizvoda od testa najkompetentniji benčmarking partneri “Frikom” i “Premia”. Sprovedenim istraživanjem obuhvaćen je 221 potrošač smrznutih testa i 5 predstavnika odeljenja iz kompanije “Žitopromet” AD.

5. REZULTATI I DISKUSIJA

Rezultati demografskih podataka seta podataka prikupljenog od potrošača ukazuju na veći udeo žena među ispitanicima, te da konzumiranju smrznutih testa preovladava mlada populacija od 26 - 35 godina sa statusom zaposlenog uz najveći udeo lokalnog stanovništva, odnosno potrošača čije je mesto stanovanja u gradu u kome se nalazi i sam proizvođač smrznutih testa “Žitopromet” AD. Razmatrajući kupovne navike potrošača može se reći da su zavisne od prihoda i navika u ishrani. Najveći broj potrošača tvrdi da ima omiljene robne marke smrznutih testa koje uvek kupuje. Izdvaja se grupa pitanja namenjena oceni zadovoljstva potrošača smrznutim testima partnera za poređenje, odnosno robnih marki “Žitopromet”, “Frikom” i “Premia”. Kod sve tri robne marke smrznuti žu-žu je proizvod kojim su potrošači najzadovoljniji. Očekivanja potrošača u najvećoj meri zadovoljava robna marka “Frikom” te je i logično da najveći broj potrošača smatra “Frikom” najboljim u klasi. Potrošači su, takođe, imali prilike da daju svoj sud na osnovu grupe pitanja karakterišu tvrdnje pomoću čega je dobijena ocena percepcije potrošača o smrznutim testima “Žitopromet” u

odnosu na “best - in - class” smrznuta testa “Frikom” i “Premia”. Cena “Žitopromet” smrznutih testa prema odgovorima potrošača nije ni pristupačnija niti nepristupačnija od cene “Frikom” i “Premia” smrznutih testa. Podeljena mišljenja potrošača su i oko toga da je izbor ukusa kod partnera za poređenje jednako bogat, kao i što se tiče samog ukusa a i kvaliteta proizvoda. Oko jednake dostupnosti “Žitopromet”, “Frikom” i “Premia” smrznutih testa u većini prodavnica su podeljena mišljenja. “Žitopromet” smrznuta testa su uglavnom dostupna u specijalizovanim “Žitopromet” prodavnicama. Potrošači se ne slažu da je dizajn pakovanja među partnerima za poređenje jednak, niti da je jednaka praktičnost pakovanja, već da su potrebna značajna poboljšanja pakovanja “Žitopromet” smrznutih testa. Promociju proizvoda robne marke “Žitopromet” potrošači smatraju lošom, ali prepoznaju tradiciju u proizvodnji prehrambenih proizvoda ove robne marke. Prepoznatljivost robne marke “Žitopromet” negativno je ocenjena od strane potrošača, što će reći da vlada mišljenje da nije niti približno prepoznatljiva među potrošačima širom Srbije kao robne marke “Frikom” i “Premia”.

Daljom analizom podataka prikupljenih od potrošača, pomoću ANOVA testa, ispituje se razlika između zadovoljenih očekivanja potrošača robnom markom i mišljenja o tome koja je robna marka najbolja u klasi. Hipoteza koja se želi istražiti na osnovu raspoloživih podataka glasi: *H0: Ne postoji razlika između zadovoljenih očekivanja potrošača robnom markom i mišljenja o tome koja je robna marka smrznutog testa “best-in-class”.*

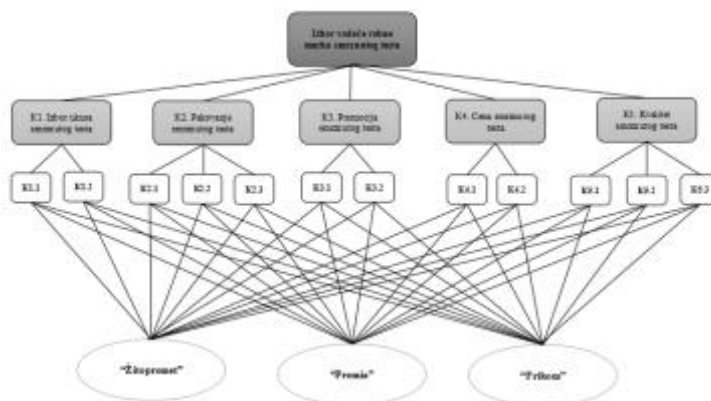
Tabela 1. Rezultati ANOVA testa

ANOVA					
Mišljenje o tome koja je marka smrznutih testa najbolja u klasi					
	Zbir kvadrata	df	Srednji kvadrat	F	Nivo značajnosti
Između grupa	40,356	2	20,178	98,043	,000
U okviru grupa	44,866	218	,206		
Ukupno	85,222	220			

U tabeli ANOVA realizovani nivo značajnosti F testa je manji od 0,0005, što je manje od $\alpha=0,05$. Na osnovu toga sledi da su razlike između zadovoljenih očekivanja potrošača robnom markom smrznutih testa i mišljenja o tome koja je robna marka smrznutih testa najbolja u klasi statistički značajne. Odnosno, postavljena hipoteza se odbacuje. Na osnovu predstavljenih rezultata ustanovljen je pokazatelj veličine uticaja, eta kvadrat, koji iznosi 0,47 i prema Koenovom kriterijumu ukazuje na to da je uticaj razlike veliki. Na osnovu rezultata ANOVA testa može se reći da se mnogima dopadaju smrznuta testa robne marke “Žitopromet”, ali robne marke “Frikom” i “Premia” su utemeljile svoju poziciju u svesti potrošača i njihovi zvučni nazivi su prva asocijacija za smrznuta testa.

T - testom za nezavisne uzorke vrši se testiranje hipoteza koje slede: *H1: Lokalni potrošači se ne razlikuju od potrošača iz okoline po percepcijama o prepoznatljivosti tradicije u proizvodnji “Žitopromet” smrznutih testa među potrošačima; H2: Lokalni potrošači se ne razlikuju od potrošača iz okoline po percepcijama o jednakosti tražnje za “Žitopromet” smrznutim testima sa tražnjom za “Frikom” i “Premia” smrznutim testima; H3: Lokalni potrošači se ne razlikuju od potrošača iz okoline po percepcijama o jednakoj prepoznatljivosti robne marke “Žitopromet” kao i “Frikom” i “Premia”.* Time se dolazi do saznanja da lokalni potrošači imaju pozitivnija mišljenja po pitanju prepoznatljivosti tradicije u proizvodnji smrznutih testa “Žitopromet”, po pitanju jednake tražnje i po pitanju prepoznatljivosti robne marke “Žitopromet” u Srbiji za razliku od potrošača koji žive u okolnim mestima.

Analiziranje drugog seta podataka izvršeno je metodom višekriterijumskog odlučivanja AHP, uz formiranje strukture hijerarhijskog modela za prioritizaciju vodeće robne marke smrznutih testa u Srbiji, prikazane na slici 3.



Slika 3. Struktura hijerarhijskog modela za prioritizaciju vodeće robne marke smrznutih testa u Srbiji

Da bi se ispitala hipoteza, **H4: Ne postoji značajna razlika u performansama između smrznutih testa robne marke “Žitopromet” i “Frikom” i “Premia” robnih marki smrznutog testa koja utiče na lošije pozicioniranje u odnosu na njih**, nastavlja se sa određivanjem značaja kriterijuma i podkriterijuma, kao i evaluacijom alternativa, odnosno robnih marki smrznutog testa, i određivanjem prioriteta primenom AHP metodologije.

Tabela 2. Značajnost kriterijuma i podkriterijuma određena AHP metodologijom

Kriterijumi	Značaj faktora	Podkriterijumi	Lokalna značajnost	Globalna značajnost
Izbor ukusa	0,065	K1.1 - Bogat izbor ukusa slanog smrznutog testa	0,500	0,033
		K1.2 - Bogat izbor ukusa slatkog smrznutog testa	0,500	0,033
Pakovanje	0,089	K2.1 - Dizajn pakovanja smrznutog testa	0,167	0,015
		K2.2 - Praktičnost pakovanja smrznutog testa	0,094	0,008
		K2.3 - Pakovanje sa informacijama o sastojcima	0,740	0,066
Promocija	0,112	K3.1 - Usmena propaganda zadovoljnih i lojalnih kupaca	0,667	0,074
		K3.2 - Oglašavanje putem elektronskih i štampanih medija	0,333	0,037
Cena	0,304	K4.1 - Pristupačna redovna cena smrznutog testa	0,250	0,076
		K4.2 - Akcijska ponuda smrznutog testa	0,750	0,228
Kvalitet	0,403	K5.1 - Izgled smrznutog testa	0,185	0,080
		K5.2 - Ukus smrznutog testa	0,156	0,067
		K5.3 - Usaglašenost sa navedenim info. o sastojcima	0,659	0,283

Na ovaj način dobijeni su rezultati koji ukazuju na dominantan uticaj pojedinih podkriterijuma. U okviru kriterijuma izbora ukusa podkriterijumi imaju jednak uticaj dok dominantan uticaj ima podkriterijum K2.3 - Pakovanje koje daje informacijama o sastojcima (0,740), K3.1 - Usmena propaganda zadovoljnih i lojalnih potrošača (0,667), K4.2 - Akcijska ponuda smrznutog testa (0,750) i K5.3 - Usaglašenost sa navedenim informacijama o sastojcima (0,659).

Sveukupni prioritet razmatranih robnih marki je sledeći “Žitopromet” 0,263, “Premia” 0,269, “Frikom” 0,441. Dobijeni rezultati definišu prioritizaciju robnih marki u sledećem opadajućem nizu: “Frikom” → “Premia” → “Žitopromet”.

Prema tome, rezultati i predstavljeni niz prioritizacije robnih marki smrznutih testa u opadajućem nizu ukazuju da se predstavljena hipoteza Ho odbacuje, odnosno, grupnim odlučivanjem došlo se do zaključka da “Žitopromet” robna marka smrznutih testa po svim kriterijumima zaostaje za robnom markom “Frikom”, koja se izdvojila kao dominantna, dok “Premia” robnu marku sustiže po pitanju cene i izbora ukusa ali značajno zaostaje po pitanju pakovanja, promocije i kvaliteta, te da razlika u performansama itekako postoji.

6. ZAKLJUČAK

U današnjem turbulentnom poslovnom okruženju, okruženju sve bržih promena i velike konkurencije na tržištu, potrebno je razviti poslovnu politiku koja će ne samo osigurati trenutni uspeh već koja će doneti dugoročne rezultate. Kako bi se poslovanje unapredilo i da bi organizacija isplivala iz mase istih ili sličnih i zauzela jaku poziciju, ostavljajući utisak uzora za ostale, menadžment mora da radi na unapređenju svojih veština i na korišćenju menadžerskih metoda i tehnika koje će biti podrška poduhvatima poboljšanja i preduslov za sticanje povoljnije pozicije. Dakle, organizacija se mora transformisati u učeću organizaciju. Benčmarking predstavlja savremenu metodu koja pruža mogućnost učenja i promene ponašanja na bazi poređenja sa najboljima u klasi. U mnogim privrednim subjektima na teritoriji Srbije moguće je uočiti slabu primenu menadžerskih alata a među njima i benčmarkinga. U ovom radu sprovedeno je razmatranje utvrđivanja atributa najbolje poslovne prakse na osnovu zadovoljstva i percepcija potrošača smrznutih testa, što je korisna mera za benčmarking. Zaključuje se da su ovim putem uočene kritične tačke koje zahtevaju poboljšanje u cilju sticanja konkurenstke prednosti. Slabe marketinške aktivnosti dovele su do toga da lokalni proizvod bude manje atraktivan od proizvoda konkurentskih proizvođača. Međutim, samo priznanje da performanse u mnogim segmentima nisu zadovoljavajuće neće doprineti promenama ukoliko se ne pristupi sprovođenju akcija. Potrebno je kontinuirano vršiti poređenja kompanije i njenih delova sa najboljima, zatim proizvodnih i ostalih aktivnosti kompanije sa aktivnostima najboljih, poređenja proizvoda i usluga sa proizvodima i uslugama konkurenata sa vodećim rezultatima, zatim definisanje i primena najbolje definisane poslovne prakse, ali ni tu nije kraj već treba kontinuirano planirati i razvijati pravce razvoja i aktivno se prilagođavati novonastalim trendovima kako bi se zadovoljila i nadmašila očekivanja potrošača a time ostvario status najboljeg u klasi. Dakle, sprovedenim istraživanjem došlo se do saznanja o pozicioniranju posmatrane robne marke smrznutih testa u odnosu na najbolje u klasi iz ugla zaposlenih i iz ugla potrošača smrznutih testa. Na bazi ovih saznanja moguće je sprovesti dalja istraživanja, gde bi se prvenstveno moglo sprovesti istraživanje mišljenja zaposlenih o primeni benčmarkinga u organizacijama i o tome da li su konkurenti spremni da dobrovoljno stupe u benčmarking proces. Šire sagledavanje problematike u potrazi za najboljom praksom može uključiti generisanje rešenja poređenjem kompanija u okviru različitih grana. A osim toga, budućim istraživanjem mogu se sagledavati načini poboljšanja i kreativne primene identifikovane prakse, rešenja i ideja vodećih organizacija u vlastitoj organizaciji.

REFERENCE

1. Stapenhurst, T., *The Benchmarking Book: A how - to - guide to best practice for managers and practitioners*, Routledge, 2009.

2. Mellat Parast, M., Adams, S., Corporate social responsibility, benchmarking, and organizational performance in petroleum industry: A quality management perspective, *Int. J. Production Economics* 139, (2012), 447-458
3. Choy, K.L., Lee, W.B., Lo, V., An intelligent supplier management tool for benchmarking suppliers in outsource manufacturing, *Expert Systems with Applications* 22 (2002) 213-224
4. Cerović, S., *Strategijski menadžment u turizmu*, Univerzitet Singidunum, Beograd, 2009.
5. Alosani, M. S., Al-Dhaafri, H. S., & Yusoff, R. Z. B. (2016). Mechanism of Benchmarking and Its Impact on Organizational Performance. *International Journal of Business and Management*, 11(10), 172.)
6. Passos, C., Haddad, R., Benchmarking: A tool for improvement of production management, 6th IFAC Conference on Management and Control of Production and Logistics, IFAC Proceedings Volumes, 46(24), September 11-13, Fortaleza, Brazil, 2013, 577 - 581.
7. Osmanagić Bedenik, N., Ivezić, V., Benchmarking kao instrument suvremenog kontrolinga, *Zbornik Ekonomskog fakulteta u Zagrebu*, 4(1), (2006), 331 - 346.
8. Sweeney, M. T., Benchmarking for strategic manufacturing management. *International Journal of Operations & Production Management*, 14(9), (1994), 4-15.
9. Wah Fong, S., Cheng, E. W., Ho, D. C., Benchmarking: a general reading for management practitioners. *Management Decision*, 36(6), (1998), 407-418.
10. Sorak, M., Poboljšanje bitnih karakteristika proizvoda primjenom benchmarking metode. *Industrija*, 38(2), (2010), 45 - 54.
11. Nazarko, J., Anna Kuźmicz, K., Szubzda-Prutis, E., Urban, J., The general concept of benchmarking and its application in higher education in Europe. *Higher Education in Europe*, 34(3-4), (2009), 497 - 510.
12. Attiany, M. S., Competitive Advantage Through Benchmarking: Field Study of Industrial Companies Listed in Amman Stock Exchange. *Journal of business studies quarterly*, 5(4), (2014), 41.
13. Grigoroudis, E., Siskos, Y., *Customer Satisfaction Evaluation: Methods for Measuring and Implementing Service Quality*, Springer Science & Business Media, 2009.
14. Shen, X. X., Tan, K. C., & Xie, M., Benchmarking in QFD for quality improvement, *Benchmarking: An International Journal*, 7(4),(2000), 282-291.
15. Sajjad, F., Amjad, S., Role of benchmarking in total quality management (case of Telecom services sector of Pakistan), *Elixir Management Arts* 46 (2012) 8567-8572
16. Wah Fong, S., Cheng, E. W., & Ho, D. C., Benchmarking: a general reading for management practitioners. *Management Decision*, 36(6),(1998), 407-418
17. Dattakumar, R., Jagadeesh, R., A review of literature on benchmarking, *Benchmarking: An International Journal*, Vol. 10, No. 3, (2003), 176-209

18. Zwikael, O., Globerson, S., Benchmarking of project planning and success in selected industries, *Benchmarking - an International Journal*, 13 (6), (2006), 688-700
19. Nunes, B., Bennet, D., Green operations initiatives in the automotive industry: An environmental reports analysis and benchmarking study, *Benchmarking: An International Journal*, Vol. 17, No. 3, (2010), 396-420
20. Ismail, H., Abdullah, R., Jusoh, Y.Y., Benchmarking Process of Knowledge Management Best Practice for Higher Learning Institution, *Knowledge Management International Conference (KMICe) 2016*, 29 – 30 August (2016), Chiang Mai, Thailand
21. Medaković, V., Moljević, S., Vasković, S., Gojković, R., Organizacija upravljanja kvalitetom u malim i srednjim preduzećima, *Festival kvaliteta*, 42. Nacionalna Konferencija o kvalitetu, (2015), p. 207-216
22. Đoković, F., Kulović, Dž., Strategijsko odlučivanje u hotelijerstvu, *Socioeconomica - The Scientific Journal for Theory and Practice of Socio-economic Deveopment*, Vol 2, No. 4, (2013), pp. 283-300
23. Jovanović, A., Mihić, M., Damjanović, V., Adaptacija ponude na lokalnom tržištu - Studija slučaja Terranova Srbija, *Marketing*, 44 (2), (2013), 173-183
24. Vidović, D. i ostali., Upravljanje performansama skladišta u JP "Pošta Srbije", *Tehnika - Menadžment* 66 (2016) 6
25. Deng, W. J., Kuo, Y. F., Chen, W. C., Revised importance-performance analysis: Three-factor theory and benchmarking, *The Service Industries Journal*, 28(1), (2008), 37-51.
26. Grigoroudis, E., Litos, C., Moustakis, V. A., Politis, Y., Tsironis, L., The assessment of user-perceived web quality: Application of a satisfaction benchmarking approach. *European Journal of Operational Research*, 187(3), (2008), 1346-1357.
27. Osmanagić Bedenik, N., Ivezić, V., Benchmarking kao instrument suvremenog kontrolinga, *Zbornik Ekonomskog fakulteta u Zagrebu*, godina 4, (2006).
28. Okanović, P., Okanović, D., Majstorović, N., Provera metrijskih karakteristika upitnikastilova donošenja kupvnih odluka primenjenog u uslovima sa i bez vezanosti za proizvod, *Primenjena Psihologija*, Vol 2(2), (2009), 167-189.
29. Zarić, V., Radošević, M., Petković, D., Ispitivanje percepcije potrošača prema poljoprivredno - prehrambenim proizvodima Republike Srbije, *IV Međunarodna konferencija "Ribarstvo" - Zbornik predavanja*, (2015).



POSITION OF AGRICULTURAL BUSINESS ENTITIES IN SERBIA AND FUTURE TRENDS OF THEIR DEVELOPMENT

Saša Krstić, Aleksandra Fedajev

University in Belgrade, Technical faculty in Bor, Serbia

Abstract: Agriculture is one of the most important economic sectors in all countries, bearing in mind that it produces food for a rising world population. The significance of this economic activity is especially evident if the global problem of hunger and poverty in the world is considered. Although the importance of agriculture at global level is growing, the share of agriculture in the creation of GDP and employment in developed economies is decreasing. On the other hand, in still underdeveloped transition economies, as it is case in the Republic of Serbia, this activity still significantly contributes to economic development.

However, the business environment in the Serbian economy is still not sufficiently stimulating, so agricultural business entities are facing with a numerous limitations in their business. In this regard, the aim of this paper is to determine the financial situation, place and role of agriculture in the economy of the Republic of Serbia, as well as the most significant limiting factors for the development of companies operating in this economic activity. On the basis of appropriate economic and financial indicators, a comparative analysis of agricultural enterprises' performances was performed in relation to performances of enterprises operating in other activities. For data analysis, PROMETHEE method was used in combination with the entropy method. The obtained results indicated that the agricultural companies are relatively poorly ranked, bearing in mind that that they occupy the sixth position out of ten analyzed economic activities. The significant constraints that these economic entities are faced are insufficient profitability, cost-effectiveness and financial stability. This indicates that it is necessary to develop and implement an appropriate strategy, which would be aimed at creation of an incentive environment for improvement of these companies' operations in the future.

Keywords: agriculture, business economics, economic-financial analysis, PROMETHEE method, entropy method

1. UVOD

Iako je poljoprivreda najstarija privredna aktivnost materijalne proizvodnje, ona i dalje nije najrazvijenija. U industriji se proces proizvodnje može ubrzati povećanjem produktivnosti dok kod poljoprivrede to nije moguće. Proizvodi koje daje poljoprivreda potiču direktno iz prirode, i kao takva ona predstavlja ekonomsku aktivnost od ključnog (strateškog) značaja jer proizvodi hranu, a opšte je poznato da samo one zemlje koje imaju razvijenu sopstvenu proizvodnju hrane, mogu postići socijalnu, ekonomsku i političku stabilnost. [1] U većini razvijenih zemalja poljoprivredna proizvodnja je u apsolutnom iznosu

dostigla izuzetno visok nivo, iako je njeno učešće u BDP-u tih zemalja na znatno nižem procentualnom nivou nego učešće drugih sektora. Dakle, što je učešće poljoprivredne proizvodnje u BDP-u, izvozu i zaposlenosti veće, to je nivo razvijenosti privrede te zemlje niži, jer se radi o primarnim proizvodima. Procenat poljoprivredne populacije je 2016. godine u Republici Srbiji bio 44%, a u EU 25%. BDV poljoprivredne proizvodnje izražena u procentima BDP-a iznosila je 2016. 7,9% , a u EU 1,6%. [1]

Poljoprivreda je kroz istoriju u Republici Srbiji uvek bila jedna od najvažnijih privrednih grana, a njen značaj je trebalo da bude još veći usled kolapsa industrijske proizvodnje, svojevremeno izazvane usled sankcija a kasnije i pogrešno vođene privatizacije. Poljoprivreda u Republici Srbiji je često subvencionisana od strane države jer ima zapaženo učešće u BDP-u i upošljava veliki broj radnika, ali ima i značajan potencijal, pre svega u vidu respektabilnih prirodnih uslova, naučno-obrazovnih, tehničko-tehnoloških, tržišnih, ali taj potencijal definitivno nije u potpunosti i na najefikasniji način iskorišćen. Samo zahvaljujući pomenutim potencijalima, poljoprivreda u Republici Srbiji još uvek daje zadovoljavajuće rezultate i pored vrlo ozbiljnih društveno-ekonomskih problema, odnosno nepovoljnih uslova poslovanja sa kojima se suočava poslednjih decenija. Sa početkom tranzicije i liberalizacije tržišta nailaze novi problemi, jer su otvorena vrata konkurenciji iz inostranstva, posebno iz zemalja iz okruženja koje su ranije ušle u tranzicioni period kao i razvijenog poljoprivrednog tržišta iz zemalja EU. [2] Takođe, nisu ispoštovane konkurentne prednosti određenih regiona. Istovremeno se zbog nedostatka sredstava smanjuje upotreba savremenih inputa u poljoprivrednoj proizvodnji kao što su mineralno đubrivo, pesticidi, mehanizacija, sistemi za navodnjavanje, a pritom su na tržištu postojale nepovoljne cene outputa, visoke kamate, nerealne zagarantovane cene, nepovoljna spoljnotrgovinska politika po pitanju izvoza prvenstveno primarnih poljoprivrednih proizvoda. To je po inerciji uslovilo nizak životni standard seoskog stanovništva i njihovu migraciju u gradove, jer bez perspektive za bavljenje ozbiljnijom poljoprivrednom proizvodnjom na većim, a ne usitnjenim posjedima, ljudi su pokušali da se zaposle u industriji, iako celokupnu privredu karakteriše visoka stopa nezaposlenosti. S druge strane, usvajanjem Zakona o privatizaciji 2001. godine i njegovom lošom primenom i sumnjivim privatizacijama, omogućeno je pojedincima i kompanijama u njihovom vlasništvu da preko noći postanu vlasnici 12-15 ili više hiljada hektara zemljišta, a paradoks je da formiranje ovakvih ogromnih poseda i strukture vlasništva nad zemljom ne postoji nigde u EU, [3] čija članica kao država silno pretendujemo da postanemo. Oko 18% ukupne obradive površine Republike Srbije nalazi se u vlasništvu poljoprivrednih kompanija, dok se preko njih realizuje oko 41% ukupnog prometa poljoprivrednih proizvoda. [4]

Na osnovu navedenih podataka, cilj ovog rada je da se izvrši finansijska analiza poslovanja poljoprivrednih privrednih subjekata u Republici Srbiji, da se sagleda njihov položaj u odnosu na druge privredne grane, da se uoče osnovni problemi sa kojima se suočavaju u poslovanju i da se na osnovu toga, predlože odgovarajuće mere za poboljšanje njihove pozicije. Izvršena finansijska analiza poslovanja poljoprivrednih preduzeća, sprovedena je na osnovu odgovarajućih pokazatelja, prevashodno upotrebom određenih racia. Nakon toga je primenom entropijske metode i PROMETHEE metode izvršeno rangiranje poljoprivrede i drugih privrednih grana, kako bi se ocenio njen položaj u nacionalnoj privredi.

2. FINANSIJSKA ANALIZA POSLOVANJA POLJOPRIVREDNIH PRIVREDNIH DRUŠTAVA

Finansijskom analizom Bilansa stanja i Bilansa uspeha poljoprivrednih privrednih društava, praćene su promene pozicija pomenutih bilansa u 2016. u odnosu na 2015. godinu. [5]

Tabela 1. Pregled imovine poljoprivrednih privrednih društava u 2015. i 2016. god. (u 000 rsd)

OPIS		A – Poljoprivreda, šumarstvo i ribarstvo		
		Godina		Ind.
		2016.	2015.	
AKTIVA				
A.	Upisani a neplaćeni kapital	922.544	684.352	134,8
B.	Stalna imovina	464.845.991	456.451.679	101,8
I	Nematerijalna imovina	2.428.333	2.630.165	92,3
II	Nekretnine, postrojenja i oprema	314.026.060	306.893.015	102,3
III	Biološka sredstva	111.898.795	111.757.168	100,1
IV	Dugoročni finansijski plasmani	35.117.908	33.009.297	106,4
V	Dugoročna potraživanja	1.374.895	2.162.034	63,6
V.	Odložena poreska sredstva	3.009.200	3.545.592	84,9
G.	Obrtna imovina	238.794.413	226.662.429	105,4
I	Zalihe	95.458.736	92.555.989	103,1
II	Potraživanja po osnovu prodaje	83.823.505	76.985.084	108,9
III	Potraživanja iz specifičnih poslova	5.596.590	6.208.549	90,1
IV	Druga potraživanja	9.469.774	7.472.917	126,7
V	Finansijska sredstva koja se vrednuju po fer vrednosti kroz bilans uspeha	160.523	372.624	43,1
VI	Kratkoročni finansijski plasmani	19.131.071	21.218.491	90,2
VII	Gotovinski ekvivalenti i gotovina	15.360.986	13.117.100	117,1
VIII	Porez na dodatu vrednost	3.313.144	2.998.314	110,5
IX	Aktivna vremenska razgraničenja	6.480.084	5.733.361	113,0
D.	Ukupna aktiva = Poslovna imovina	707.572.148	687.344.052	102,9

Iz Tabele 1 možemo videti da je stalna imovina porasla je za svega 1,8%. U strukturi osnovnih sredstava dugoročna potraživanja su se smanjila za 36,4% dok su se dugoročni finansijski plasmani povećali za 6,4%. Obrtna imovina se povećala za 5,4%, i to najviše dugoročna potraživanja, za 26,7%, gotovina se povećala za 17,1%, dok su se potraživanja iz specifičnih poslova smanjila za 9,9% kao i kratkoročni finansijski plasmani, za 9,8%. Što se ukupne aktice tiče, ona se u 2016. povećala za 2,9% u odnosu na 2015. godinu.

Tabela 2. Pregled izvora poslovnih sredstava poljoprivrednih privrednih društava u 2015. i 2016. god. (u 000 rsd)

OPIS		A – Poljoprivreda, šumarstvo i ribarstvo		
		Godina		Ind.
		2016.	2015.	
PASIVA				
A.	Kapital	407.606.841	391.989.502	104,0
I	Osnovni kapital	249.631.646	247.917.478	100,7
II	Upisani a neplaćeni kapital	914.783	692.397	132,1
III	Otkupljene sopstvene akcije	476.073	345.842	137,7
IV	Rezerve	9.625.387	8.990.654	107,1
V	Revalorizacione rezerve	79.873.653	88.520.743	90,2
VI	Nerealizovani dobiti po osnovu HoV	1.330.076	83.141	n/a
VII	Nerealizovani gubici po osnovu HoV	242.858	326.271	74,4
VIII	Neraspoređeni dobitak	139.955.423	125.253.510	111,7
IX	Gubitak	122.608.969	122.773.160	99,9
B.	Dugoročna rezervisanja i obaveze	89.937.097	80.617.537	111,6
I	Dugoročna rezervisanja	6.916.128	6.270.796	110,3
II	Dugoročne obaveze	83.020.969	74.346.741	111,7
V.	Odložene poreske obaveze	6.951.817	6.754.823	102,9
G.	Kratkoročne obaveze	252.680.166	251.959.042	100,3
I	Kratkoročne finansijske obaveze	83.628.584	78.513.745	106,5
II	Primljeni avansi, depoziti i kaucije	7.914.768	10.442.121	75,8
III	Obaveze iz poslovanja	118.442.618	122.390.050	96,8
IV	Ostale kratkoročne obaveze	30.880.912	30.247.296	102,1
V	Obaveze po osnovu poreza na dodatu vrednost	1.972.709	1.573.457	125,4
VI	Obaveze za ostale poreze, doprinose i druge dažbine	4.245.955	3.620.019	117,3
VII	Pasivna vremenska razgraničenja	5.594.620	5.172.354	108,2
D.	Gubitak iznad visine kapitala	49.603.773	43.976.852	112,8
Đ.	Ukupna pasiva	707.572.148	687.344.052	102,9

Iz Tabele 2 se vidi da se pasiva Bilansa stanja naravno povećala identično kao i aktiva za pomenutih 2,9%. U strukturi izvora finansiranja kapital se povećao za 4%, najviše zahvaljujući povećanju upisanog a neuplaćenog kapitala za 32,1%, reserve su povećane za 7,1% a neraspoređeni dobitak za 11,7%. Revalorizacije reserve su se smanjile za 9,8% a nerealizovani gubici po osnovu hartija od vrednosti za 25,6%. Što se tiče kratkoročnih obaveza, ostale su na približno istom nivou, zabeležen je rast od svega 0,3%. Dugoročna rezervisanja i obaveze su se povećale za 11,6% a rast gubitka iznad visine kapitala iznosio je 12,8% u analiziranoj 2016. u odnosu na 2015.

Tabela 3. Bilans uspeha poljoprivrednih privrednih društava u 2015. i 2016. god. (u 000 rsd)

OPIS		A – Poljoprivreda, šumarstvo i ribarstvo		
		Godina		Ind.
		2016.	2015.	
A.	Ukupni prihodi	367.181.435	347.244.209	105,7
B.	Ukupni rashodi	356.873.569	344.152.302	103,7
	Poslovni prihodi	351.520.849	324.054.417	108,5
	Poslovni rashodi	331.780.259	314.895.105	105,4
I	Poslovni rezultat	19.740.590	9.159.312	215,5
	Finansijski prihodi	3.193.973	8.341.297	38,3
	Finansijski rashodi	8.750.235	9.608.070	91,1
II	Rezultat iz finansiranja	-5.556.262	-1.266.773	438,6
	Prihodi iz ostalih aktivnosti	12.414.586	14.797.711	83,9
	Rashodi iz ostalih aktivnosti	15.891.462	19.472.908	81,6
III	Rezultat iz ostalih aktivnosti	-3.476.876	-4.675.197	74,4
IV	Neto dobitak poslovanja koje se obustavlja	52.027	50.781	102,5
V	Neto gubitak poslovanja koje se obustavlja	451.613	176.219	256,3
	Neto dobitak	20.302.640	16.826.328	120,7
	Neto gubitak	11.682.091	14.887.282	78,5
VI	Neto rezultat	8.620.549	1.939.046	444,6

Analizom Tabele 3, odnosno Bilansa uspeha poljoprivrednih privrednih subjekata dolazi se do sledećih zaključaka. Ukupni prihodi su se u 2016. povećali za 5,7% u odnosu na 2015. Od toga, poslovni prihodi su se povećali za 8,5%, dok su se finansijski najviše smanjili, za 61,7%, a ostali prihodi su se smanjili za 16,1%. Ukupni rashodi su se povećali za 3,7%, od toga poslovni za 5,4%, dok su se finansijski i ostali rashodi smanjili za 8,9%, odnosno 18,4%.

Neto dobitak se povećao za čak 344,6% ili 4,4 puta u posmatranom periodu. Iako procentualni rast ukupnih prihoda u odnosu na ukupne rashode ne ukazuje na ovoliki rast neto dobiti, zapravo je došlo do znatno većeg povećanja ukupnih prihoda u odnosu na ukupne rashode u apsolutnom iznosu u 2016. u odnosu na 2015. godinu.

3. ANALIZA EKONOMSKIH I FINANSIJSKIH POKAZATELJA POSLOVANJA PRIVREDNIH DRUŠTAVA PREMA STRUKTURI U REPUBLICI SRBIJI

Ekonomski i finansijski indikatori ukazuju na najznačajnije performanse privrednih subjekata u prethodnom periodu, čijom analizom se dolazi do zaključaka o tome šta su ključne prednosti i ograničenja poslovanja određenog privrednog subjekta. Oni kasnije služe menadžmentu za definisanje mera poslovne politike kojima će se poboljšati njihove ekonomske i finansijske performanse i ostvariti strateški ciljevi u budućem periodu. [6]

Privredni subjekti koriste različite kombinacije indikatora, u zavisnosti od predmeta analize i postavljenih ciljeva. U ovom radu su, na osnovu pregleda dosadašnje literature u ovoj oblasti izabrani sledeći indikatori poslovanja privrednih subjekata u pojedinim privrednim sektorima:

1. Opšti racio likvidnosti,
2. Racio finansijske stabilnosti,
3. Racio zaduženosti,
4. Racio finansiranja
5. Stopa prinosa na ukupnu imovinu (SPNUI),
6. Stopa prinosa na capital (SPNK).

Tabela 4. Indikatori poslovanja privrednih subjekata u privrednim sektorima u 2016. godini

Pokazatelji/ Privredna društva prema strukturi	Pokazatelji likvidnosti		Pokazatelji zaduženosti		Pokazatelji profitabilnosti	
	(ORL)	(RFS)	(RZ)	(RF)	(SPNU I)	(SPNK)
A-Poljoprivreda, šumarstvo i ribarstvo	0,95	1,30	0,48	0,96	1,22	2,41
C-Prerađivačka industrija	0,88	2,10	0,76	3,21	3,05	12,91
D-Snabdevanje el. energijom	0,65	1,54	0,42	0,79	1,79	3,40
F-Gradevinarstvo	0,77	1,78	0,63	1,75	-0,41	-1,14
G-Trgovina na veliko i malo	1,04	1,35	0,75	2,97	1,79	7,12
H-Saobraćaj i skladištenje	0,84	1,39	0,45	0,84	2,12	3,99
J-Informisanje i komunikacije	0,96	2,05	0,66	2,00	5,86	17,65
B-Rudarstvo	0,95	2,04	0,65	1,83	2,63	7,45
E-Snabdevanje vodom	0,74	1,22	0,36	0,57	1,38	2,17
I-Usluge smeštaja i ishrane	0,64	2,08	0,63	1,75	-1,62	-4,50

Analizom dobijenih pokazatelja u Tabeli 4 može se zaključiti da sektor Usluge smeštaja i ishrane ima najniži opšti racio likvidnosti (0,64). To praktično znači da je 1 dinar kratkoročnih obaveza pokriven sa 0,64 dinara obtnih sredstava, dok sektor Trgovina na veliko i malo ima najviši ORL (1,04). Sektor Poljoprivreda, šumarstvo i ribarstvo ima opšti racio likvidnosti 0,95 i tu je izjednačen sa sektorom Rudarstvo i Informisanje i komunikacije. Kao drugi pokazatelj likvidnosti korišćen je racio finansijske stabilnosti. U idealnim uslovima ovaj racio je manji od 1. Najveći RFS ima sektor Prerađivačka industrija (2,10), a za njim slede sektor Usluge smeštaja i ishrane (2,08), sektor Informisanje i komunikacije (2,05) i sektor Rudarstvo (2,04). To znači da je 1 dinar sopstvenih izvora finansiranja pokriven sa preko 2 dinara osnovnih sredstava. Razlog su nagomilani gubici iz ranijih godina, a to praktično znači da se javlja nedostajući kapital za uspostavljanje dugoročne finansijske ravnoteže. Sektor Snabdevanje vodom je u najpovoljnijoj poziciji sa RFS 1,22, dok sektor Poljoprivreda, šumarstvo i ribarstvo ima RFS 1,30.

Sledeći veoma važan aspekt poslovanja koji se neizostavno sagledava u finansijskoj analizi poslovanja privrednih subjekata jeste stanje zaduženosti. U analizi su korišćeni racio zaduženosti i racio finansiranja. [7] Kao što se može videti iz Tabele 4, u najnepovoljniji RZ imaju sektor Prerađivačka industrija (0,76) i Trgovina na veliko i malo (0,75) jer se najviše od svih sektora oslanjaju na pozajmljene izvore finansiranja. U najpovoljnijoj situaciji su sektori Snabdevanje vodom (0,36), Snabdevanje električnom energijom (0,42), Saobraćaj i skladištenje (0,45), dok sektor Poljoprivrede ima 0,48, a to praktično znači da se navedeni sektori u dovoljnoj meri finansiraju sopstvenim izvorima. Kod racia finansiranja poželjan odnos pozajmljenih i sopstvenih izvora finansiranja je 1:1, a upravo sektor Poljoprivreda, šumarstvo i ribarstvo ima RF 0,96. Sektor Prerađivačka industrija ima RF 3,21 a to znači da su pozajmljeni izvori finansiranja više nego 3 puta veći od sopstvenih izvora finansiranja. Suprotno od ovog sektora, sektor Snabdevanje vodom ima RF 0,57, što je takođe nepovoljno, jer dominiraju sopstveni izvori finansiranja naspram pozajmljenih.

S obzirom na to da je osnovni motiv poslovanja svih privrednih subjekata ostvarivanje dobiti, pokazatelji profitabilnosti predstavljaju veoma bitnu ulogu u ekonomsko-finansijskoj analizi poslovanja. Posmatranjem stope prinosa na ukupnu imovinu može se zaključiti da je najpovoljnije stanje u sektoru Informisanje i komunikacije gde je ostvareno zanemarljivih 5,86 dinara neto dobitka na angažovanih 100 dinara imovine. Sektori Građevinarstvo i Usluge smeštaja i ishrane imaju negativnu stopu prinosa na ukupnu imovinu jer su poslovali sa neto gubitkom. Ukoliko se posmatra stopa prinosa na kapital, situacija je slična. Najveću stopu prinosa ostvarena je u sektoru Informisanje i komunikacije sa 17,65 dinara neto dobitka na svakih 100 dinara angažovanog sopstvenog kapitala. Sektori Građevinarstvo i Usluge smeštaja i ishrane ostvarili su negativnu stopu prinosa na kapital jer su poslovali sa neto gubitkom.

4. METODOLOGIJA

Imajući u vidu broj racia uključenih u analizu, može se zaključiti da komparativna analiza finansijskih performansi privrednih subjekata iz različitih privrednih oblasti spada u domen multikriterijumske analize. Multikriterijumska analiza kao podrška odlučivanju (Multi-Criteria Decision Aid - MCDA) je jedna od najbrže rastućih oblasti operacionih istraživanja poslednjih dvadeset godina i nalazi primenu u gotovo svim oblastima ljudskog društva. [8] Jedna od najčešće primenjivanih metoda multikriterijumske analize je PROMETHEE GAIA metod, koji su razvili Brans, Marshal i Vincke tokom zadnje dve

decenije XX veka (Brans, J. P., Mareschal, B. [9]; Brans, J.P. Mareschal, B. Vincke, Ph., 1984 [10]; Brans, J.P., Vincke, Ph., 1985 [11]).

PROMETHEE GAIA metod je adekvatan metod za rešavanje multikriterijumskih problema koji zahtevaju rangiranje konačnog seta mogućih alternativa na osnovu određenog broja kriterijuma koji trebaju biti maksimizirani ili minimizirani. Za svaku alternativu se izračunava vrednost te alternative izražena u preferencijama, odnosno izračunava se neto tok preferencija koji sintetizuje sve pokazatelje i na osnovu koga se posmatrane alternative rangiraju. [12]

Kako bi posmatrane alternative mogle biti rangirane na osnovu posmatranih kriterijuma, PROMETHEE metod zahteva definisanje odgovarajućih parametara za svaki od njih (Brans, J.P., Mareschal, B. Vincke, Ph., 1984 [10]; Brans, J.P., Vincke, Ph., 1985 [11]; Brans, J.P. Mareschal, B., 2005 [13]; VP Solutions [14]):

1. **smerna preferencije**, odnosno da li određeni kriterijum treba minimizirati ili maksimizirati;

2. **težinskih koeficijenata**, koji ukazuju na značaj određenog kriterijuma odnosno učešće određenog kriterijuma u izračunavanju neto toka preferencije na osnovu koga se vrši rangiranje posmatranih alternativa. Što je vrednost težinskog koeficijenta veća, to je kriterijum značajniji za donosioca odluke. Pri tom, težinski koeficijenti dodeljeni kriterijumima moraju biti normalizovani tj. mora važiti jednakost:

$$\sum_{j=1}^k w_j = 1 \quad (1)$$

3. **prag preferencije (p)** koji predstavlja najmanju razliku između dve posmatrane alternative po posmatranom kriterijumu koju donosilac odluke smatra značajnom za donošenje odluke;

4. **prag indiferencije (q)**, koji predstavlja najveću razliku između dve posmatrane alternative po posmatranom kriterijumu koju donosilac odluke smatra nevažnom za donošenje odluke.

5. **funkcije preferencije** koja prevodi razliku između dve alternative (npr. a i b) u nivo preferencije koji se kreće od 0 do 1, za svaki posmatrani kriterijum ponaosob. Što je nivo preferencije alternative a u odnosu na alternativu b bliži 0, to je alternativa b bolja u odnosu na alternativu a po datom kriterijumu, a što je bliži 1 to je alternativa a bolja od alternative b po posmatranom kriterijumu. Funkcije preferencije koje se primenjuju u okviru PROMETHEE metode prikazane su u Tabeli 1.

Na osnovu definisanih parametara sprovodi se PROMETHEE metodologija, koja se sastoji iz sledećih koraka (Brans, J.P., Mareschal, B. Vincke, Ph., 1984 [10]; Brans, J.P., Vincke, Ph., 1985 [11]; Brans, J.P. Mareschal, B., 2005 [13]):

1. Najpre se računaju odstupanja na osnovu poređenja parova alternativa

$$d_j(a, b) = g_j(a) - g_j(b) \quad (2)$$

pri čemu $d_j(a, b)$ predstavlja razliku vrednosti alternativa a i b prema svakom od kriterijuma.

2. Zatim se primenjuje izabrana funkcija preferencije

$$P_j(a, b) = F_j[d_j(a, b)] \quad j=1, \dots, k \quad (3)$$

gde $P_j(a, b)$ predstavlja preferenciju alternative a u odnosu na alternativu b prema svakom od kriterijuma, kao funkciju od $d_j(a, b)$. Pri tom, važe sledeća ograničenja: $0 < P_j(a, b) < 1$ i $P_j(a, b) \neq P_j(b, a)$.

3. Na osnovu toga se izračunava opšti indeks preferencija

$$\forall a, b \in A \quad \pi(a, b) = \sum_{j=1}^k P_j(a, b)w_j \quad (4)$$

pri čemu se funkcija $\pi(a, b)$ kreće od 0 do 1 i definiše kao ponderisana suma $P_j(a, b)$ za svaki kriterijum imajući u vidu da w_j predstavlja težinski koeficijent j-tog kriterijuma. Funkcija $\pi(a, b)$ izražava nivo preferencije alternative a u odnosu na alternativu b uzimajući u obzir sve kriterijume. Što je njena vrednost bliža nuli, to je alternativa b bolja u odnosu na a , a što je bliža 1 to je alternativa a bolja u odnosu na alternativu b .

4. Zatim se izračunavaju pozitivni i negativni tokovi preferencija

$$\varphi^+(a) = \frac{1}{n-1} \sum_{x \in A} \pi(a, x) \quad (5)$$

$$\varphi^-(a) = \frac{1}{n-1} \sum_{x \in A} \pi(x, a) \quad (6)$$

gde je φ^+ pozitivan tok preferencija i pokazuje koliko je alternativa a bolja u odnosu na sve ostale alternative, a φ^- negativni tok preferencija, koji ukazuje na to koliko je alternativa a lošija u odnosu na sve ostale alternative. Ovi tokovi se izračunavaju za svaku posmatranu alternativu.

5. Na osnovu izračunatih pozitivnih i negativnih tokova preferencija izračunava se neto tok preferencija na osnovu koga se vrši PROMETHEE konačno rangiranje alternative

$$\varphi(a) = \varphi^+(a) - \varphi^-(a) \quad (7)$$

pri čemu je $\varphi(a)$ neto tok preferencija za svaku alternativu.

Na osnovu dobijene vrednost neto toka preferencije za svaku alternativu vrši se njihovo rangiranje od najbolje ka najlošijoj. Vrednost neto toka preferencije se kreće u rasponu od -1 do 1, pri čemu će najbolje rangirana alternativa imati najveći pozitivan neto tok preferencija, a najgore rangirana alternativa imati najveći negativan neto tok preferencija.

Jedan od vrlo bitnih faktora efikasnog rešavanja problema multikriterijumske analize je adekvatan pristup određivanju težinskih koeficijenata. Težinski koeficijenti mogu biti subjektivni i objektivni. [15] Subjektivni koeficijenti odražavaju subjektivne stavove donosioca odluka i zasnovane su na njihovim preferencijama dobijenim putem intervjua, anketiranja i organizovanih sastanka. Objektivni koeficijenti su oni koji su dobijeni na bazi objektivnih informacija, kao što je matrica odlučivanja. [16] Kako bi se sporovala što objektivnija analiza finansijskih performansi privrednih društava u različitim privrednim

delatnostima, neophodno je koristiti objektivne težinske koeficijenate. Jedna od najčešće korišćenih metoda za objektivno određivanje težinskih koeficijenata jeste entropijska metoda. [17] Ova metoda se zasniva na količini informacija koje jedan set podataka obezbeđuje. Ukoliko je entropija veća, veća je i disperzija podataka, pa dati indikator ima veći značaj za rangiranje i zato mu se dodeljuje veći težinski koeficijent. I obrnuto, kod indikatora gde je entropija manja manje su i razlike između posmatranih alternative, pa se samim tim tom indikatoru dodeljuje manji težinski koeficijent.

5. POSTAVKA METODA MULTIKRITERIJUMSKE ANALIZE

Imajući u vidu veliki broj pokazatelja koji se moraju uzeti u obzir kako bi se ocenio ekonomsko-finansijski položaj određenog privrednog društva, vrlo je logično da primena metoda multikriterijumskih metoda u potpunosti odgovara ovakvom vidu analize. PROMETHEE GAIA metod, primenjen u ovom radu, zahteva definisanje odgovarajućih parametara na osnovu kojih se vrši izračunavanje neto toka preferencija, kao sintetičkog pokazatelja svih analiziranih aspekata poslovanja. Težinski koeficijenti su izračunati primenom entropijske metode i prikazani su zajedno sa ostalim parametrima u Tabeli 5.

Tabela 5. Postavka problema multikriterijumske analize

Parametri	ORL	RFS	RZ	RF	SPNUI	SPNK
Min/Max	max	max	min	min	max	max
Težinski koeficijent	0,17	0,17	0,17	0,17	0,17	0,17
Funkcija preferencije	linear	linear	linear	linear	linear	linear
Prag indiferencije (Q)	0,10	0,29	0,11	0,73	0,02	0,05
Prag preferencije (P)	0,27	0,71	0,28	1,78	0,04	0,13

Težinski koeficijenti prikazani u Tabeli 5 dobijeni entropijskom metodom ukazuju na to da ni kod jednog od posmatranih pokazatelja ne postoje značajno veće ili manje razlike među privrednim subjektima u analiziranim delatnostima, imajući u vidu da je dobijen isti težinski koeficijent za sve pokazatelje od 0,17. Funkcija preferencije (linearna) i pragovi preferencija (koji su iskazani u apsolutnom iznosu) izabrani su na osnovu predloga korišćenog softvera VISUAL PROMETHEE, koji on daje na osnovu disperzije podataka.

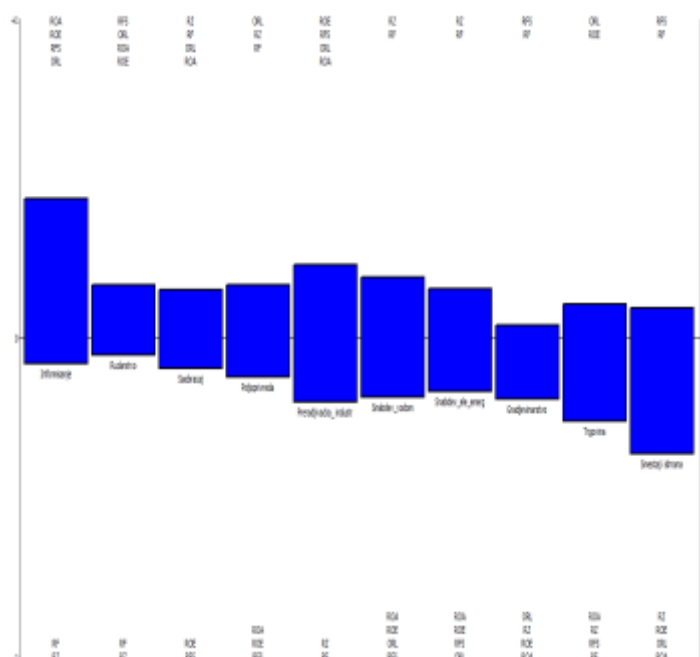
5.1. REZULTATI I DISKUSIJA

Primena multikriterijumske analize omogućila je rangiranje privrednih društava u posmatranim privrednim delatnostima, čime se može sagledati položaj poljoprivrednih privrednih društava u odnosu na privredna društva u ostalim oblastima priređivanja. U Tabeli 6 su prikazani rezultati PROMETHEE II rangiranja.

Tabela 6. Rezultati PROMETHEE II rangiranja

Rang	Delatnost	Phi	Phi+	Phi-
1	Informisanje i komunikacije	0,3559	0,4438	0,0879
2	Rudarstvo	0,1111	0,2091	0,0979
3	Saobracaj i skladištenje	0,0530	0,1850	0,1320
4	Poljoprivreda, šumarstvo i ribarstvo	0,0423	0,1764	0,1341
5	Prerađivačka industrija	0,0278	0,2408	0,213
6	Snabdevanje vodom upravljanje otpadnim vodama, kontrolisanje procesa uklanjanja otpada i slične aktivnosti	0,0047	0,2017	0,1970
7	Snabdevanje električnom energijom, gasom, parom i klimatizacija	-0,0136	0,1763	0,1899
8	Građevinarstvo	-0,1547	0,0605	0,2153
9	Trgovina na veliko i malo, popravka motornih vozila i motocikala	-0,1561	0,1323	0,2884
10	Usluge smeštaja i ishrane	-0,2703	0,1091	0,3794

Na osnovu podataka u Tabeli 6. može se zaključiti da je, uzimajući u obzir sve obuhvaćene pokazatelje, poljoprivreda rangirana na četvrtoj poziciji. Relativno povoljnoj poziciji privrednih društava koja posluju u ovoj privrednoj delatnosti doprinela je uspešna poljoprivredna sezona. Povoljni uslovi za obavljanje ove delatnosti omogućili su privrednim subjektima u ovoj oblasti da unaprede svoje performace u odnosu na prethodnu godinu. Najbolje rangirana su privredna društva u oblasti Informisanja i komunikacija, dok su najlošije rangirana privredna društva u oblasti pružanja usluga smeštaja i hrane. Kako bi se sagledale prednosti i nedostaci privrednih društava u posmatranim oblastima privređivanja na Slici 1 je prikazan duga dijagram, gde su iznad stubića predstavljene prednosti, a ispod nedostaci subjekata privređivanja u posmatranim delatnostima.



Slika 1. Duga dijagram

Slika 1 ukazuje na to da poljoprivredna privredna društva imaju prednost u domenu likvidnosti i strukture izvora finansiranja. Sa druge strane, ovi privredni subjekti imaju nedovoljno visoku profitabilnost, ekonomičnost i finansijsku stabilnost. Prvorangirana privredna društva u oblasti Informisanja i komunikacija imaju prednost u svim posmatranim pokazateljima, osim u domenu finansijske stabilnosti i zaduženosti. Slabosti najlošije rangiranih privrednih subjekata u oblasti pružanja usluga smeštaja i ishrane, pak, su svi aspekti ekonomsko finansijske analize osim racija finansijske stabilnosti i racija finansiranja.

6. BUDUĆI PRAVCI RAZVOJA POLJOPRIVREDE U REPUBLICI SRBIJI

Pristup finansiranju, kao i niz kreditnih proizvoda u poljoprivrednom sektoru u Republici Srbiji je veoma loš. Narušice se već ionako niska produktivnost jer poljoprivrednici ne mogu da ulažu u osnovna sredstva zato što visoki krediti vode u zaduženost, mada poljoprivredni privredni subjekti mogu da koriste dugoročne izvore finansiranja ali samo u početnim godinama investicionog ciklusa. [18] Situacija se može poboljšati povećanjem dostupnosti kapitala iz alternativnih izvora finansiranja, koji nisu dovoljno česti kod nas a imaju relativno važnu ulogu u svetu naročito kod poljoprivrednih preduzetničkih početnika. Najvažniji među njima su mikrokrediti, poslovni anđeli, kapitalisti sa rizikom, zajednička ulaganja, crowdfunding i slično. [19] Postoje i razni fondovi koji nude bespovratna sredstva ali se ni ona ne koriste u dovoljnoj meri, pa je zbog toga neophodna edukacija i upoznavanje poljoprivrednika i poljoprivrednih privrednih subjekata sa ovim mogućnostima. Kasnije bi ta sredstva trebalo usmeriti u izgradnju novih kanala i sistema za navodnjavanje, ali i postojeći vodoprivredni resursi reka i već izgrađenih kanala su nažalost nedovoljno iskorišćeni iako predstavljaju izuzetan proizvodni potencijal za samu poljoprivrednu delatnost. [20] Treba napomenuti da u okviru Ministarstva poljoprivrede, šumarstva i vodoprivrede Republike Srbije, postoji poseban sektor, Uprava za poljoprivredno zemljište, koje se aktivno zalaže za zaštitu i uređenje poljoprivrednog zemljišta. Mere koje ovo telo preduzimo podrazumevaju kontrolu plodnosti obradivog poljoprivrednog zemljišta, uređenje–revitalizaciju poljskih puteva, nabavku nove opreme za navodnjavanje, bušenje bunara u funkciji navodnjavanja, izgradnju sistema za navodnjavanja, studijsko-istraživačke radove, programe i projekte u oblasti zaštite i korišćenja poljoprivrednog zemljišta, kao i organizovanje stručnih skupova ili savetovanja. [21] Od velikog je značaja ukazati na osnovne principe, zajedničke ciljeve i usaglašavanje agrarne politike ovog Ministarstva i EU. Približavanje politike EU i agrarne politike Republike Srbije dovešće do povećanja produktivnosti u sektoru poljoprivrede, zatim do rasta standarda poljoprivrednika, dobijanje poljoprivrednih proizvoda po konkurentnijim cenama, kako na domaćem, tako i na stranom tržištu, što će pozitivno uticati na povećanje izvoza poljoprivrednih proizvoda veće finalne obrade.

7. ZAKLJUČAK

Nema sumnje da Republika Srbija raspolaže svim neophodnim resursima za razvoj poljoprivrede. To se pre svega odnosi na prirodne resurse i radnu snagu, koja ima veliko iskustvo u bavljenju ovom delatnošću, kao i dovoljnim brojem kvalifikovanih stručnjaka iz ove oblasti. Treba napomenuti da je višegodišnja kriza devedesetih godina prošlog veka razorno delovala na poljoprivredu i njoj najbližu prehrambenu industriju, sa kojom zajedno čine agrosektor. Rezultati privatizacije koja je potom usledila u agrosektoru su vrlo promenljivi, od jako uspešnih primera do potpunih promašaja. Generalno, rezultati su mogli i

morali biti znatno bolji. Pritom su preduzeća iz oblasti poljoprivrede prošla nešto lošije u odnosu na preduzeća iz prehrambene industrije. Razlog treba tražiti u pomenutim kupcima ogromnih poseda uz korišćenje različitih subvencija. Njihov osnovni cilj bio je da se kroz primarnu poljoprivrednu proizvodnju, uz što manja ulaganja, ostvari profit. Imajući u vidu veličinu njihovih poseda, to im i nije bilo naročito teško. Takođe, početkom 21. veka očekivao se relativno brz ulazak Republike Srbije u EU, pa su novi vlasnici koji su do poljoprivrednog zemljišta došli po ceni od 200 do 500 evra po hektaru očekivali da ga kupcima iz razvijenih zemalja EU prodaju po znatno višoj ceni, i do 10 000 evra po hektaru. Reći da je država jedini krivac je možda preoštira konstatacija, ali ona kao nosilac ekonomske politike i osnivač Agencije za privatizaciju svakako snosi najveći deo odgovornosti jer nije stvoren podsticajni ambijent za dalji razvoj i unapređenje ove privredne grane, koja je posle višedecenijskog favorizovanja industrijske proizvodnje, neosnovano i neodgovorno stavljena u drugi plan i u periodu tranzicije. I pored svega navedenog, sektor poljoprivrede, šumarstvi i vodoprivrede poslednjih godina ostvaruje pozitivan finansijski rezultat, odnosno neto dobitak, pa se ne može reći da je neuspešan. Može se govoriti o tome da ostvareni rezultati nisu dovoljno visoki u odnosu na resurse i potencijale kojima poljoprivreda raspolaže. Možda je zato bolje iskoristiti termin, „nedovoljno uspešna“. Iz svega navedenog, Republika Srbija konačno treba da donese odluku kojim putem želi da ide i da se razvija poljoprivredna proizvodnja, da li osnivanjem porodičnih farmi i zadrugarstva kao što je to slučaj u EU, ili će novim zakonskim odredbama omogućiti nastavak latifundacije, odnosno stvaranja velikih privatnih poseda obradivog zemljišta, koji se odomaćio u prethodnoj deceniji.

REFERENCE

1. World bank database, <https://data.worldbank.org/indicator/>
2. Stojanović Ž., Cvetković M., Tražnja za hranom i prilagođavanje agrosektora u Srbiji i regionu. u (Cerović B., Uvalić M.) Kontroverze ekonomskog razvoja u tranziciji, Srbija i Zapadni Balkan, Ekonomski fakultet u Beogradu, Beograd, 2011, 173-182.
3. Popov Đ., Uticaj tranzicije na stanje Republike Srbije, Zbornik radova Pravnog fakulteta, 47 (1), (2013), 25-45.
4. Republički zavod za statistiku, Statistički godišnjak Republike Srbije 2017.
5. Agencija za privredne registre, Godišnji bilten finansijskih izveštaja 2016.
6. Krstić J., Stojiljković M., Finansijska Analiza, Ekonomski fakultet u Nišu, Niš, 2000.
7. Vučković B., Veselinović B., Drobnjaković M., Finansiranje trajnih obrtnih sredstava u poljoprivredi, Ekonomika poljoprivrede, 64 (3), (2017), 1065-1080.
8. Behzadian, M., Kazemzadeh, R. B., Albadvi, A. Aghadasi, M., PROMETHEE: A comprehensive literature review on methodologies and applications. European Journal of Operational Research, 200 (1), (2010), 198-215.
9. Brans, J. P., Mareschal, B., How to Decide with PROMETHEE, <http://homepages.ulb.ac.be/~bmaresc/PromWeb.htm>
10. Brans, J.P. Mareschal, B. Vincke, Ph., PROMETHEE: A new family of outranking methods in multi-criteria analysis, in (Brans, J.P.), Operational Research '84, North-Holland, Amsterdam, (1984), 447-490.

11. Brans, J.P., Vincke, Ph., A preference ranking organisation method: The PROMETHEE method for MCDM. *Management Science*, 3 (6), (1985), 647-656.
12. Tomić-Plazibat, N., Aljinović, Z., Pivac, S., Risk Assessment of transitional Economies by multivariate and Multicriteria Approaches. *Panoeconomicus*, 57 (3), (2010), 283-302.
13. Brans, J.P. Mareschal, B., Promethee methods. Chapter 5 in: *Multiple Criteria Decision Analysis: State of the Art Surveys*, Springer Science and Business Media, Boston, (2005), 171.
14. VP Solutions, Visual PROMETHEE,
<http://www.promethee-gaia.net/files/VPManual.pdf>
15. Hwang, C. L., Yoon, K., *Multiple Attribute Decision Making-Methods and Applications. A state-of-the-art survey.* Springer-Verlag, New York, 1981.
16. Chen, T. Y., Li, C. H. Objective weights with intuitionistic fuzzy entropy measures and computational experiment analysis. *Applied Soft Computing*, (2011), 5411-5423.
17. Zou, Z., Yun, Y., Sun, J. Entropy method for determination of weight of evaluating indicators in fuzzy synthetic evaluation for water quality assessment. *Journal of Environmental Sciences*, (2006), 1020-1023.
18. Mitrović S., Mitrović A., Cogoljević M., *Doprinos poljoprivrede u razvoju Srbije, Ekonomika poljoprivrede*, 2017, 64 (2), (2017), 805-819.
19. Njegomir V., Tepavac R, Ivanišević N., *Alternativni izvori finansiranja preduzetničkih poduhvata u poljoprivredi, Ekonomika poljoprivrede*, 64 (1), (2017), 295-306.
20. Vukoje V. *Rezultati poslovanja privrednih subjekata iz oblasti poljoprivrede i prehrambene industrije AP Vojvodine (2001-2016).* Feljton, Novi Sad, 2018.
21. Sajt Ministarstva za poljoprivredu, šumarstvo i vodoprivredu:
<http://www.minpolj.gov.rs/>



TOTAL QUALITY MANAGEMENT (TQM) IN HIGHER EDUCATION

Damir Ilić, Tatjana Ilić-Kosanović, Vladimir Tomašević

School of Engineering Management, Belgrade, Serbia

Abstract: This paper examines the positive aspects of Total Quality Management (TQM) in the field of higher education. During the analysis, special attention was devoted to adapting TQM philosophy to the specifics of the higher education process. At the same time, the negative aspects of the TQM implementation and the reasons that caused the failures in the implementation were presented. The goal was to create an objective representation and point to the positive and negative consequences that the implementation carries with it. Many other systems, models, and standards, that have found their application in higher education, largely contain the same arguments and commitment to quality improvement, such as TQM. By observing the positive and negative practices of TQM implementation, significant lessons can be drawn for future efforts to improve quality in higher education institutions.

Keywords: Quality, Total Quality Management, TQM, Higher Education

1. UVOD

Upravljanje ukupnim kvalitetom (na engleskom Total Quality Management, odnosno TQM, kako će se navoditi u daljem tekstu), može se definisati kao „tekući proces tokom kojeg najviše rukovodstvo preuzima sve neophodne korake kako bi omogućio svima u organizaciji tokom obavljanja svih zadataka da uspostave i postignu standarde koji ispunjavaju ili prevazilaze potrebe i očekivanja svojih potrošača, kako spoljnih, tako i internih“ [1]. Anderson, Erikson i Torsteson navode definiciju Helstena i Klefsdžoa (Hellsten and Klefsjo) koji definišu TQM kao „kontinuirano evoluirajući sistem menadžmenta koji se sastoji od vrednosti, metodologija i alata, čiji je cilj povećanje zadovoljstva internih i eksternih klijenata uz redukovanu količinu resursa“ [2].

Ključno pitanje, koje se postavlja, je relevantnost i primenjivost TQM filozofije u visokom obrazovanju. Parize (Pariseau) i Mekdenijel (McDaniel) navode da Brigham (Brigham) smatra da postoji pritisak korisnika usluga visokog obrazovanja kako bi se na neki način umanjila vidna praznina između njihovih očekivanja u pogledu visokog obrazovanja, i onog što visoko obrazovanje zaista pruža studentima, roditeljima, poslodavcima i zakonodavcima. Ovakva situacija zahteva konstantnu posvećenost unapređenju kvaliteta kako bi se na pravi način odgovorilo potrebama onih zbog kojih sistem obrazovanja zapravo i postoji [3]. Visoko obrazovanje u uslovima globalizacije je pod velikim pritiskom da pokaže značajne pomake i kontinuirano poboljšanje u pogledu kvaliteta. Postoji pritisak na visokoškolske ustanove da zbog novih, revidiranih, potreba za radnom snagom, poslovnog okruženja koje neprekidno zahteva pouzdaniju, inovativnu i izuzetno obrazovanu radnu snagu, stvore nove generacije obrazovanih kadrova koji će zadovoljiti potrebe sve dinamičnije svetske privrede. Treba istaći činjenicu da je 2009. godine TQM imao ubedljivo najveći broj

zabeleženih pokušaja primene u visokom obrazovanju, daleko veći u odnosu na druge metodologije unapređenja kvaliteta [4].

2. ZNAČAJ KVALITETA U VISOKOM OBRAZOVANJU

Sa fenomenom globalizacije i uvođenjem Bolonjske deklaracije povećava se mobilnost studenata. Povećava se konkurentnost između obrazovnih ustanova, a samim tim javlja se i potreba da se veća pažnja posveti kvalitetu obrazovnog procesa. Bolonjska deklaracija je potpisana 1999. godine od strane ministara nekoliko evropskih zemalja zaduženih za visoko obrazovanje. Potpisivanjem Bolonjske deklaracije otpočeo je tzv. Bolonjski proces koji ima za cilj kreiranje jedinstvenog evropskog sistema univerzitetske nastave i istraživanja, uz istovremeno priznavanje i zadržavanje raznolikosti nacionalnih specifičnosti (kultura, jezik, tradicija, itd). Na taj način se teži stvaranju fleksibilnijeg i efikasnijeg sistema visokog obrazovanja Evrope, koji bi bio kompetetivan i na globalnom svetskom tržištu znanja. Do danas, Bolonjsku deklaraciju potpisalo je preko 40 zemalja Evrope, među kojima je i Republika Srbija. Najvažnija konkretna opredeljenja (mere) u okviru Bolonjskog procesa su:

- Uvođenje Evropskog Sistema Prenosa Bodova (ESPB ili, na engleskom, ECTS);
- Usvajanje nove strukture studija, koju čine 3 ciklusa;
- Promovisanje mobilnosti studenata i nastavnika;
- Usvajanje sistema uporedivih diploma.

Postoje brojni razlozi zbog kojih visoko obrazovanje treba da razmišlja o kvalitetu. Mogu se pomenuti neki od njih:

1. Razlozi koji se tiču konkurencije između obrazovnih ustanova;
2. Zadovoljstvo potrošača (koje u visokom obrazovanju ima nešto drugačije značenje o čemu će biti reči nešto kasnije);
3. Očuvanje standarda;
4. Odgovornost;
5. Unapređenje morala zaposlenih kao i motivacije;
6. Pitanja koja se odnose na status i prestiž u društvu;
7. Prijemčivosti, kako za studente, tako za pojedince i organizacije koje mogu pokazati interes za finansiranje ustanove.

Trajbus (Tribus) smatra da, prilikom primene principa kvaliteta, koji imaju široku poslovnu primenu u sferi obrazovanja, treba voditi računa o sledećem:

- Škola se nikako ne može smatrati fabrikom;
- Studenti se ne mogu bukvalno posmatrati kao "proizvod";
- Obrazovanje studenta se smatra proizvodom;
- Uspešna realizacija proizvoda iziskuje od studenta da participira u pogledu zajedničkog upravljanja procesom učenja [5].

Tabela 3. Vodeći pristupi kvalitetu u visokom obrazovanju u literaturi [6].

Pristup	Definicija	Primer
Resursi	Resursi kvaliteta se odnose na ona dobra koji su inputi za instituciju i koriste se za različite funkcije i aktivnosti (Schmidtlein).	Ljudski, intelektualni, fizički i finansijski resursi.
Sadržaj	Kvalitet u pogledu sadržaja se odnosi na izvrsnost ustanove u pogledu onog što podučava (Astin).	Izloženost liberalnoj umetnosti i nauci.
Ishodi	Kvalitet ishoda se fokusira na usklađenost prema specifikacijama misije i postignuću ciljeva (Bogue and Sanders).	Studentska dostignuća
Dodatna vrednost	Pogled na kvalitet iz ugla dodatne vrednosti odnosi se na obrazovni uticaj institucije na studente i osoblje fakulteta (Astin).	Razlika između ishoda i inputa
Produktivnost	Pogled na kvalitet iz ugla produktivnosti odnosi se na institucije koje mogu da postignu više sa manje uloženog – one ustanove koje su više efikasne (Hines)	Odnos između ishoda i inputa
Bazirano na učešću	Kvalitet baziran na učešću fokusira se na potrebe korisnika institucije – „socijalnog servisa“ (Wolff)	Zadovoljstvo studenata, roditelja, studenata koji su okončali studije, fakulteta, zajednice, državnih institucija, donatora i dr.
Ugled	Kvalitet baziran na ugledu odnosi se na široku prepoznatljivost imena brenda (Mc Guire et al.)	Rangiranje i rejting

3. PRIMENA TQM U VISOKOM OBRAZOVANJU

Vilijams (Williams) smatra da je TQM je našao svoju primenu na visokoškolskim ustanovama u nekolicini zemalja poput SAD, Australije i Velike Britanije kao odgovor na finansijske pritiske što je uslovalo da se obrazovne ustanove ponašaju kao komercijalni poduhvati. Smatra se da je u jednom trenutku postojalo veliko interesovanje za primenom TQM u visokom obrazovanju, ali da je zapravo izostala njegova puna implementacija. Uspešnu primenu TQM se uglavnom više odnosila na povećanje produktivnosti rada uz snižavanje troškova, a manje na kvalitet znanja koji je pružan studentima. Primetan je trend da upotreba TQM obuhvata samo delove institucije, ali retko kada organizaciju u celini. Li (Lee) ističe da Pajper (Piper) smatra da se njegova primena u suštini ograničila na administrativni sektor i sektor usluga budući da su tamo očekivani najbolji rezultati [7].

Autori poput Sahnija (Sahney), Benveta (Benwet), Karunesa (Karunes), Kampatelija (Campatelli), Krukšanka (Cruickshank), Pika (Peak) i drugih smatraju da je primena TQM u visokom obrazovanju neizbežna i da njegovi principi, metodologije i alati mogu da pomognu pri realizaciji programa unapređenja kvaliteta na visokoškolskim ustanovama. Nasuprot njima, autori poput Birnbauma (Birnbaum), Dešotela (Deshotels), Sejmura (Seymour), Mesija (Massy) i drugih smatraju da se, zbog svojih specifičnosti, na visokoškolske ustanove ne može primeniti ista matrica menadžerske filozofije kreirana za potrebe industrije pre svega usled akademske kulture koja se protivi principima TQM [8].

Veoma važno pitanje za primenu TQM u visokom obrazovanju je definisanje pojma potrošač. Ukoliko se posmatra student, u klasičnom smislu te reči, kao *potrošač*, to navodi na razmišljanje o premisi "kako je potrošač uvek u pravu". To bi značilo da ukoliko se studentima daje ono što zaista žele, to ne mora nužno biti usmereno na viši kvalitet obrazovanja. Studenti su često usredsređeni na kratkoročne ciljeve (prelazak sa godine na

godinu i polaganje ispita sa što boljom ocenom) radije nego na dugoročne ciljeve (koji se tiču sticanja potrebnog znanja i rada na sebi) [9].

Tabela 4. Poređenje TQM u industriji i obrazovanju [10].

TQM u industriji	TQM u obrazovanju
Korporativna kultura	Predavanje / Institucionalna kultura
Direktor / Viši menadžera	Direktor / Dekan
Menadžeri	Šefovi odseka
Zaposleni	Nastavno osoblje & Nenastavno osoblje
Kupci	Studenti
Nula defekata	100% Rezultati
Proizvodni process	Akademski proces

U najčešće *potrošače (klijente)* visokoškolskih ustanova ubrajaju se:

- Studenti - plaćaju usluge, primaju obrazovne usluge, koriste administrativne usluge i dr;
- Roditelji - sprovode odabir pružaoca usluga, plaćaju za pružene usluge i dr;
- Sponzori istraživanja - odobravaju fondove u zamenu za informacije, uslugu ili aktivnosti;
- Državni organi - obezbeđuju fondove univerzitetima za pružanje usluga. Imaju izvesnu dozu uticaja na uslugu odnosno dizajn proizvoda;
- Društvo - koristi se pruženim uslugama, plaća putem poreza deo usluga;
- Budući poslodavci - predstavljaju naručioce proizvoda pružanja usluga, obezbeđuju finansiranje u pojedinim situacijama i daju savet u pogledu dizajna usluge;
- Akademska udruženja - imaju korist od aktivnosti studenata fakulteta;
- Akreditaciona tela - sprovode kontrolu nad proizvodom/dizajnom usluge;
- Osoblje fakulteta - kontrolišu deo dizajna proizvoda i usluga, koriste pojedine usluge [11].

Pet najvažnijih elemenata koji karakterišu unapređenja koja donosi TQM u visokom obrazovanju su:

- Fokusiranje na identifikaciju procesa koji se mogu predstaviti putem dijagrama toka i njihovo povezivanje sa drugim procesima i naposljetku sa ciljevima organizacije;
- Identifikovanje, razumevanje i izlaženje u susret potrebama potrošača;
- Čvrst oslonac na podatke u cilju definisanja potreba, opisivanja problema i predlaganja rešenja;
- Identifikovanje i uključivanje onih koji donose odluke koje se tiču unapređenja kvaliteta;
- Poštovanje doprinosa svakog pojedinca unapređenju kvaliteta bez obzira na poziciju u instituciji [12].

Značajno podudaranje ciljeva TQM sa ciljevima visokoškolskih ustanova obuhvata [13]:

- TQM i visokoškolske ustanove dele fokus na individuu na svim nivoima;
- Stavljanje naglasaka na timove zadužene za kvalitet koji vode prema ispunjenoj potrebi potrošača. Visokoškolske ustanove se trude da inoviraju svoje programe kako bi izašle u susret potrebama studenata. Tamo gde inovacija nije moguća sprovodi se prilagođavanje, mada treba imati u vidu da često akademski standardi i želje studenata nisu podudarne;
- TQM obuhvata uslužni sektor, baš kao i visokoškolske ustanove, sa tom razlikom da usluge visokoškolskih ustanova nemaju opipljiv karakter;

- Merenje performansi je sastavni deo TQM uz upotrebu indikatora performansi. Upotreba pomenutih indikatora u obrazovanju nije neprikladna, već mora da podrazumeva njihovo brižljivo identifikovanje kako bi bili prihvatljivi i za one koji pružaju usluge i studente;
- TQM ima za cilj smanjenje troškova što predstavlja veoma važan cilj za visokoškolske ustanove. Treba naglasiti da visokoškolske ustanove imaju odbojnost prema TQM usled njegove regulativne prirode, kao i usled visokih troškova uspostavljanja TQM procedura.

Uprkos mnogim oprečnim stavovima po pitanju primene TQM u visokom obrazovanju, treba izdvojiti stav Sirvancija (Sirvanci) koji smatra da treba TQM treba primeniti u svom izvornom obliku bez modifikacija i prilagođavanja u odnosu na model koji se primenjuje u poslovnom svetu. Studenta koji upiše visokoškolsku ustanovu treba posmatrati kao sirovinu koja je spremna za proces prerade, odnosno transformacije. Naposljetku kada student završi sve kurseve (baš kao što proizvod prolazi različite faze obrade) i stekne diplomu (što je nalik brendiranju proizvoda kada se na njega postavi etiketa), on dobija šansu da pronađe posao gde se bori sa konkurencijom oličenom u drugim zaposlenima, baš kao i proizvod koji se takmiči na tržištu sa svojom konkurencijom [14].

4. STRATEGIJE PRIMENE TQM U VISOKOM OBRAZOVANJU

Baks (Bax) navodi da Koate (Coate) definiše najmanje šest strategija koje su visokoškolske ustanove primenjivale na proces implementacije TQM u visokom obrazovanju:

1. Elementarni TQM pristup (upotreba ključnih elementa upravljanja kvalitetom);
2. Pristup Gurua (primena učenja eminentnih stručnjaka iz oblasti kvaliteta);
3. Japanski model pristupa (studije koje analiziraju domete japanskih osvajača prestižne „Demingove nagrade“);
4. Model industrijskih preduzeća (prilagođen pristup uspešnih dostignuća kompanija koje su uspešno implementirale TQM);
5. Hošin (Hoshin) pristup planiranju (fokus na uspešno planiranje, razvoj, izvršenje i mesečnu analizu);
6. Pristup planiranju zasnovan na Boldridžovoj (Baldrige) nagradi (identifikovanje oblasti za uspešnu primenu poboljšanja) [15].

4.1. DEMINGOVIH 14 TAČAKA

Demingovih 14 tačaka stvara okvir za implementaciju TQM u visokom obrazovanju i to na sledeći način [16], [17], [18], [19]:

1. Stvaranje i konstantnost svrhe - Neophodno je razviti misiju koja predstavlja svrhu odnosno cilj visokoškolske ustanove. Kada se definiše misija svi zaposleni na visokoškolskoj ustanovi moraju da znaju kako da daju svoj doprinos. Svi procesi ili pozicija koje ne doprinose misiji visokoškolske ustanove treba da se eliminišu. U visokoškolskom obrazovanju akcentat je na inovaciji (novi kursevi, nove metode učenja poput učenja na daljinu i sl.), unapređenju postojećih usluga kako u pogledu kurseva tako i u pogledu drugih usluga koje pruža obrazovna ustanova, unapređenje u pogledu istraživanja i nastave;

2. Usvajanje nove filozofije - Insistirati na kvalitetu u bukvalno svakom segmentu svakodnevnog funkcionisanja obrazovne institucije, počevši od učionice pa sve do čišćenja toaleta. U prošlosti da bi potencijalni studenti bili u prilici da uspeju u svojoj karijeri morali su da pohađaju fakultete kako bi stekli neophodna znanja i razvili potrebne veštine. Studentski interesi su bili u fokusu samo onda kada je to zapravo bilo neizbežno. Danas fakulteti i univerziteti daleko više zavise od studenata, nego što studenti zavise od njih. Samim tim zadovoljstvo potrošača postaje ključno prilikom donošenja važnih odluka na visokoškolskoj ustanovi. Nedostaci postojećeg obrazovnog sistema se odnose na: loš kvalitet nastavnog procesa, anahronost programa, nekonzistentni nastavni programi, nepristupačna cena i porast neefikasne birokratije. Svi ovi pobrojani nedostaci su razlog više za usvajanje nove filozofije usmerene prema kvalitetu na visokoškolskim ustanovama;
3. Prekinuti praksu oslanjanja na masovnu kontrolu - Fokus se mora staviti na proces ili na finalni proizvod. Primenjeno na visokoškolske ustanove, fokus mora da bude na većem napretku u učenju, a manje na testiranju. Suština je da se proces rada na visokoškolskoj meri izmeni do te mere da potreba za inspekcijama ne bude toliko nužna. Uobičajeno je da kada se nešto loše desi u visokoškolskoj ustanovi sistem pokušava da minimalizuje šteta, dok je u industriji akcenat na prevenciji da se takve stvari uopšte i dogode. Dakle umesto odgovora na nametnutu realnost, visokoškolske ustanove imaju za zadatak da aktivnim angažovanjem razviju osećaj kakve ih realnosti očekuju u budućnosti. Obrazovne ustanove su često predmet periodičnih kontrola. Ukoliko se obrazovna ustanova oslanja isključivo na periodične kontrole kao način za unapređenje kvaliteta, onda se svakako radi o lošoj praksi;
4. Okončati praksu bavljenja poslom rukovodeći se isključivo troškovima - Fokus mora da bude na troškovima i dobiti koja se realizuje na duge staze. Aktivnija uloga visokoškolskih ustanova na boljoj pripremi srednjoškolaca završnih razreda za akademski život može uprkos trenutnim troškovima rezultovati velikom dobiti u krajnjoj instanci na duge staze. Ovaj princip se može odnositi i na nabavku materijala, opreme i drugih potrepština neophodnih kako za odvijanje nastavnog procesa tako i za normalno funkcionisanje visokoškolske ustanove. Finansijska sredstva imaju značajnu ulogu u pogledu očuvanja i razvijanja nivoa kvaliteta na visokoškolskoj ustanovi, ali treba napomenuti da nivo kvaliteta nije direktno proporcionalan utrošenim sredstvima. Rešavanje problemskih situacija na kratke staze odvlači ogromnu količinu vremena, novca i resursa, pa je daleko jeftinije posvetiti daleko veću pažnju prevenciji i potpunom rešavanju problema na duge staze;
5. Nprekidno raditi na unapređenju procesa - Neophodno je kontinuirano pratiti zadovoljstvo studenata, potencijalnih poslodavaca, osoblja na fakultetu i ukoliko se ispostavi da postoje problemi reagovati na vreme tako što će se proces koji ne funkcioniše na zadovoljavajući način unaprediti. Mora se raditi na preciznom prikupljanju povratnih informacija putem anonimnih anketa ili upitnika o zadovoljstvu životom i radom na visokoškolskoj ustanovi. Suština je pružiti bolju uslugu studentima uz zadržavanje nižih troškova u čemu značajnu ulogu ima pažljivo praćenje potreba studenata. Kontinuirano unapređenje procesa mora da obuhvati sve aspekte funkcionisanja visokoškolske ustanove. Ovo svakako podrazumeva i potrebu da se odgovori na potrebe svih zainteresovanih strana, prvenstveno studenata. Postoji neophodnost neprekidnog rada na unapređenju nastavnih programa i insistiranje na praksi stipendiranja najuspešnijih studenata. Važno je istaći potrebu da se kontinuirano mora voditi briga o rezultatima koji se postižu putem nastavnog procesa i neprekidno ulagati napore u njegovo kontinuirano poboljšanje;

6. Obuka na radnom mestu - Treba pronaći načine da se kontinuirano ulaže u obuku zaposlenih na visokoškolskoj ustanovi počevši od raznih službi, pa do nastavnog kadra. Ulaganja u obuku zaposlenih se uvek vrata višestruko na duge staze. Deming ističe potrebu da obuke na radnom mestu i daje joj prednost u odnosu na učenje od svojih saradnika ili proučavanje štampanog materijala čija upotreba može biti diskutabilna u pogledu razumljivosti. manje iskusno osoblje na visokoškolskoj ustanovi ima potrebu za obukom u pogledu razvijanja pedagoških veština putem mentorstva od strane iskusnijih članova kolektiva. Mnoge ustanove ne pružaju dovoljno pažnje obuci i praktično je svode na pružanje neke vrste tehničkih informacija ili na repliciraju prakse u pogledu reagovanja na neki događaj, a u suštini bi morale da razvijaju sposobnost kod zaposlenih na visokoškolskoj ustanovi u pogledu donošenja odluka ili sposobnosti za rešavanje kriznih situacija;
7. Uvođenje institucije liderstva - Svaki zaposleni na visokoškolskoj ustanovi ima potencijal da razvije leaderske sposobnosti u svom domenu rada. Liderstvo na visokoškolskoj ustanovi ima za cilj da se problemi u komunikaciji ili produktivnosti brzo uoče i efikasno otklone bez nepotrebne medijacije menadžera. Na primer neadekvatno izabrana rezolucija projektora u učionici, problematičan računar u računarskom centru ili problem lošeg osvetljenja u učionici su mali problemi u procesu koje može rešiti predavač. U budućnosti obrazovne institucije će imati sve više izraženu horizontalnu povezanost na račun dominantne hijerarhijske podele;
8. Odagnati strah - Svrha angažovanja nastavnog kadra je proces obrazovanja, a ne "uterivanje straha u kosti" studentima putem testova. Profesori moraju da se više posvete svojoj pedagoškoj ulozi, a da pronađu način da putem pripremnih testova ili većim fokusom na slabe tačke odagnaju strah kod studenata. Treba pospešivati i ohrabrivati inovativnost u nastavnom programu, pa čak i onda kada on rezultuje neuspehom. Menadžment visokoškolske ustanove ima za zadatak da stvori radno okruženje koje se odlikuje otvorenošću, uzajamnim poverenjem, otvorenom i iskrenom komunikacijom na različitim nivoima, uzajamnom poštovanju, spremnošću za kontinuirani unapređenje, kreativnošću i sl. Najveća opasnost po zaposlene u visokoškolskoj ustanovi je da se uhvate u zamku primene neprekidnog niza različitih vidova evaluacije. Sa jedne strane one doprinose kvalitetu, ali sa druge neizbežno vode ka nepoverenju i izazivaju nepotreban i suvišan strah. Osećaj straha kod zaposlenih može da stvori teskobu ili pritajenu agresiju kao i nespremnost da javno iskažu svoj stav. U literaturi se identifikuju tri glavna uzročnika straha koja utiču na zaposlene da odustanu od izražavanja svog stava: strah da se ništa na taj način neće promeniti, tendencija da se izbegnu sukobi i odsustvo namere da se nekom stvore problemi. Menadžment u obrazovnim ustanovama mora da preduzme mere kako bi identifikovao i uklonio razloge koji izazivaju strah kod zaposlenih sa ciljem promovisanja akademskih sloboda i stvaranja uslova za rad koji kod pojedinca podstiču kreativnost;
9. Rušenje prepreka između odeljenja - Suština je da se na visokoškolskim ustanovama podstiče saradnja i timski rad na račun međusobnog nadmetanja. Neophodno je uključiti što više zaposlenih na visokoškolskoj ustanovi u proces donošenja odluka. Stroga hijerarhija u izveštavanju i delovanju je manje delotvorna u odnosu na obavljanje posla na human i efikasan način u cilju zadovoljenja stvarnih studentskih potreba bez obzira kako izgleda podela u okviru odeljenja kojima zaposleni na visokoškolskoj ustanovi pripadaju;
10. Izbegavati opsesiju sa ciljevima i sloganima - Ne treba se fokusirati na predočavanje studentima koji uspeh treba da ostvare na testu kako bi bili uspešni, već na to kako da im

se pruži veća šansa za uspeh putem dodatnih predavanja, lekcija, ukazivanjem na korisnu literaturu i sl. Upotreba slogana koji su marketinško orjentisani doprinosi kreiranju imidža institucije i pozicioniranju na tržištu koje se bavi pružanjem obrazovnih usluga;

11. Eliminisanje kvantitativnih pokazatelja - Ukoliko se pred nastavno osoblje postavi zadatak koji broj radova moraju da ostvare tokom godine, tada pomenuti kvantitet može nepovratno da nanese štetu kvalitetu radova što treba da bude prioritet. Merilo efikasnosti, recimo, nekog programa na visokoškolskoj ustanovi nije broj upisanih studenata koji pohađaju nastavu na tom programu, jer bi to svakako izazvalo suparničku atmosferu na ustanovi. Stvarno merilo uspešnosti programa predstavlja njegov kvalitet i napor koji je uloženi u njegovo pokretanje. Treba uvažiti različitost i različite nivoe sposobnosti koje individue poseduju;
12. Omogućiti zaposlenima da se ponose svojim radom - Ponos ima motivišući faktor na visokoškolskim ustanovama. Uspeh ustanove podrazumeva uspeh svakog pojedinca na visokoškolskoj ustanovi. Neophodno je ukloniti sve barijere između zaposlenih na visokoškolskoj ustanovi i omogućiti studentima da učestvuju u izvesnoj meri u proces donošenja odluka. Visoko obrazovanje iziskuje fleksibilnost kako bi se odgovorilo na efikasan način na studentske potrebe;
13. Aktivno učešće organizacije u procesu obuke i obrazovanja - Svi zaposleni u visokoškolskoj ustanovi bez obzira na odeljenje u kome rade moraju da budu aktivno uključeni u proces obuke i obrazovanja. na taj način će moći da na efikasan način doprinesu idejama i predlozima kako proces u koji su uključeni može da se poboljša. To se odnosi i na sticanje znanja o TQM. Nastavno i nenastavno osoblje, tehnička podrška i dr. kontinuiranim unapređenjem sopstvenih veština doprinose i direktno kvalitetu i produktivnosti organizacije;
14. Uloga menadžmenta u realizaciji preduzetih mera - Menadžment na svim nivoima mora da usvoji TQM filozofiju. Neophodno je dobro sagledati procese na visokoškolskoj ustanovi i ustanoviti kako se pomenutih 14 tačaka odnose na te procese. Svaki zaposleni na visokoškolskoj ustanovi mora biti upoznat sa ciljevima i zadacima TQM kao i na koji način da seti ciljevi i zadaci sprovedu u delo. TQM jednom rečju zahteva apsolutnu posvećenost svih činilaca u visokoškolskoj ustanovi. Entuzijizam nekoliko osoba po pitanju sprovođenja TQM je unapred osuđen na propast bez podrške čitavog kolektiva.

5. PREPREKE U PRIMENI TQM U VISOKOM OBRAZOVANJU

Roza (Rosa) i Amaral (Amaral) navode autore koji ukazuju na prepreke u primeni TQM u visokom obrazovanju [20]:

- Kels (Kells) smatra da su prepreka nejasno definisani ciljevi i namere kao i nejasan redosled prioriteta;
- Birnbaum (Birnbaum) smatra da postoji više različitih grupa spoljašnjih i unutrašnjih klijenata sistema visokog obrazovanja koji imaju različite potrebe;
- U visokom obrazovanju postoji više aktera poput nastavnog osoblja, studenta i nenastavnog osoblja;

- Institucije visokog obrazovanja karakteriše individualizam i unutrašnje nadmetanje, kao i primetno odsustvo timskog duha koje se javlja samo po pitanju jasno definisanih organizacionih ciljeva;
- Harvi i Grin (Harvey and Green) smatraju da postoje nejasno definisani parametri za merenje rezultata u visokom obrazovanju (zanemarivanje kvalitativnih aspekata);
- Birokratija, nedostatak kanala za komunikaciju kao i nedovoljno razvijeni informacioni sistem upravljanja;
- Nedostatak liderstva.

6. ZAKLJUČAK

TQM po svojoj prirodi predstavlja univerzalni model za upravljanje kvalitetom koji je primenjiv u svim oblastima ljudskog delovanja. Ukoliko visokoškolske ustanove ustraju u nastojanjima da konstantno rade na procesu unapređenja kvaliteta, to će svakako rezultovati koristima po čitavo društvo i ekonomiju. Roza (Rosa) i Amaral (Amaral) navode da su Bruks i Beket (Brookes and Becket) došli do zaključka da je najveći broj modela upravljanja kvalitetom testiranih u visokom obrazovanju imao prvobitno industrijsku primenu. Pri tome su uočene brojne koristi u vidu upravljanja i merenja kvaliteta i utvrđivanju prioriteta koji se tiču unapređenja kvaliteta. Dileme su se isključivo odnosile na primenu modela koji su oprobani u poslovnom okruženju na visoko obrazovanje [21].

Primena TQM u visokom obrazovanju je u prvi mah bila indukovana finansijskim poteškoćama sa kojima su se susretale visokoškolske ustanove. Njegova primena je tokom godina bila sve masovnija, ali implementacija bi retko kad obuhvatila obrazovnu ustanovu u potpunosti. Njegov fokus je u suštini bio usmeren na povećanje produktivnosti, bez nekog većeg napora da se primeni na kvalitet nastavnog procesa, budući da su tamo očekivani najveći otpori promenama koje TQM donosi. Koncept TQM sa sobom nosi puno pozitivnih aspekata po visokoškolske ustanove uz apsolutnu i nedvosmislenu potrebu za učešćem i posvećenošću svih zaposlenih.

Treba istaći i činjenicu da obrazovne ustanove nisu ulagale veći trud u pokušaje da javno obrazlože probleme oko neuspešne implementacije TQM. Proces implementacije TQM je izuzetno skup i zahteva veliku količinu uloženog vremena i angažovanja, pa samim tim svaki njegov neuspeh je uzrokovao veliku dozu frustracije u funkcionisanju ustanova obrazovanja. Sa pravom može da se tvrdi da nijedno načelo koje zastupa TQM pristup nije u koliziji sa interesima visokog obrazovanja. Čini se da su visokoškolske ustanove u velikoj meri više zaplašene terminologijom koju koristi TQM, nego njenom suštinom. Naprotiv, potpuna i bezrezervna primena principa TQM može samo da doprinese uspehu visokoškolskog obrazovanja. Naravno, sve se svodi na rešenost da se istraje na procesu unapređenja kvaliteta na visokoškolskoj ustanovi bilo da je u pitanju TQM, ISO, EFQM, QMS, ESG ili bilo koji drugi pristup.

REFERENCE

- [1]. W. J. Miller, A Working Definition for Total Quality Management (TQM), Researchers, Journal of Quality Management. Vol. 1, No. 2 (1996) 152-157.
- [2]. R. Andersson, H. Eriksson, H. Torstensson, Similarities and Differences Between TQM, Six Sigma and Lean, The TQM Magazine, Vol. 18, No. 3 (2005) 283.
- [3]. S. E. Pariseau, J. R. McDaniel, Assessing Service Quality in Schools of Business, Journal of Quality & Reliability Management, Vol. 14, Issue 3 (1997) 204.
- [4]. A. Quinn, et al. Service Quality in Higher education, Total Quality Management, Vol. 20, No. 2 (2009) 139
- [5]. H. N. Najafabadi, S. Sadeghi, P. Habibzadeh, Total Quality Management in Higher Education Case Study: Quality in Practice at University College of Borå, (2008) 16. Preuzeto 31. 07. 2017. sa
<http://bada.hb.se/bitstream/2320/3709/1/HosseinSanazPouya.pdf>
- [6]. B. A. Winn, K. S. Cameron, ORGANIZATIONAL QUALITY: An Examination of the Malcolm Baldrige National Quality Framework. Research in Higher Education, Vol. 39, No. 5 (1998) 494.
- [7]. H. Lee, Beyond TQM, Quality in Higher Education, Vol. 1, No. 2 (1995) 125-126.
- [8]. M. J. Rosa, C. S. Sarrico, A. Amaral, Implementing Quality Management Systemy in Higher Education Institutions. Quality Assurance and Management, InTech, (2012) 131. Preuzeto 31. 07. 2017. sa
<https://cdn.intechopen.com/pdfs-wm/33265.pdf>
- [9]. R. K. Michael, W. E. Sower, J. Motwani, A Comprehensive Model for Implementing Total Quality Management in Higher Education, Benchmarking for Quality. Management & Technology, Vol. 4, No. 2 (1997) 107-109.
- [10]. K. Abdus Samad, R. Thiyagarajan, TQM in Higher Education – A Conceptual Model to Achieve Excellence in Management Education, International Journal of Management, Vol. 6, Issue 1 (2015) 627.
- [11]. A. Quinn, et al. (2009). Service Quality in Higher Education, Total Quality Management Vol. 20, No. 2 (2009) 141.
- [12]. R. R. Sims, S. J. Sims, *Toward an Understanding of Total Quality Management: Its Relevance and Contribution to Higher Education*. In Sims, R. R., Sims, S. J., (1995). *Total Quality Management in Higher Education: Is it Working? Why or Why not?*, Praeger, Westport, USA, 1995, p. 9.
- [13]. A. Bolton, A Rose by any Other Name: TQM in Higher Education, Quality Assurance in Education, Vol. 3, No. 2 (1995) 14.
- [14]. I. Rabah, Total Quality Management in Higher Education: Defenders, Opponents, and Attempts for Modifications, Global Journals Inc, Global Journal of Management and Business Research: (A) Administration and Management, Volume 15, Issue 11 (2015) 58.

- [15].R. M. Bax, An Assessment of the Quality Improvement Climate as Perceived by Community College Leadership in Iowa, Iowa State University, Ames, Ann Arbor, MI, USA, 1994, p.33-35.
- [16].R. C. Winn, R. S. Green, Applying Total Quality Management to the Educational Process, *Int. J. Engng Ed.* Vol. 14, No. 1 (1998) 25-28;
- [17].T. Kriemadis, A New Strategy for Higher Education Institutions: the Deming Management Method, 14-21. Preuzeto 30.07.2017. sa <http://ejournals.teiath.gr/index.php/DO/article/download/140/139>
- [18].A. W. Hughey, Application of the Deming Philosophy to Higher Education, *Industry & Higher Education*, Vol 14, Issue 1 (2000) 41- 44.
- [19].R. Redmond, et al. Quality in Higher Education. The Contribution of Edward Deming's Principles, *International Journal of Educational Management*, Vol. 22, No. 5 (2008) 435 – 439.
- [20].M. J., Rosa, A., Amaral, A Self-Assessment of Higher Education Institutions in Westerheijden. In D. F., Stensaker, B., Rosa, M. J., (2007). *Quality Assurance in Higher Education: Trends in Regulation, Translation and Transformation*, Springer, Dordrecht, Netherlands, 2007, p. 189-190.
- [21].M. J. Rosa, C. S. Sarrico, A. Amaral, Implementing Quality Management Systemy in Higher Education Institutions, *Quality Assurance and Management, InTech*, (2012) 142. Preuzeto 01. 08. 2017. sa <https://cdn.intechopen.com/pdfs-wm/33265.pdf>



INTEGRATED INCIDENT MANAGEMENT MODEL FOR DATA PRIVACY AND INFORMATION SECURITY

Sándor Dombora

Óbuda University Kandó Kálmán Faculty of Electrical Engineering, Hungary

Abstract: With the entry into force of the General Data Protection Regulation, organizations having activities within the European Union must pay particular attention to the protection of personal data, in addition to information security. In order to comply with strict data management requirements as required by the Regulation, data protection and information security incidents have to be treated differently in order to comply with information security and data privacy laws and standards. Most of these events are information systems incidents too. Most of the organizations have a solution to dealing with them because restoring and restarting IT systems is a business requirement. The introduction of new separate processes for data privacy causes redundancy and additional costs. This paper analyses issues related to the integrated management of information security and data privacy incidents and presents a standardized incident management process model that, in addition to effective enforcement, also supports compliance with information security and data protection legislation.

Keywords: information security, data privacy, personal data, incident, management, integrated model

1. INTRODUCTION

The goal of the organisations is to produce goods and provide services to their clients, customers and partners. During their production activities they gather, store, transform, display, handle and exchange information with 3rd party organisations. This information may consist of business and personal information. Another categorisation can be public, confidential, secret or top secret information, too.

Organisations have legal requirements regarding information security according to their field of activity and the information they handle. The legal environment consists of three types of acts: information security, data privacy and sectoral acts.

The sectoral laws may be divided into two subgroups: business related and security related. While the business-related laws imply implementation of information security measures, the sectoral information security and data privacy laws require implementation of internal rules and regulations regarding information security and data privacy.

The internal regulations required by laws, should consist of policies, procedures and regulations to enforce information security, and they should incorporate penalties for violation of data privacy and information security. These regulations together form the Information Security Management System (ISMS).

While the role of information security increases, and the related laws are continuously improved to properly protect information and personal data, more and more information security events such as data leakage are discovered and made public. Companies usually have incident management process in place for IT services, but they lack implementation of security incident management, or maybe they have them working separately without interaction between them.

An integrated incident management process is needed with participation of the IT and information security department, in order to enable quick investigation and response to service and security incidents.

2. THEORETICAL BACKGROUND

2.1. INFORMATION SECURITY AND DATA PRIVACY

Several definitions exist for information security but the most comprehensive is given by the ISO/IEC 27001 standard. Throughout this document I use that definition.

Information security: “preservation of confidentiality, integrity and availability of information; in addition, other properties such as authenticity, accountability, non-repudiation and reliability can also be involved” [8].

Confidentiality: “the property that information is not made available or disclosed to unauthorized individuals, entities, or processes” [8].

Integrity: “the property of safeguarding the accuracy and completeness of assets“ [8].

Availability: “the property of being accessible and usable upon demand by an authorized entity” [8].

The definition of personal data is best described by Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC. The regulation supersedes and need harmonization with national laws for data privacy of European Union (EU) countries [11]. The act entered in force on 25th of May 2018.

Personal data: “means any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person” [11]

Information security management system (ISMS): “That part of the overall management system, based on a business risk approach, to establish, implement, operate, monitor, review, maintain and improve information security” [8].

Goal of data privacy is protection of personal data, it focuses is on confidentiality and integrity of personal data, which is part of information security.

Before adoption of GDPR, most organisations focused on defining a right privacy statement and incorporated data privacy constraints in the contracts with 3rd parties for processing personal data. These implemented security measures fulfil only the administrative requirements of national data privacy laws, but they do not provide protection for personal data stored in information systems.

By adoption of GDPR [11] by EU, the level of penalties for data privacy breaches became so high, that organisation started to implement security measures in their information systems and developed information security and data privacy incident management.

2.2. LAWS, STANDARDS, REGULATIONS

Organisations have the option to implement security standards, but they must comply with the relevant laws. The most important information security and data privacy laws and regulations without the need for completeness:

- General Data Protection Regulation (GDPR) [11], is the comprehensive regulation of EU for data privacy;
- Federal Information Security Management Act (FISMA) [2], requires US federal agencies to implement information security program for their information systems;
- Social Security Number Privacy Act [14], lists rules for handling social security numbers;
- Children's Online Privacy Protection Act (COPPA) [1], for limiting companies in collection and disclosure of children's personal information;
- Hungarian Act L of 2013 on Electronic Security of State and Local Government Bodies [5], Hungarian act for implementing information security in public sector.

The most important and well known sectoral laws and regulations, without any completeness are the following:

- Sarbanes-Oxley Act (SOX) [12], protects investors and the public by increasing the accuracy and reliability of corporate disclosures, includes paragraphs for audit requirements;
- Gramm-Leach-Bliley Act (GLB) Act of 1999 [3], includes paragraphs for protection of consumer's financial information;
- Health Insurance Portability and Accountability Act (HIPAA) [4], has a Privacy Rule and a Security Rule;
- Identity Theft Red Flags and Address Discrepancies Under the Fair and Accurate Credit Transactions Act of 2003 - 16 CFR Part 681, [6] requires financial institutions and creditors to implement identity theft prevention program to detect, prevent and mitigate identity theft.

The implementation of standards is optional for organisations. Usually they choose to implement them to gain productivity, improve quality and/or security. In some cases implementation of a specific standard can be mandatory. The most frequently implemented standards related to information security are:

- ISO/IEC 20000-1:2011 is a service management system standard [7].
- ISO/IEC 27001:2013 is an information security management system standard;
- PCI-DSS is the Payment Card Industry Data Security Standard [10], for securing payments and protect transaction information, it is mandatory for organisations using payment card technologies;

- NIST Special Publication 800-NIST SP 800-53 Revision 4 [13], its title suggests is a set of security controls for federal information systems;
- NIST Special Publication 800-61 [15], as its title suggests is a computer security incident handling guide.

2.3. INCIDENT MANAGEMENT

2.3.1. What are incidents

In general, incidents are events which negatively influence the operation or business of an organisation. More specifically we can define the different types of incidents. The following types of incidents may affect information security or cause personal data breaches.

IT service incident: unexpected event which causes loss of service or a degradation in quality of a service [9]. Some organisation call the simply IT incidents.

Information security incident: “a single or a series of unwanted or unexpected information security events that have a significant probability of compromising business operations and threatening information security” [8 p.2]. “a single or a series of unwanted or unexpected information security events that have a significant probability of compromising business operations and threatening information security” [16 p.40]. For example: unauthorized access to confidential information, data corruption or unauthorized modification, inaccessibility of information.

Data privacy incident: personal data breach.

Personal data breach: “means a breach of security leading to the accidental or unlawful destruction, loss, alteration, unauthorised disclosure of, or access to, personal data transmitted, stored or otherwise processed” [11 p. 34.]. This means that any unauthorized access, leakage, misuse, theft, unauthorised disclosure of personal data exhausts the notion of personal data breach.

Security incident: unwanted or unexpected security events that have a significant probability of compromising business operations and threatening physical security. This means: unauthorized access, intrusion, flooding, theft or destruction of valuables and documents, or simply failed security measures.

2.3.2. Relationship between types of incidents

Personal data is a special type of information. This means, that any personal data breach is security incident too. Starting from this viewpoint we can define the relationship between different types of incident.

As shown on Figure 1. we have the following relations between incident types:

- **security incident:**
 - if information systems are affected, then it is an IT service incident too;
 - if information (electronic data or document) is affected, then it is an information security incident too;
 - if documents or information containing personal data is affected then it is a data privacy incident too;

- **IT service incident:**
 - in most cases affects information so it is an information security incident too;
 - IT service incident can be caused by security incident
- **information security incident:**
 - if it affects confidentiality or integrity of any personal data then it is a data privacy incident too;
 - if it affects information systems, then it is an IT service incident too;
- **data privacy incident:**
 - because personal data is (a kind of an?) information, it is an information security incident too;
 - the data privacy incident can be caused by security incident.

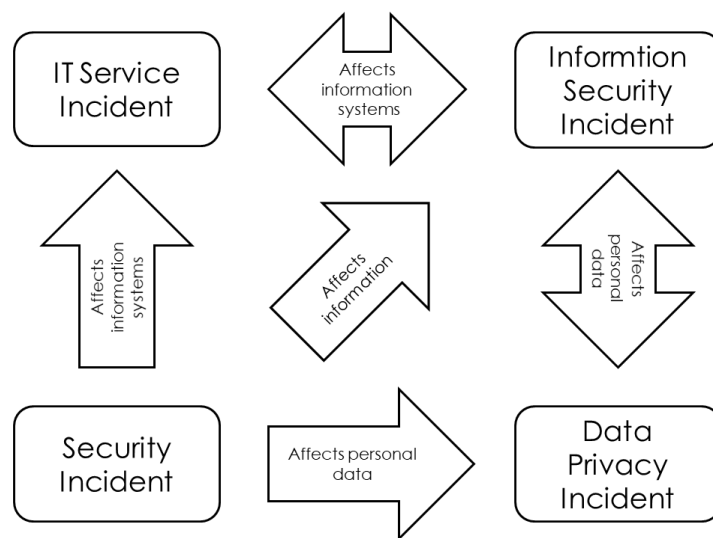


Figure 1. Relationships between incident types (own editing)

2.3.3. Goal of incident management

We consider the following goals for incident management, regarding the incident types:

- **IT service incident:** detecting, investigating, restoring the affected information systems as quickly as possible, restarting workflows, minimizing loss;
- **information security incident:** detecting, investigating causes, preventing further information security incidents, minimizing damage, protecting information;
- **data privacy incident:** detecting, investigating causes, prevent further data privacy breaches and if necessary, apply penalties, report to authorities;
- **Security incident:** detecting, assessing damage, preventing further security events, minimizing damage, apply penalties.

However, the main goal of incident management is the quick detection, investigation, handling and response to different types of incidents. Depending on the incident types the

incident management processes have their own goal, and they need to implement different types of actions. This means that the incident management processes are similar, but there are some tasks which are different. Because the incidents detected might have two or more types, there is an interdependency between the handling processes too. They need to get/the information and have to preserve evidences for each other.

3. INTEGRATED MANAGEMENT OF INCIDENTS

3.1. NEEDS FOR INTEGRATED INCIDENT MANAGEMENT

Organisations usually have implemented IT service incident management, but they lack information security incident management, or have it implemented independently from IT service incident management. Some organisations may have security departments too, with security incident management rules with or without formal regulation.

The GDPR entered in force on 25th of May 2018 requires handling and reporting personal data breaches.

Most of the information security and data privacy acts and standards require handling of the information security incidents or data privacy breaches. On the other hand, organisations use information systems, which may fail, so they should be able to handle IT incidents, too. These leads to the need for optimization of incident management in the organisations.

Regarding the big number of acts, standards and the relationship between incident types, it is straightforward to implement an integrated solution. This integration should be based on coordinated incident management, which saves time, money and restarts IT services quickly. On the other hand, this integration should facilitate discovery of information security incidents and data privacy breaches as soon as possible, because the incident response teams share information with each other.

However, there are good incident management models, most organisations use parallel workflows for handling the different types of incidents.

There is a need for collaboration between incident response teams of the different type of incidents, in order to comply with laws. They should interact at least the following topics:

- registration and investigation of incidents;
- notification and alert the corresponding department if the investigated incident may have more than one type;
- collection, preservation and transfer of evidences;
- common event management: logging, analysing and correlating events;
- information sharing:
 - regular vulnerability test execution of IT and security systems;
 - automated monitoring of IT and security systems;
 - automated bug reporting;
- deciding which response team has the priority, in order to comply with laws and ensure proper level of information security.

3.2. THE RECOMMENDED INTEGRATED INCIDENT MANAGEMENT MODEL

The standard Special Publication 800-61 developed by NIST with title Computer Security Incident Handling Guide focuses on information security in IT systems. It defines Information Impact Categories (None, Privacy Breach, Proprietary Breach, Integrity Loss) and Recoverability (Regular, Supplemented, Extended, Not Recoverable) [15] for incidents. It also addresses the Incident Response Coordination [15]. The basic idea is very similar to the approach, that is presented in this paper, however does not address the incidents related to information stored in paper-based documents, which is important because several organisations use paper-based documentation under their operation/of their activities.

The incident management process in ITIL focuses on IT service incidents, it addresses information security, but its main goal to restart the IT service as soon as possible [9].

Both approaches provide a good basis for the integrated incident management model, as they address the whole process, beginning with detection and analysis of incidents through resolution and closure with follow-up activities.

The recommended incident management process model, enhances the above-mentioned models with handling all types of incidents, not only computer security incidents.

The model shown in Figure 2. uses sources of information: information and security system monitoring, through IT event management and human reporting (employees, partners, customers) of incidents.

The information is recorded in a central service desk tool, and the the lifecycle of the incidents is coordinated by the Service Desk team. In the first interaction with new incidents the Service Desk gathers information, executes a preliminary diagnosis, sets the severity of incidents, classifies them by marking with the following flags: information confidentiality, integrity, availability, personal data, information system, security. By marking with these flags, the incident is forwarded to all affected incident response teams, who can investigate and recover from the incident.

The incident response teams are aware of involvement of the other incident response teams and have to interact in order to preserve the necessary evidences and handle the incident. The coordination is done by the Service Desk, who gathers and integrates the partial results from the incident response teams.

Depending on the severity of the incident, a Crisis Board consisting of managers of the participating incident response teams and the Chief Information Security Officer (CISO) as head is convened. The CISO based on the members' point of view decides the activities needed to recover from the incident and in case of personal data breach submit an incident report to authorities if it is needed.

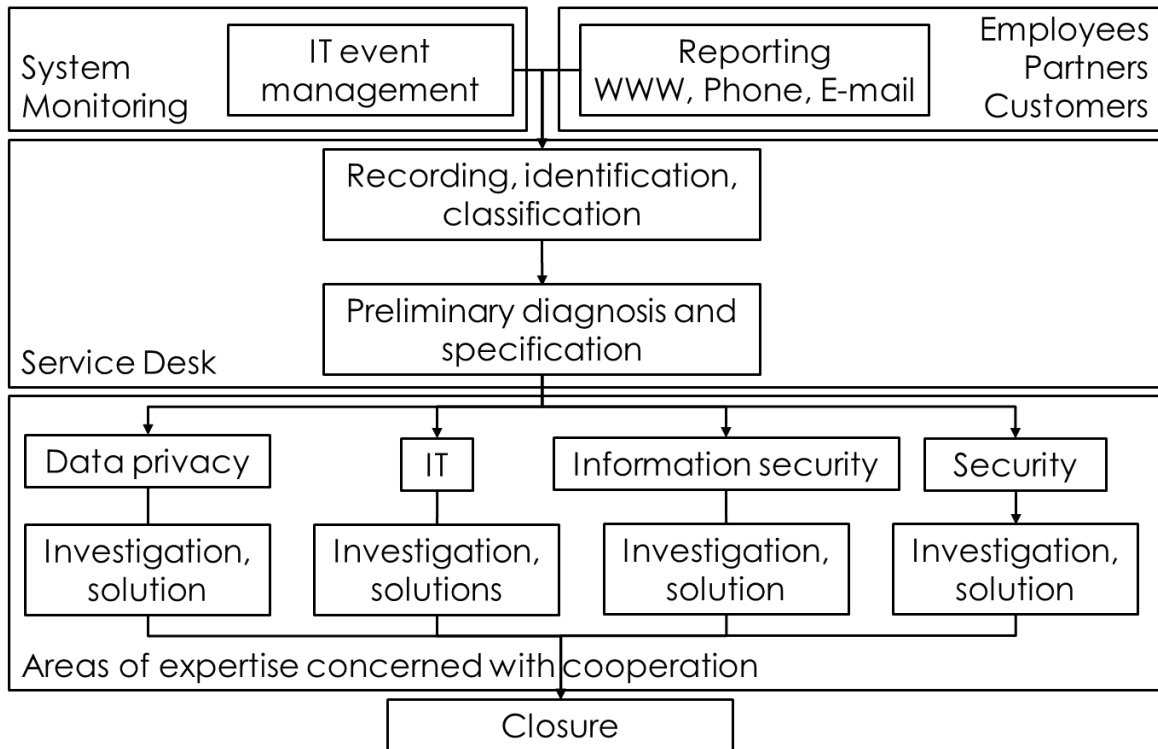


Figure 2. Recommended incident management model

To comply with the local and global legal environment, organisations should incorporate activities into the incident management model to fulfil the constraints of related laws and regulations.

After closing the incident, depending on its severity a “lessons learned” follow-up activity is executed by the participating incident response teams, to draw and document the conclusions, for later use.

4. CASE STUDIES

4.1 SUCCESSFUL IMPLEMENTATION OF INTEGRATED INCIDENT MANAGEMENT AT A PUBLISHING HOUSE

The goal of the project was Information Security Management System implementation, to comply with the legal environment.

Circumstances: The publishing house provided services for several organisations. They had ITIL based incident management running on two levels, the first level was provided for clients, and a second level for internal users. They used a common Service Desk software with separated workflows and resources.

Tasks completed: A new ISMS with new regulations and processes was developed and integrated with the already implemented ITIL based IT processes. The development of IT systems was separated from the IT operations. A new integrated incident management process was developed and implemented.

Challenges: the small number of employees made impossible to assign different owners to the developed processes. This implied integration of roles, which had to be separated in groups which does not cause security issues.

Results: Integrated IT service and information security incident management process, which uses a common workflow, and plan for automated incident detection and prevention tools, which reduces the number of incidents by forecasting them. Compliance with laws.

Conclusions: By integrating information security incident management with IT service incident management, identification of security incidents became easier, and they can handle it together with the IT service incidents, without significant resource increase.

4.2. SUCCESSFUL IMPLEMENTATION OF INTEGRATED INCIDENT MANAGEMENT AT A SERVICE PROVIDER

Because the organisation handles and stores personal information related to its business, it is subject of GDPR. A project was initiated to implement GDPR compliance in the organisation.

Circumstances: The Service Provider has several branch offices and handles confidential information related to its activities. To support its business activities the company implemented two service desks, independent from each other, one for customers and one for branch offices. To support the daily operations and ensure security, other two incident management processes were developed without supporting tools, which were handled by the Operations and Security departments. In case of incidents employees had to decide which team to contact, although in most cases more than one team was affected.

Completed tasks related to incident management: During the project the organisation had to implement personal data breach response processes, which was slightly different from all other incident management processes already implemented in the organisation. During the analysis of the legal environment and the already implemented incident management processes, it became clear that all incident management processes have similar workflows with different activities in resolution phase and the new process have to interact with them. Finally, an integrated incident management process model was developed and implemented.

Challenges: It was clear that an integrated incident management process should be implemented which has a single point of contact and common workflow, but the departments managing the different workflows insisted to keep their old solutions. After the integrated model was presented, they realised the advantages, and accepted the solution.

Results: Optimised incident management process was implemented, which works with less service desk operators and better resolution times, uses less service desk software licence and has central reporting of activities. Employees in branch offices do not need to know which incident whom they should report.

Conclusions: The integrated incident management process performs much better, uses less resources, the cooperation between the incident response teams improved.

5. SUMMARY

Regardless of the type of organisation, reporting incidents becomes easier. Most of the security incidents originated from IT systems are detected, which increases the security level of the organisation. By cooperation between incident response teams, more evidences are saved and the resolution time of incidents decreases. Using one single service desk, results in

better resource usage and better cooperation between departments. The integration of incident management workflows results in better discovery of security and data privacy incidents.

REFERENCES

1. Children's Online Privacy Protection Act (COPPA) of 2010
2. Federal Information Security Management Act (FISMA) of 2002, Public Law 107-347.
3. Gramm-Leach-Bliley Act (GLB) of 1999, Public Law 106-102
4. Health Insurance Portability and Accountability Act (HIPAA), of 1996, PUBLIC LAW 104-191
5. Hungarian Act L of 2013 on Electronic Security of State and Local Government Bodies
6. Identity Theft Red Flags and Address Discrepancies Under the Fair and Accurate Credit Transactions Act of 2003 - 16 CFR Part 681
7. ISO/IEC 20000-1:2011, Information technology - Service management - Part 1: Service management system requirements
8. ISO/IEC 27001:2005, Information technology Security techniques - Information security management systems – Requirements
9. ITIL Service Operation, The Stationery Office, (2011)
10. Payment Card Industry (PCI) Data Security Standard v3.1 Requirements and Security Assessment Procedures, PCI SCC Standard PCI DSS v3.1, (2015)
11. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016
12. Sarbanes-Oxley Act (SOX) of 2002, Public Law 107-204
13. Security and Privacy Controls for Federal Information Systems and Organisations, NIST SP 800-53 Rev. 4., (2013)
14. Social Security Number Protection Act of 2011
15. P. Cichonski, T. Millar, T. Grance, K. Scarfone., Computer Security Incident Handling Guide, NIST SP 800-61 Rev. 2., (2012)
16. The OpenGroup, FAIR – ISO/IEC 27005 Cookbook, Reding, (2010)



COMPARATIVE ANALYZIS OF HRM IN PUBLIC ADMINISTRATION

Jadranka Denkova, Jovan Ananiev, Strasko Stojanovski

Faculty of law Goce Delcev University, Stip, Macedonia

Abstract: The public sector should be focused on satisfying the needs of the citizens on efficient, transparent and responsible way. The civil society and the private sector should develop awareness and responsibility towards the public duties. The usage of the model on good governance represents the new characteristics of the values: beneficiary treatment, openness and transparency, the rule of law for greater efficiency in the public sector. The main direction in the process of reforms in the public administration is creation of professional, depoliticized, effective, efficient and citizen oriented public administration in accordance with parliamentary democracy and responsibility. The principle of the rule of law and, accordingly, working according to by the law implies avoiding administrative behavior and procedures, but still providing room for more flexible type of goals oriented management and elevated level of individual and institutional responsibility. The level of effectiveness in public administration of the loop of responsibility – if it is closed or not. In that context, this study will examine the thesis which states that the management of human resources in the public sector can be accomplished with clear and precise rules and procedures so that it can create realistic basis for effective and responsible public administration. The research focus human resources management functions such as: planning and analysis of the needs of the human resources in the public sector, the employment procedure, the employment introduction as well as evaluation and motivation of the employees. In this perspective, there is inclusion of the procedures for the in-service trainings of the state employees, the criteria for the kinds of training and nomination for the participants of the training, feedback for the completion of the training, evidence and the utilization of the trained employees. The results of the study are build on empirical research with the use of qualitative method (interview). The analysis of research findings also includes exceptions since

Keywords: HRM, public sector, public administration, efficiency, effectiveness

1. INTRODUCTION

Human resources management involves a meaningful analysis of human resource needs, recruitment, selection and choosing the best candidates that respond to the needs of the organization. Human resource managers is committed to integrate the candidates into the organization by providing a system of appropriate remuneration and career development, ongoing training and advancement of knowledge, assessment, control and ensuring adequate protection. Hence, the subject of this research paper is to understand the significance, applicability and legal positioning of the human resources management in the public sector in the Republic of Macedonia. The research also addresses analysis of Human Resource Management in the public sector in the European countries. The overall goal of this research

paper is to compare the approach of the human resource management in the Republic of Macedonia compared to the European countries through an analysis of research. The methodology of the research is based on analysis of legal and sublegal documents, relevant research results, as well as interviews received from civil servants (managerial and administrative civil servants) in the public sector in the Republic of Macedonia. Considering the importance of the public administration in one country, the need for continuous improvement and promotion is imposed as inevitable. Therefore, the weaknesses in the process of human resources management in the Republic of Macedonia need to be addressed through examples of the approach of the human resource management in the European countries in order for greater effectiveness in its functioning.

2. COMPARED ANALYSIS OF HUMAN RESOURCE MANAGEMENT IN THE EUROPEAN COUNTRIES AND REPUBLIC OF MACEDONIA

Western European countries have long ago recognized that human resource management standards are decisive for the success of the organization. Improving public administration performance means seeking for better standards for the efficiency and effectiveness of the public administration. For the implementation of these standards, public managers are key driving forces, with a role directly transferred from the public authorities. Moreover, when the adoption of a national policy becomes more complex and more exposed to international coordination, as is the case with all EU Member States, the need for top managers becomes more visible, with perspective and ability to coordinate their work with national and international institutions. It is important to point out that European countries pay considerable attention to the training of the civil servants that are of great importance for their professional and career development. In the Republic of Macedonia, the Laws provide only general guidance on the trainings. No specific guidelines can be found to standardize the significance of the trainings. Therefore, administrative officials are referred to trainings without appropriate criteria, and after the completion of the training, the results of the training are neither recorded or stored.¹⁵

The mobility of public servants within the member states of the European Union is represented as a rule whereby each country has different employment conditions, and if the person applying for the job meets the special conditions will be employed. In the Republic of Macedonia, the new Law of Administrative Civil Servants equaled the titles of all employees in the public and state sector, which enabled mobility in the civil service and possibility for transfer from state to public authority and vice versa.¹⁶ In the previous Law on Civil Servants, the status of civil servants had only employees in the ministries.

In European countries, the role of public sector managers is largely driven by administrative officials. However, the possibility of engaging outside professionals in the human resource management field is not excluded.

¹⁵ In this context, one of the respondents says: "There is no certain criteria and procedures for the realization and selection of people that need to be trained. I believe that time is required to pass for the procedures to be established since the civil servants are still hungry for training and this is the first year that funds are planned in the budget of the institutions of the program K2. However, with the budget rebalance these funds are less and remain less available to train employees. "

¹⁶Mobility procedures are carried out in a transparent and fair procedure for deployment, ie undertaking an employee's position at the same level other institution in accordance with the Law on Public Sector Employees would.

In the Republic of Macedonia there are categories of titles in the administration, and the role of managers is performed by those with the highest administrative titles, heads of departments, secretaries, advisers, state secretaries and ministers.

The reforms of the state administration in the countries of Central and Eastern Europe were aimed at establishing a profession of public management in the state administration. It requires action in several areas, namely: training managers; familiarization with the regulations that define the obligations, responsibilities and appropriate rights of the staff, special regulations of the administration; improving personal management and managerial standards, above all these, establishing an administrative context in which authorities will be able to manage their responsibilities in a professional, impartial, transparent and controlled way.

The state administration reforms in the countries of Central and Eastern Europe were aimed at establishing a public management profession in the state administration. The procedure requires action in several areas: training managers; familiarization with the regulations that define the obligations, responsibilities and appropriate rights of the staff, special regulations of the administration; improving the personal management and managerial standards and above all of these, establishing an administrative context in which civil servants will be able to manage their responsibilities in a professional, impartial, transparent and controlled way.

One problem, inherited from the previous administrative structures in the countries of Central and Eastern Europe, is the lack of coordination and unique standards for managing the public administration. These shortcomings must be overcome, and staff management must be coordinated within the public administration itself, to ensure that an acceptable level of interoperable administrative law and public administration standards has been achieved and maintained. In order to achieve this the different approaches to organizing the state administration must be taken into account.

Human resource management in the public administration is accomplished through the establishment of special authorities in charge of it. As a result, in some European countries a Ministry of Public and State Administration has been established, while in other, public administration management has been assigned to specific ministries that have their own departments (finance, internal affairs, etc.), and within these competencies they have been granted the function of public administration management. In other systems, agencies for managing with central and local government are established. In the Republic of Macedonia there is a Ministry of Public Administration that regulates the affairs for human resource management in the public administration.

Strategies for human resource management in public sector have been conducted in accordance with governmental strategies that they require. This means that the strategy for human resource management in the public sector is not independent and it should consider several different factors and perspectives at national and local level.

However, for some countries the method of human resource management in the public sector is not defined. In other countries, the strategy of human resources management is not time-limited and isn't in the form of a written document, but there are written procedures and rules pertaining to the human resource management strategy. In the Republic of Macedonia, the human resource management strategy is adopted by the Ministry of Information Society and Administration, where each state authority is obliged to adopt strategic plans in the organization that incorporate the human resource management strategy into its composition.

Human resource strategies in European countries can be seen as priority issues for unifying the status of employees, as well as promoting mobility in the EU institutions and its

member states, as well as the advancement of the career system. In the Republic of Macedonia, the new Law on Administrative civil servants introduced novelties in the field of human resources management, in the procedure of employment, civil servant titles, the mentoring, assessment, as well as the procedure for determining responsibility.

Human resource management strategies can be in line with certain national strategies at a more "conceptual" level. However, at the local level, these strategies are not automatically developed. There is a necessity for building a strategy appropriate to the local needs that will be implemented effectively sharing the overall vision and strategy of the Government.

The process of human resource management is accomplished more effectively if decentralization of competence is implemented and if local authorities implement this function independently.

3. HUMAN RESOURCE MANAGEMENT IN THE REPUBLIC OF MACEDONIA

Through the presentation of the results in this research paper, one can see how the human resources management in the public sector is accomplished, while at the same time looking at the advantages and disadvantages.

The conclusion of my research paper is that all the respondents believe that the function of human resource management is established organizational part of the state organs and the realization of this function deviates from the human resource management laws and regulations. In the state departments or human resource sectors there are formal organizational units, which means they are not fully staffed due to lack of appropriate professional staff.

According to the laws and sublaws in the employment of civil servants, besides determining the need for the employment of staff, announcement of the job position, the interview process and the selection of the right candidate, there have been additional criteria added with the new Law on Administrative officers. These changes are due to the deficiencies in the previous laws and they allow for the relevant candidates to be selected, with appropriate knowledge and experience which is a commitment of the all European countries in the civil servants employment at central and local level.¹⁷

Also a novelty in the Law is the preparation of the questions, the expertise and the competence of the questions, as well as the scope of the material which provides a quality choice. In particular, the transparency of the procedure, which involves compulsory electronic publishing of the results, as well as digital recording of the procedure during the duration of the exam at the Agency for Administration, should be emphasized.

A novelty in the Law of Administrative Civil servants is also the introduction of the psychological test which was emphasized as a necessary condition for efficient selection of the candidates. The need for such a test was pointed out on the interview I conducted with the civil servants in the administration.

The new Law of Administrative Civil Servants made a clear distinction about the required experience in the profession, which was not the case with the previous Law, and it was detected as a negativity. The new Law of Administrative Civil Servants gives priority to all those who have experience as administrative civil servants in relation to those who have inadequate work experience.

³ The selection procedure for employment consists of four stages: administrative selection, an exam for an administrative officer, a verification of credibility, an interview and a test of personality.

The possibility of employing administrative workers through the system of jobs leaves room for entry of unskilled workers into the civil service.

The law provides an easy opportunity if an announcement for a job is announced, immediately after the completion of the procedure, for the employee to be assigned to another job.¹⁸ Therefore, in the public administration it occurs frequently for a employee who was admitted for one job covering one area, immediately after the employment, or after a very short period of time, to assigned to a job in another area, regardless of the fact that during the employment was evaluated according to other criterias.

Motivating civil servants depends on the knowledge and abilities of the responsible staff in the selection. The state administration authorities have no procedure or any motivational criteria.

Some of the respondents, holders of managerial positions, stated that they strive to motivate employees by: overtime work permit on vacant days when the worker has an urgent need, involvement in work tasks that are important for the department, giving the opportunity to declare their needs for retraining etc.

However, the motivation in the state body as a an important factor for effective and efficient civil servants is a category that is not addressed in the Law of Civil Servants, and in state bodies it is not mentioned as a category that requires a special approach in the function of effective and responsible working activity.

4. CONCLUSION

The recruitment of qualified staff and the management of their career development will enable the achievement of the public institutions goals and strategy. In all European countries, there is a slogan that if public works are carried out by competent and expert people, the goals of the organization will be realized.

The EU Member States have a different approach in the process of human resource management, while a complete picture of how this process is being implemented at central and local level is still lacking. The European administration understands the role of human resource management and the human resources strategy is integrated and coordinated with all government plans and policies.

An important issues essential for human resource management, is understanding and analysis of all dimensions of human resources such as: the organization, the people, the processes, and the systems. The Human Resources Management Strategy should include all of the stated dimensions. That implies a rational approach to the human resources development with full management support and a strong link between human resources and government policies. This means favoring of a) the mobility of civil servants as a significant part of human resource strategies followed by increasing the flexibility of civil servants, b) improving the quality of work and c) development of leadership.

Employment is important, since other human resources policies are largely dependent on the efficiency of this process. One of the challenges human resources management is identifying, motivating and retaining the talents.

⁴ In this context, the proposition: "Young people are not burdened only to find a job and to be employed" is not true since it is not a big challenge for the young to work in the public administration. Otherwise, those who are employed are quite ambitious and have high expectations in their entirety. They have an intolerance that is more difficult to channel, and they expect immediate development of results in their career development. Those who work least have major interventions by foreign political parties and ministers, and ambitions to immediately get to managerial positions.

Selection procedures are part of a formalized recruitment process where official exams have little linkages to specific jobs. In this system, the civil servants are usually selected at the start of their career and remain in the public service as professionals. These systems have limited access to civil servants in the middle of their careers. Some of the operational human resource management projects are: training, continuous learning, employment projects, personal motivation, development research, analysis of administrative problems in human resource management, and human resources management through information technology projects. Other projects relate to the development of new payment systems, performance related career advancement, programs for flexible payment system, etc.

Within the framework of the research, the respondents concluded that the human resources management function is an organizational part of the state authority, and for the purpose of achieving its goals, trained staff as well as a completed normative setup is essential.

The results indicate an establishment of procedures for planning and analysis of the required staff, announcement of job positions, selection and recruitment of the appropriate staff. In this context, there has been a direction for amending the Laws and bylaws that regulate human resources issues in the state sector.

Regarding the monitoring of the work and the motivation of the employees in the public sector, computer software need to be included as an indicator of measurable data. In this way, it will be possible for the public sector to reward and punish the employees. This method will produce motivated and accountable civil servants.

In particular, clear indicators should be established when making questionnaires and interviews, based on precise indicators that will allow for impartial scoring. It is compulsory for the employment commission to be composed of experts who will correspond to the necessary expertise and qualifications required in the job position announcement.

In the legal and sublegal acts, there should be precise statements that will influence the motivation of the civil servants. The civil servants need to be motivated from every aspect through the basic salary component accompanied by other benefits. From this aspect, the law should focus in particular on in-depth analysis of motivation.

Regarding the trainings, the state authorities do not perceive the training as an indispensable need for each state organ. Therefore, the state authorities need to pay special attention to why the trainings represent the most important segment in the establishment of effective and efficient employees.

In other words, it is recommended that the organizational unit of the human resource management to experience a complete transformation in the state authorities. This means that the laws and the responsible authorities should begin to seriously deal with the administrative workers. Therefore, if administrative employees are employed according to clear legal rules, if they progress in their careers according to equal criteria, if the department is in accordance with written procedures, and the trainings are an element that affects the motivation and strengthening the capacities of the state administration, we will have motivated, effective and responsible state administration that will produce good results and satisfaction from the citizens.

In order for the quality of the public sector employees to be improved, public authorities should ensure creation of an opportunity for a competition, a progressive policy for human resources management and opportunities for promotion and career development of public sector employees. Research data from European countries show that 80% encountered a problem of providing qualified staff of information technology and lawyers. This problem concerns not only the public sector but also the private sector, because it is difficult for

employees with such qualifications to be found. Therefore, the public sector and companies are trying to develop career management programs through which they can provide high-performance personnel offered on the labor market.

The most common type of government organizations are a mix between a centralized and decentralized management structure, and human resource management is shared among the central government, the decentralized local government departments and public institutions. Therefore, the competence and responsibility for human resource management is shared, depending on the type of organization.

The central authorities have a strategic role in human resources management, and they outline the strategies and the directions of the human resource management. For example, they play an important role in determining civil servants systems for providing the service and determining the public spending.

Human Resources Policies and Guidelines are developed and controlled by central authorities. These human resources policies mainly relate to the processes of recruitment, assessment, training and career management. In addition to its strategic role, central authorities are involved in managing the processes, remuneration, pensions, and in the management of senior civil servants.

REFERENCES

1. Richard D. Bingam, Viljam M. Boyen, Miti Olajon Candler, Teril Lin Kornvel, Gek P. De Sario, Pol R. Domel, Kenet L. Ender, Kler L. Felbinger, Edvard V. Hil, Sanda, Kayfman, V. Denis, Kiting, Lorens F. Keler, Norman Krumolc, etc. Management of local government - public administration practice, Project of the Government of Republic of Macedonia (2009), Skopje.;
2. Илија Тодоровски, Лидија Петковска-Христова, Анета Јовевеска, Весна Стојанова, Мирјана Сланинка Динева, Јорде Јакимовски, Наташа Габер, Маријана Ханциска, Аница Драговиќ Функционирање на системот на локалната самоуправа во РМ, ISPP(2004) Скопје;
3. Сотир Костов, Нов јавен менаџмент во општините, Центар за квалитет Скопје. (2005);
4. Илија Тодоровски, Развојот и карактеристиките на локалната самоуправа во Англија, САД и Југославија, НИО Студентски збор (1991). Скопје;
5. Steven Ott, Alvert C. Hyde, Jay M. Shafritz Public management, (1990) Chicago USA;
7. Husmans J.H. The effectiveness of the cognitive style constraint in implementing operations research proposal, Management Science. (1970);
8. Жан Валин Административно право, Проект на Владата на РМ, (2010) Скопје;
9. Danielle Bossaert. Christoph Demmke, Koen Nomden, Robert Polet Civil services in the Europe of Fifteen - Trends and New development European Institut for public administration. (2002);
10. Мирјана Петровиќ Организационо понашање, (2003) Економски факултет Белград;
11. Прирачник за децентрализација за претставници на граѓански организации за мониторинг на процесот за спроведување на децентрализација во Република

- Македонија / [автори Јане Вртески, Наташа Илијева-Ацевска, Георги Христов]. - Скопје : Фондација отворено општество - Македонија, 2013. - 160 стр. : илустр. ; 24 см Фусоти кон текстот. - Библиографија: стр. 160. - Содржи и: Анекс 1-3ISBN 978-608-218-174-5;
12. Breyer Stewart, Sunstein Richard B. Stewart, Cass R. Sunstein, *Administrative Law Regulatory Policy*, Asjen Law Business, United State (2006);
 13. Jay M Shafritz, Albert C. Hyde, Sandra J. Parkes, *Classics of Public Administration*, Wadsworth, United State (2003);
 14. Harry Wore, Carry S. Miller, W. Fred Wegener, Larry S. Miller, *Effective Police Supervision*, Nexis Matthew Bender, United State (2003);
 15. Michael C., Le May, *Public Administration-Clashing Values in the administration in public policy*, Wadsworth, United State (2005);
 16. Lian M. Berman, James. Lonathan Pwest, *Human Resource management in Public Service-Paradoxes, Processes and Problem*, Sage publication, United State (2000);
 17. M. Petkovic, *Organizational behavior*, Faculty of Economy, Belgrade, (2003);
 18. Harry Wore, Carry S. Miller, W. Fred Wegener, Larry S. Miller, *Effective Police Supervision*, Nexis Matthew Bender, United State (2003);
 19. Печијарески, Љ., *Избрани проблеми од менаџмент и развој човечки ресурси*, Економски факултет - Прилеп, (2007);
 20. Матис, Ј. Роберт, Џексон Џ. Џон, *Управување со човечки ресурси*, Превод на дванаесетото издание, (2009);
 21. Gareth R. Jones. Jenifer M. George, *Современ менаџмент*, Проект на Влада на РМ за прведување на 500 научни и стручни книги и учебници, Скопје (2008);
 22. Wiersma Wiliam, *Researcx Metxod in Education*, (Allsin and Backon), (2000);
 23. Danielle Bossaert. Christoph Demmke, Koen Nomden, Robert Polet *Civil services in the Europe of Fifteen - Trends and New development* European Institut for public administration, (2002);
 24. *The Liaison Office as a Tool for Successful NGO-Government Cooperation: An Overview of the Central and Eastern European and Baltic Countries' Experiences*, by Maria Gerasimova, (2006);
 25. „Global Civil Society: An Overview“, Lester M. Salamon, the John Hopkins Comparative Nonprofit Sector Project, (2003);
 26. Danielle Bossaert & Christoph Demmke, *Main Challenges in the Field of Ethics and Integrity in the EU Member States*, (2000);



DEFINING SIGNIFICANCE OF NETWORK INTELLIGENCE ELEMENTS FOR DECISION MAKING SUCCESS

Savo Stupar, Elvir Šahić, Mirha Bičo Ćar

*University of Sarajevo, School of Economics and Business, Sarajevo, Bosnia and
Herzegovina*

Abstract: Network intelligence is a significant aspect, that is, a significant component of the overall human intelligence, which refers to the ability to navigate in a networked society, based on all types of relationships and relations that are expressed in digital form in contemporary society. In this context, we can consider the concept of network intelligence as a framework in which it is possible to understand and solve many business problems in a different way, and to explore it in more detail as an important tool for making better business decisions. The aim of this paper is to investigate to what extent certain elements (components), which are an integral part of network intelligence, influence the success of a business decision in the managerial decision-making process. For the purposes of this research, due to the inability to comprehensively measure the notion of "success of a business decision", under this concept we will only imply an integral element of that term, that is, the functionality of the decision. The research methodology is the application of an inductive method of constructing an expert system, that is, a knowledge based system (Doctus Knowledge Based System Shell) or a conclusion on the degree of informativeness (decisive influence on decision functionality) of individual components of network intelligence based on individual cases of specific business decisions (Case Based Reasoning). This work is an attempt to, with the help of the inductive module shell of the Expert System Doctus, come up with new knowledge which will outline, from the set of components of the network intelligence, those that significantly influence (which are the components with a higher degree of informativity) on the success of business decision, and that in the future research more attention is paid to the impact of these components on decision making quality, which in addition to quality will contribute to the simplicity and speed of making a concrete business decision.

Keywords: Network Intelligence, Managerial Decision Making, Expert Systems, Quality of Business Decision, Doctus

1. INTRODUCTION

„Everything touches everything“
Jorge Louis Borges

Fifteen year old Canadian teenager [1, 10-15] under pseudonym MafiaBoy, on the 7th of February 2000, managed to obstruct business of billion dollar companies, that were employing the best experts for IT network security, using his home PC. Even with relatively

limited IT knowledge he managed to access vulnerable computers on few universities and small firms. After that, using those computers, he started sending commands for „bombing“ Yahoo with messages and that way he took down, at that time, their leading web sites for e-commerce.,

The massive spreading of Christianity, many people contribute to historic figure known as Isus of Nazareth. However, the truth is a little different. Christianity, actually owes it's success to one true and devout Jew who never met Isus. His name is Šaul (Jewish name), better known as Pavle. In order to spread Christianity further than Jewish community, he knew that he needs to spread message with huge intensity. Because he knew (first hand) social network of modern society of first century from Rome to Jerusalem, he used his knowledge to reach as much people as possible and convert them. He walked 15 000 kilometers, not randomly, but with the aim to reach all big communities of that time and to approach all the right people at the right places. That way he insured that religion „release roots“ and spread. First and the most successful traveling salesman of Christianity skillfully used technology and social media knowledge.

Although there are huge differences between MafiaBoy and Paul, both of them had something in common: both of them were experts in networks, even dough they didn't percieve them as such. The key of their success was use of already existing network that was used as a medium for their successfull operation (successful from their moral asumptions). MafiaBoy used world's computer network – Internet, which is the most efficient way to reach big number of people nowadays, Paul at the other hand was master of social and religious networks in first century, which were the most efficient way to spread religion at those times.

Surely none og them were not aware what was their main assistent. But today we know that answer is in structure and topology of networks which they used for their operations and their ability to manage them well.

Both of the succeeded because they were conected. Our mutual connection can be viewed in many areas such as: our biological existence, our social world , economy and religious traditions.

Networks are everywhere. Internet is network of computers, brain is network of nerve cells (neurons), and people cummunicate through the use of relations of networks such as family, friends or colleagues.

Detailed Internet maps (computer netwoeks) came to discovery that internet is vounerable to hacker attacks. Maps of firms connected in trade and ownership (networks of traders and owners) are folowing traces of money and power in Silicon valey. Maps of interactions (networks of relationships) between biological species in ecosystems, shows destrucitve effect of humanity on enviroment. Maps of interactions of genes (networks of genes) cooperating in cells, bring new discoveries about cancer activities. When we take a look on all those maps together, we can see that there is a lot of things in comon. Same as different people have almost identical skeleton, using that analogy all of the mentioned maps were created on the same background.

From all mentioned, as well as from list of recent discoveries, we can conclude that incredibly simple and universal laws of nature manage structure and development of all complex networks tthat surround us.

Today we have a belief that nothing is isolated, but the most of events and acourances are connected, wether it was connected or not (synchronistic) with huge number of other parts of the most complex system – universe. It has a consequence, comprehension that the world is smal, and that inside it everything is connected with everything. In almost all sciences, scientists are coming up with the conclusions that complexity has realy strong arhitecture, and

in order to understand it, it is required to know as much as possible about networks. Even though only few people understand that network science, latest discoveries in that field, give much more complex and exciting meaning to the term network. More complex than that term represents in everyday use. These discoveries represent new aspect of view on connected world around us and as such, in future, they will be enforcer of new mysteries that form our view on the world. That's why today, when new and exciting discoveries (above all from network science) brought revolution in biology and medical sciences, it is clear that if we want to understand life, and then even cure a disease, we need to use network thinking.

Network component of intelligence or network thinking can be defined as network view on nature, society and business, which represents new thought framework in which we can understand many problems. Knowledge or discoveries about how networks occur, how they look and develop, as well as core of network component intelligence represents one new aspect of view on all kinds of problem and occurrences, which brings a new way of contribution to their solving and interpreting.

1. 1. SIXS STEPS TO (AWAY FROM) ANYBODY

“In order to show that in today's world humans are closer to each other than ever before, one member of the group suggested a test. He made a bet: give me a name of one person, anybody from one and a half billion of citizens of the Earth, and he will find a connection between him and that person using maximum five acquaintance, out of which he will know one of them personally” says Karinty [1, 34] in “Láncszemek” (the story of Chains).

And really in the end, Karinty character from the story manages to connect one Nobel prize winner with himself, explaining that Nobel prize winner had to meet with Swedish king Gustavo, who traditionally gives Nobel prizes and who plays tennis regularly, also from time to time he plays with one tennis champion which happens to be good friend of Karinty. So, first step is connection (friendship) between Karinty and tennis champion, second step connection (playing tennis) between tennis champion and king Gustavo and finally third step that need to be realized in the end (between Karinty and Nobel prize winner) is again connection (friendship) between king Gustavo and Nobel prize winner.

How to get to Bill Gates? In the beginning it seems impossible, but in the core really simple, using six step rule. One of the authors of this article has friend Adnan Kreso, who is at the same time old friend (both of them were young officials in ex Jugoslavlja) with Goran Radman, ex head manager of Microsoft for southeast Europe, who still maintains private and business contacts with Bill Gates.

Karinty's findings that all people on the planet are connected over maximum five links (steps), was published in 1929 and today is well known as „Six degree separation“.

This idea [1, 34-38], again in 1967 was rehabilitated by Stanley Milgram, professor from Harvard, through the studies about our mutual connection with each other. Aim was to find solution for something known as „small world problem“ [2, 32] and answer the question how the humans are connected, and find a number of links (steps or acquaintance) between any two men in USA, who are randomly picked. Do we belong to separated worlds which coexist together but independently, so they are connections between any two individuals, anywhere in the world, rare and reserved? Or are we all connected into one big intertwined network? Experiment started as he picked two persons, wife of one post graduate from Sharon in state

Massachusetts, and one stock market broker in Boston. As starting point for research he picked Wichita in state Kansas and Omaha in Nebraska. In the beginning it wasn't clear at all how many links will be required to connect people from such distant areas. When Miligram in 1969 asked one intelligent man what does he think how many steps will be required to connect them, he responded at least hundred links will be required to connect somebody from Nebraska and Sharon.

Miligram started experiment by sending letters randomly selected citizens of Wichita and Omaha, where he asked them for cooperation on research project social contacts in American society. In letters he shortly explained their purpose of research, after that photograph, name and surname, address and other relevant information about one of picked subjects, as well as some instructions, out of which two are basic ones: If you know this person send him this letter directly. Do it only if you are close to the point of addressing each other with a name.

If you don't know that person that well, don't try reaching him directly. In that case send this letter (together with post cards and its whole content) to some of your acquaintance who you assume might know person we are trying to reach. You can send letter directly to cousin, friend or acquaintance only if you know them personally.

If you lived in Omaha and for example had cousin in area near Boston, you can send letter to him no matter if he doesn't know him personally, because there is bigger probability that he will be able to reach intermediate in two, three, or four steps. Miligram's intention was to analyze list of people who had a letter in the process after letter is delivered to targeted person.

Out of 160 letters what were sent to citizens of Wichita and Omaha, 42 arrived to the final destination. Smallest number of links in experiment was two and the highest was ten. Analysis of 42 letters with completed chains enabled Miligram to determine number of people required for letter to get to its destination. Result was that average number of links was 5,5 – what is incredibly small number, and at the same time close to Karinthyjev's number. If that number is rounded to 6 we get famous „Six degree separation“.

The whole idea of six degree separation from anybody to anybody else on planet, gives us a clue that through society, no matter the size of it, we can move, using social links from one to another person. Those social links are part of six (nowdays seven) billion links, and in order to connect any two links from that network, on average participation of six other links is needed.

For complete connection it is required little more than one social link on each person (link). Since we all have much more connections, that connection grows and we become aware of the fact that we are living in the world in which we are only few handshakes away from each other. In other words, we live in a small world, and the world is small because society became such a dense network.

1.2. CREATING AND MAINTAINING CONNECTIONS IN SOCIAL MEDIAS

People with ability of cherishing valuable relationships [3, 198-202] on social networks:

- Maintain and cherish really wide informal networks
- Seeking mutual beneficial (sinergetic) relationships
- Build personal contacts and maintain them

- Making friendship with associates and maintain that friendship

Jeffrey Katzenberg is a person who was constantly forming new relationships and acquaintances. Three associates with telephone headphones, almost like represent his antennas, while searching network of people in film industry in search for his next business acquaintance and non stop calling people in order to arrange meetings and then return calls with confirmation or change of arranged meeting time or even announcing Katzenberg's calls. All of that in order for him not to be on phone constantly in all of his free moments and be able to reach hundreds of people with who he is maintaining contacts.

Katzenberg one of the three founders of hollywood company Dreamworks SKG has networking skills with no equal. Motive for his constant and long phone calls is mostly simple intention to keep in touch with people, and not to directly „do business“. Thanks to his everyday communication he prepares those relationships, maintains them to be fresh, and when business opportunity arises, he can call any of them without any holding back, give an offer or close the deal.

Similar to other sectors, in movie and TV industry especially, personal connections can be a key factor for closing the deals, because all of the projects (movies, TV series, interactive CD ROM) are short term projects directed towards one goal, and have limited time span. For them it is important to make instant-organisation, pseudo-family that has directors, producers, actors and staff on „set“, which all part ways when project is finished, but like that they make soft network of potential players in new projects for which actual projects help them to form new acquaintances and friends. Katzenberg maintains network with all of them (and not only them) in order to be able to communicate with them easier when there is need for new projects.

Talent like that for connecting is concentrator characteristic, „star“ in almost all kinds of jobs. For example in studies about extraordinary workers in areas of engineering, IT, biotech and other areas of „works with knowledge“ it is shown that forming and maintaining networks is key to success [3, 198]. Even in areas like technology, networks are made or old way face to face or by phone, and email.

However, the thing that is key for one relationship to translate into business link is not spatial distance (even though it can be helping factor) but *psychological*. People who we agree with, who we trust, who we find nice are often the best contacts in our networks.

Networks of exceptional experts are not coincidence. Every link in them (expert) is there with a reason and chosen to be there because of some special expertise or quality. Those networks constantly translate and exchange expertise and information in sophisticated way. Every member, if he is chosen to be member (link) of the network, at that moment represents ready expansion of knowledge or expertise („our little external storage“), available only one call away.

People who create network and work inside of it, have huge time advantage over those who have to use wider, more complex sources of information in order to find solutions. One estimation says that „star“ inside the network in one hour can find answer to the problem that requires three to five hours for average person to find. [3, 199].

Networking is secret for success in many cases, when people spend small part of their experience in one organization, and more in short term relationships of strong intensity.

The film and television industry is a good example for this. However, some predict that this model will be typical for many areas in the future. In such fluid reality, in which virtual organizations are formed to perform the project, and then disbanded when the project is completed, the secret of success is not what you worked for, but who you worked with and

who you are still in contact with. So, of the priceless importance for future work, are the connections that are established during the work on the project.

The Silicon Valley can be seen as a successful example of comparative existence and interweaving more complex networks: networks of people, network of projects and network of capital. The existence of such a system of connections can result in great wealth, and its absence can have severe consequences, especially in difficult times.

That the quantity and quality of personal relationships (direct acquaintances and friendships, and indirect ones - again through one or more friends and acquaintances) is a very important factor both in business and in all other areas of life (employment, quality of treatment, advancement in hierarchy, war conditions, solving housing problems, staying abroad, etc.) has numerous examples.

Therefore, these networks of personal contacts represent significant personal capital. Good work on a larger or a smaller scale depends on the workings of other people's networks. One manager said: "Although it may seem like it depends on me doing my job, in fact, besides my subordinates, there are hundreds of people whom I can not directly manage, but they can affect the effectiveness of my work. At least twenty such people are actually crucial "[3, 200].

Many authors, this type of personal capital call social capital. "Social capital refers to resources available in and through personal and business networks. These resources include information, ideas, tips, business opportunities, financial capital, power and influence, emotional support, even benevolence, trust and co-operation. "[6, 1]. "If you want to go south, head north. This old proverb of Zen-Buddhism is valid for social capital. If we are trying to build social capital effectively, we will not succeed "[6, 22]. "If anyone is a member of an association just to" mingle ", people will immediately blast his false façade. But if you become a member of the association you believe in, with a mission that you are enthusiastically advocating, you will establish new relationships as a natural by-product of their involvement in the work of this association. Socially owned capital is a by-product, sometimes very willful and aware by-product of search for meaningful activities. " [6, 22].

Danah Zohar and Ian Marshall speak of this in the same way, calling them spiritual capital [7, 49]: "Spiritual capital, in itself, is not a fortune in money, but it proves the possibility of making profits (perhaps even greater profits) through the business that takes place in a wider context of meaning and value. It can create a profit that at the same time rests on the use of the wealth of the human spirit and increases that wealth and total human well-being. "

2. RESEARCH

2.1. RESEARCH OBJECTIVES

Main objective of this research, like it is mentioned in introduction, is to estimate level of significance of some components of network integration (NQ) for success business decisions. In this work 16 components of network intelligence are analysed what doesn't mean that it is finite number. Usefulness of research results is viewed in reduction of components of network integration, important for success of decision, to much smaller number. That is important because it enables us to focus undividable attention on them. To focus on components which are ranked the best on the list of informativeness, significance in process of making functional decision.

2.2. RESEARCH METHODOLOGY

The methodology used in this research uses the Expert System (ES), created by an inductive shell-building method (tools for building expert and knowledge-based systems), Doctus Knowledge Based Shell, or Case Based Reasoning Case Based Caseing. The basic elements of the applied research methodology are:

- A suitable sample of respondents that we personally know. These are managers in the construction industry, mechanical engineering, IT managers, financial managers, etc.
- Sample size: 61 decisions (in practice, 30 cases proved to be sufficient for the stability of research results through this method)
- Method of re-targeting the research goal:
- development of an expert system knowledge base • calculation of the significance of individual attributes (components NQ)
- Creating Case Based graphs
- extracting the most informative attributes into a new knowledge base (Knowledge Management -> Extract Rules)

An inductive approach to the design of a prototype expert system is used to realize research objectives in a way that, based on a considerable number of cases in practice, it tries to prove which of the components of the network intelligence are crucial for the success of a business decision.


In this example, the goal of creating a knowledge base is primarily to discover new knowledge (based on known cases / decisions from the practice) of the decision-makers in the business decision-making process. This new knowledge should "measure via soft methods" the importance of individual components of network intelligence managers for the success of a business decision, in order to improve the future decision-making process based on the results obtained.

For the purposes of this paper, it is necessary to note that the future prototype of the expert system should analyze 61 (already adopted and realized) manager's decision in relation to the 16 decision criteria, ie the components of network intelligence, and to "submit" the most informative criterion in relation to the functionality of the decision , which represents only one, but a very important element of the success of the decision.

For each decision, the manager should answer what its functionality was, or whether the *problem was solved* or not resolved, whether the *problem was solved only partially* by passing and implementing this decision, and whether it has completely fulfilled expectations or was *more than expected* by its realization.

Defining attributes is a first step towards building ES. On tab with attributes it is necessary to list all attributes (Criteria for decision making), their values (Value of Attributes) and outcomes (Decision attributes), which are required for defining functionality changing processes (As elements of success) of managerial decision during process of decision making. First we write name and value of attribute that includes decision about estimation of functionality of managerial decision. The name of that attribute is **Functionality of decision**. While inputting we should pay attention to order of these values. Because we should input lower desirable values, first value is *problem not solved*, and after that all other values until value *more than expected*. To define any attribute that we enter along with its values as the source attribute, we will use the Edit / Set to Decision Attribute command. After that we enter the remaining attributes with their values.

Case entry and case based graph creation are the following activities on the construction of the ES. All known cases or decisions already taken that are already known to

have been functional (*satisfying expectations* or *more than expected*) or not (*problem not solved* or *partially solved*) are entered. Entering cases is done by entering a case name by entering the value of the attribute (decision attribute) for each of the entered cases (dependent variable) or decisions. Based on the examples presented, it is possible to implement the rules for the conclusion, ie to make the decision about the most informative attribute in the managerial decision-making process. Generating the Case Based graph is triggered by pressing the button  (Case Based Graph command), after which a dialog box appears in which the Branching method options are entered.

The informative coefficient logically shows to what extent (degree) the attribute is crucial for the exact decision making, and is mathematically equal to the entropy of the attribute calculated on the basis of the frequency of the occurrence of individual values in the reported cases. An overview of calculated information coefficients can be started by selecting the desired attribute on the graph, and activating the *View -> Information command*.

By adding new cases to the Knowledge Base on the Cases tab, the decision tree will adjust or adapt to change the informativeness of individual attributes.

Generating rules is done using the Knowledge Management -> Extract Rules command after the results are obtained by the Case Based Reasoning procedure (case-based reasoning). This way, in the new knowledge base, the most informative attributes are distinguished, that is, they generate new rules.

Knowledge base that is generated this way can later be used as a knowledge base for the new expert system. When we collect information about new decisions and enter them into the Cases tab, it is necessary to enter the values of the attributes contained in the new decisions, and by running the Reason command (deductive reasoning) it is possible to evaluate the functionality of each of the decisions made.

2.3. PLAN AND REALIZATION OF THE RESEARCH

The goal of the survey was to find out what decision makers think about the decision-making process from the aspect of the criteria offered (the criteria or aspects of decision making are in the questionnaire (Table 1) on the left in the 1st column that is shaded), of the 16 criteria in their opinion was the most important most relevant) for the success or failure of a particular business decision. If the decision that is made solves the problem (satisfies expectations) or is more than expected, it can be conditionally stated that this is a successful decision. If the problem was not resolved, or if it was necessary to carry out additional analyzes in order to make decision, it can be said that this is an unsuccessful decision, and after answering the following 16 questions, we look for the reason why this decision is unsuccessful, or which one of the 16 offered attributes (criteria) decision are the most relevant or most informative about its failure.

Due to the complexity of the notion of the success of the decision, it was necessary to reduce the number of elements from which the success of the decision consists. Here, under the success (quality) of the decision, we will assume the functionality of the decision, which represents only one, but very important element of the quality of the managerial decision. Namely, the decision must make the company effective (efficient). If a decision does not result in company efficiency, then this is not a good decision. In the short term, the company is effective if its short-term activities are functional. And the decision is functional if it meets the immediate needs for which it is made. Whenever we make a decision, we solve a problem and we have a goal in front of us and we want to achieve something. As we read a book, we

expect something from it [4, 34-35]. If the book does not meet our expectations, we can freely say that we "threw" money and time spent on it. If we assume that every decision is made to function and produce some expected results, then under the functionality of the decision, imply one of the essential elements of the quality of the decision. By choosing one of the 4 responses from the table, the respondent will define the conditionally stated success of the decision.

The first attribute is a dependent variable and we call it the original attribute, and the other 16 attributes represent independent variables or decision criteria.

Out of the total of 90 managers, 34 of them responded to our call and filled out a total of 61 questionnaires (for each decision one questionnaire).

Table 1. Questionnaire (Decision making criteria for the decision functionality)

Name	Value 1	Value 2	Value 3	Value 4
Functionality of the decision	= Problem not solved	Partial solved problem	Meets the expectations	More than expected
Ability of managing in web community	= Unable to manage	Not managing well enough	Managing well	Excellent managing
IT/communication literacy	= None	Poor	Good	Excellent
Basic IT literacy	= None	Poor	Good	Excellent
Tendency of accepting innovations in E-communications	= Doesn't have that tendency	To a lesser degree	To a higher degree	Accepts all innovations
Preference to virtual contacts	= None	Sometimes	Often	Adores virtual contacts
The value of creating informal networks	= Doesn't know nor create them	Knows but doesn't create them	Knows and creates them	New Value
Networking with people	= Not at all	Sometimes	Often	Almost regularly
Cherishing networks of people	= Doesn't do it	Only some of them	Cherishes more of them	Cherishes all of them
Maintaining networks of people	= Doesn't do it	Only some of them	Maintains more of them	Maintains all of them
Establishing mutually beneficial relationships	= Doesn't do it	Sometimes	Does it mostly	Almost always
Personal connections (knowing people)	= None	A little	A lot	New Value
Establishing acquaintances	= Not at all	Establishes few acquaintances	Establishes lots of acquaintances	New Value
Maintaining acquaintances	= Not at all	Only some of them	Almost all of them	New Value
Friendship with associates/co-workers	= Not friend with co-workers	Limited friendships	Often establishes friendships	New Value
Building friendships	= Doesn't do it	From time to time	Often	New Value
Maintaining friendships	= Doesn't do it	Only some of them	Almost all of them	New Value

3. RESEARCH RESULTS

As stated in the previous chapter, for the purpose of proving the main hypothesis, we created an expert system with the help of DoctuS shell, whose appearance of the Attributes tab is in fact a questionnaire of 17 questions, that are answered by 34 managers and they filled in 61 questionnaires. All questions were related to a specific decision. Out of 17 questions, one question (decision attribute) was related to the level of functionality of a specific decision already made, and the remaining 16 questions were treated as independent variables. Since managers have already brought and implemented these decisions, it is logical that they knew their outcome. In this case, as already mentioned, it was the **Functionality of the decision**. The aim of the research was to find out more about the decision making process from the aspect of the importance of the components of the network intelligence that were needed, that is, that were used in the making of any concrete decision.

After entering 61 questionnaires into the Cases case database, in order to obtain the most informative attributes for the decision functionality, we launched the Knowledge Management -> Inductive Reasoning (Case Based Reasoning)

The most informative attribute for the success (functionality) of the decision, according to this research, is the **Tendency to accept the innovations in E-communication**. When the value of this attribute, as an independent variable does not have this tendency, the value of the dependent variable functionality of the decision (Fo) in this case satisfies the expectations. If the **Tendency of accepting innovations in E-communications** has a value to a smaller extent, the next crucial attribute is Maintenance of networks of people, so depending on the value of this attribute, when it maintains only some networks, **Functionality of the decision (Fo)** has the same value that meets expectations, and when this value is maintained

by several networks of people, the dependent attribute **Functionality of decision (Fo)** has a value more than expected, which is a logical and expected result of the survey. If the value of an independent variable is **the acceptance of inovations in E_communication**, as the most informative attribute (decisive in relation to the dependent attribute **Functionality of decision or Fo**) accepts all the inovations, the corresponding value of **Fo** is the same as in the previous case more than expected. And finally, if the value of the attribute **The tendency to accept inovations in E_communication** is present to a greater extent, (4th value of that attribute), a new crucial (the most sinusoidal or most informative) attribute appears, which is the **Tendency towards the virtual contacts**, so if the value of this attribute is sometimes, the new most informative attribute is the **Ability to manage well in E_community**, and if its value is often, then the next most informative attribute is **Creating Networks of people**. When the **Ability to manage well in E_community** is not well enough, the **functionality of the decision** is more than expected, and when that value is manages well, then the next crucial attribute is **Creating networks of people**, so if the value of this attribute is creates occasionally and creates regularly, **Fo satisfies the expectations**, and if this value is creates often, **Fo meets expectations** and more than expected. If the **Ability to manage well in E_community** is manages well, then **Fo meets expectations**. When a manager has a **Tendency for a virtual contact** and the **creation of networks of people** works (creates sometimes), the **Functionality of the decision** meets expectations, and in the case that **Creating networks of people** works or creates often, a new crucial attribute is created. **Establishing mutually beneficial relationships**, and if the manager does it sometimes (establishes sometimes), the **Fo** value will be problem solved partially. If it works to a greater extent (establishes to a greater extent), the **Fo** value will be problem solved partially and satisfy the expectations.

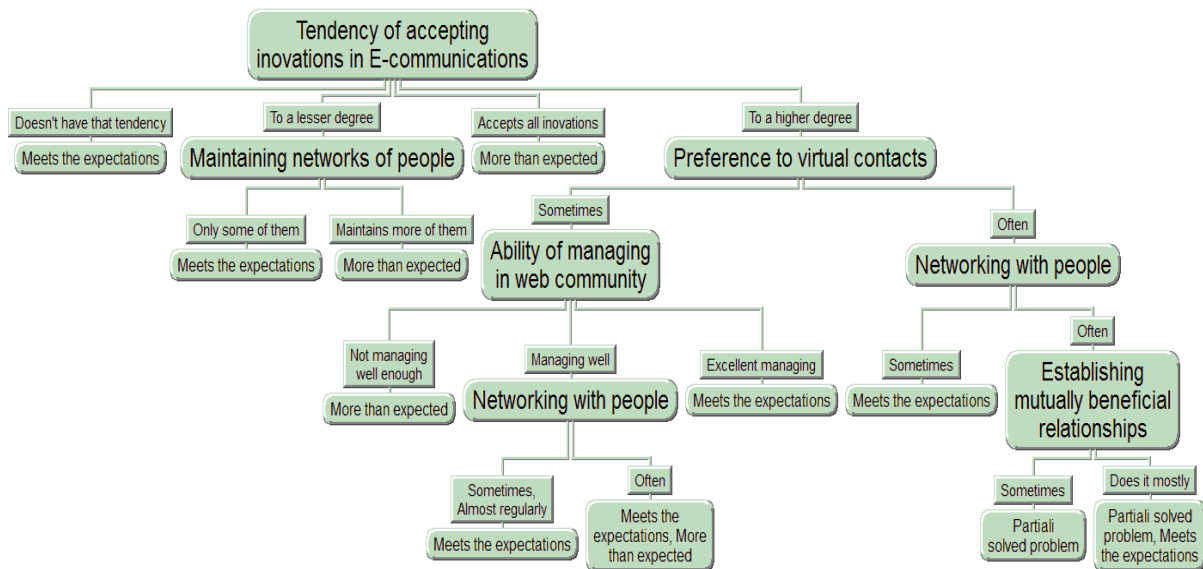


Figure 1. Case Based Graph

Table 2. Table of significance (informativeness) of decision attributes

Attribute	informativity	Density
Tendency of accepting innovations in E-communications	0.1361	4.57
Networking with people	0.1026	3.44
Basic IT literacy	0.0973	3.26
Preference to virtual contacts	0.0831	2.79
IT/communication literacy	0.0818	2.74
Ability of managing in web community	0.0762	2.56
Establishing mutually beneficial relationships	0.0698	2.34
The value of creating informal networks	0.0605	2.03
Cherishing networks of people	0.0438	1.47
Maintaining networks of people	0.0399	1.34
Maintaining friendships	0.0178	0.60
Establishing acquaintances	0.0075	0.25
Personal connections (knowing people)	0.0046	0.15
Building friendships	0.0032	0.11
Maintaining acquaintances	0.0026	0.09
Friendship with associates/co-workers	0.0013	0.05

Lets take a look at order of informativeness (significance) of components of network intelligence in relation to sucess and functionality of some decision:

Using orders *Knowledge Management -> Extract Rules*. it is possible to isolate the most informative atributes (the ones that appear in Case Based Graph) in newly created ES with significantly reduced number od atributes (6 most important in ratio with total number of 16 atributes). When some manager wants to check if some of his decisions will result with functionality of decision more than expected, meet the expectations or if the problem that the decision is being made about be partialy solved or the decision will be completely unfunctional.In that case it is required to input values of the most informarive atributes into the tab Cases, and running the command Reason (deductive reasoning) in order to get answer. It is not neccessary to input all 16 atributes but only the values of 6 most informarive atributes, which makes process of decision making much simpler. „Process of reduction of number of rules is called reduction, what is basicly third kind of conlusin after deduction and induction. It is achieved by being able to to make same decisions using values with less atributes“.

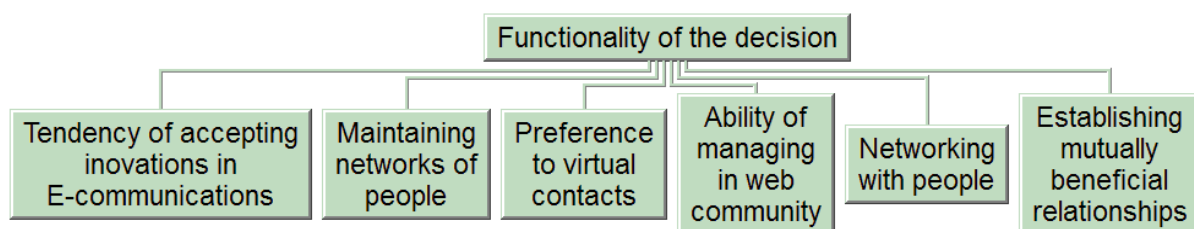


Figure 2. Case Based Rule Graph

4. CONCLUSION

Idea that network intelligence represents ability of using social connections, acquaintances, contacts on computer social media to help obtaining some private aims, gave inspiration for research on topic of functional dependence of success of some managerial decision and components that make network integration.

First place on the list of informativeness (significance) of attributes, or components of network intelligence belongs to component *Tendency of accepting innovations in E-communication* with coefficient of informativeness 0,1361. On second place there is *Creating people networks* with coefficient of informativeness of 0,1026, third place is *General computer literacy*, and fourth place *Tendency towards virtual contacts* etc.

One more results of this research, that is not any less significant than general ones, is related to the fact that inductive approach of building expert system, reduces number of attributes necessary for success of decision making, discovers new knowledge, that was silent (tacit) up to that point, and by generating new expert system in which it will be integrated, becomes explicit.

REFERENCES

1. Barabasi, L., In the network - why everything is connected and how to think online in business science and everyday life, Naklada Jasenski and Turk, Zagreb, 2006.
2. Gladwell, M., A turning point - how small things can lead to a big change, Naklada Jasenski and Turk, Zagreb, 2005.
3. Goleman, D., , Emotional intelligence in business, Mozaik knjiga, Zagreb, 2000.
4. Adizes, I., Managing Change - The Power of Mutual Respect and Trust in Private and Family Life, Work and Society, Adizes, Novi Sad, 2005.
5. Barackskai, Z., Dörfler, V., Velencei, J. Reductive Reasoning. Montenegrin Journal of Economics, 1 (1), (2005), 59-66.
6. Baker, W., Social Capital to Success - How to extract hidden resources from your personal and business networks, Zagreb School of Economics and Management, Zagreb, 2003.
7. Zohar, D, Marshall, I., Spiritual Capital - Wealth for a Sustainable Future, HESPERIAedu, Beograd, 2008.



MEASUREMENT OF THE QUALITY OF BANKING SERVICES IN MONTENEGRO BY APPLYING THE SERVQUAL MODEL

Milica Raičević¹, Dijana Medenica Mitrović²

¹Faculty of Business Studies “Montenegro Business School”, Mediterranean University, Podgorica; ²Faculty for Business Management, Bar, Montenegro

Abstract: The quality-based strategies should be at the core of the application of the marketing management concept in the banking sector. The aim of this paper is the theoretical and practical analysis of the quality of banking services, and the satisfaction of their users. In particular, the emphasis is on the importance of the service process, whose improvement strengthens the reliability dimension. High quality services that meet and exceed the needs and expectations of clients in the banking sector are the basis for building the competitive advantage and development of long-term relationships with clients. The research part of the paper defines and analyses the relationship between the quality of service and the satisfaction of consumers of banking services in Montenegro. The study measures and analyses the quality level of banking services, by applying the gap theory using the SERVQUAL model. Thus, information is provided that can be useful to banks to improve their offer, enhance the quality of banking services and create an appropriate marketing strategy for users of banking services in Montenegro, which would improve the quality of the banking services in this country.

Keywords: quality of services, customer satisfaction, banking sector, marketing strategies, SERVQUAL

1. UVOD

Na finansijskom tržištu usljed mnogobrojnih promjena, da bi obezbijedile konkurentsku poziciju, banke moraju da definišu strategiju rasta koja će u sebi sadržati povećanje kvaliteta bankarske usluge. Banke kvalitet usluga vezuju za promotivne aktivnosti, cijene i definisanje novih distributivnih kanala, dok klijent misli o kvalitetu usluge ne stvara samo na osnovu izvršene usluge već i na osnovu slike koju stvara prije, tokom i nakon korišćenja bankarske usluge. Ukoliko banka želi da maksimizira prihod i profit, kroz zadržavanje starih i privlačenje novih klijenta, treba da obezbijedi superiornu uslugu, koja će biti poboljšana kroz sve segmente korišćenja iste. Predmet ovog rada je analiza kvaliteta bankarske usluge i davanje preporuka na koji način unaprijediti kvalitet bankarske usluge. U radu je dat teorijski prikaz kroz definisanje i značaj kvaliteta usluga u bankarstvu, data je analiza elemenata kojima se definiše kvalitet usluga i izvršeno je istraživanje primjenom SERVQUAL modela u bankarskom sektoru Crne Gore. Primjenom SERVQUAL modela data je analiza bankarskih usluga i preporuke za poboljšanje istih na obostrano zadovoljstvo – banaka u konkurentskoj prednosti, a klijenta u pogledu kvaliteta usluga.

2. DEFINISANJE I ZNAČAJ KVALITETA USLUGA U BANKARSTVU

Snažna konkurencija na finansijskom tržištu među učesnicima rezultira pojavu novih strategija poslovanja koje će akterima osigurati konkurentsku prednost. Banke se svakodnevno suočavaju sa tržišnim promjenama, koje su posljedica ekonomskih i finansijskih promjena, pa moraju da obezbijede takve usluge koje će im obezbijediti konkurentsku prednost, odnosno koje će im obezbijediti zadržavanje postojećih i privlačenje novih klijenata. Iako kvalitet usluge nije jedini činilac koji određuje odluku klijenta da koristi neku bankarsku uslugu, ipak ima veoma važnu ulogu, posebno na tržištima manje razvijenih zemalja, i presudno utiče na opstanak i razvoj poslovanja, o čemu govori više studija [1, 2, 3]. Što se tiče crnogorskog bankarstva, evidentno je da banke svoju raznolikost bankarskih usluga kreiraju kroz inovativne promotivne aktivnosti, raznolikosti cijene bankarskih usluga i kreiranja širokog spektra proizvoda i usluga. Međutim, samo ove aktivnosti na promjenljivom bankarskom tržištu, nijesu dovoljne da bi u dugom roku obezbijedile bankama konkurentsku prednost, maksimizaciju prihoda i profita, kao i zadržavanje starih i privlačenje novih klijenata. Brojna istraživanja su pokazala da je potrebno dosta napora i znanja za pružanje kvalitetne usluge u izrazito promjenljivom poslovnom okruženju u kom posluju banke [4, 5, 6, 7, 8]. Moderno bankarstvo se fokusira na klijenta usluga i na kvalitet bankarskog proizvoda i usluge, zato je sada zadatak banaka da kreiraju strategiju koja će klijentu pružiti uslugu i proizvod visokog kvaliteta i koja će zadovoljiti i nadmašiti očekivanja klijenata [9]. Zadovoljstvo korisnika usluga u velikoj mjeri utiče na rezultate poslovanja, imidž uslužne organizacije i dobijanje novih korisnika kroz neposrednu preporuku [10]. Studija koja je sprovedena u SAD je pokazala da unapređenje kvaliteta usluga može da poveća prinose u banci [11]. Da bi se obezbijedio visoki kvalitet bankarske usluge i proizvoda treba kontinuirano isti da se provjerava i da se precizno definiše.

Kvalitet usluge treba da ima tri dimenzije [12]: tehnički kvalitet gotove usluge, funkcionalni kvalitet gotove usluge i korporativni kvalitet, a kvalitet se može posmatrati sa raznih stanovišta [13] same banke kao uslužne organizacije: kao imanent; kroz sredstva uložena u pruženu uslugu; kao kvalitet mjeren prema svakom klijentu; kao kvalitet na temelju ponude i kao kvalitet koji podrazumijeva razmjenu vrijednosti između uslužne organizacije i korisnika usluga [9].

Rečenim, nameću se nedostaci ovih stanovišta koji se zasnivaju na tome da se samo posmatraju kvalitet usluge i proizvoda, ali ne i klijent i šta je za njega kvalitetna usluga kojoj će se vraćati. Klijentovi stavovi po pitanju bankarske usluge i proizvoda se daleko razlikuju od stavova same banke i one se odnose na: vrijeme pružanja usluge, pravovremenost, potpunost, ljubaznost, konzistentnost, dopustivost i pogodnost, tačnost, odziv, numeričku tačnost, urednost [14].

Može se zaključiti da ono što klijent bankarskih proizvoda i usluga očekuje od banke i ono što banka pruža se razlikuje. Klijent formira svoje mišljenje o kvalitetu na osnovu iskustva i komunikacije sa bankom tj. zaposlenog u banci, dok banka kvalitet posmatra kroz rješavanje finansijskih problema njenih klijenata i privlači klijente kroz promotivne aktivnosti. Iza promotivnih aktivnosti nekad ne stoji i kvalitet, pa ono što banka treba da uradi je da kreira superiornu bankarsku uslugu i proizvod čiji će kvalitet biti potvrđen u direktnom kontaktu klijent – zaposlenik banke (bankarski službenik).

3. ANALIZA GLAVNIH DIMENZIJA I ODREDNICA KVALITETA USLUGA U BANKARSTVU

Kada se proces pružanja bankarskih proizvoda i usluga posmatra sa stanovišta klijenata razmatra se šta pružena usluga donosi klijentu i kako se usluga isporučuje klijentu. Na kraju je rezultat pružene usluge koji se vidi nakon korišćenja iste. Drugim riječima, klijent banake se ne interesuje samo za ono što usluga pruža, već i za način kako se usluga pruža.

Prema Parasuraman i saradnicima [15] klijenti ocjenjuju bankarsku uslugu u direktnom kontaktu sa bankom tj. zaposlenim u banci i to kroz pet osnovnih odrednica kvaliteta: opipljivost, pouzdanost, odgovornost, sigurnost i empatija. Takođe, ove odrednice kvaliteta su ujedno i elementi SERVQUAL modela, koji je najčešće korišćeni alat za mjerenje kvaliteta usluga. Ovaj model je zasnovan na algoritmu “opažanja minus očekivanja”. Model osnovne odrednice kvaliteta mjeri tj. uparuje sa ukupno 22 ili 21 atributa, (u našoj analizi je korišćena 21 tvrdnja), tako što klijent banke, bankarsku uslugu ocjenjuje kroz zadovoljstvo kvalitetom, putem odgovarajućeg stepena saglasnosti sa datom tvrdnjom. Na taj način ispitanici iskazuju svoje stavove po pitanju očekivanja i po pitanju doživljenih performansi primljene bankarske usluge, pa je moguće utvrditi postojanje jaza između doživljenih i očekivanih performansi bankarskih usluga. Bez obzira na svoju popularnost i široku primjenu, SERVQUAL model je predmet kako teorijskih, tako i operativnih kritika [16, 17], pa su činjenici pokušaju njenog unapređenja i otklanjanja nedostataka.

Opipljivost kao karakteristika bankarske usluge se odnosi na fizički izgled objekta u kome se pruža usluga (uredjenje ekspozitura, filijala itd.); pouzdanost se odnosi na sposobnost osoblja banke da uslugu pruži tačno, precizno i u skladu sa potrebama klijenta (adekvatna prezentacija bankarskih izvoda i materijala klijentu); odziv se reflektuje kroz pomoć klijentu banke u pružanju brze i blagovremene usluge; sigurnost se ogleda kroz znanje, stručnost i prduzetljivost osoblja banke sa kojim klijent dolazi u kontakt i posvećenost kao odrednica kvaliteta usluge kroz sposobnost osoblja da uspostavi i održi komunikaciju na relaciji zaposlenik banke - klijent na pravi način, da klijentu posveti pažnju i da razumije njegovu potrebu [18]. Rezultat usluge se vrednuje posle korišćenja usluge i on se naziva kvalitetom uslužnog rezultata, a neki autori ga nazivaju i tehnički, odnosno fizički kvalitet [19].

Nameće se zaključak da kvalitet usluge prvenstveno zavisi od osoblja banke, odnosno njegovog odnosa prema klijentu, pa samim tim pri kreiranju strategije kojom će se definisati superiorna usluga treba voditi računa da se poboljša učinak osoblja. Možemo reći da se strategija formiranja kvalitetnijih usluga, koja predstavlja preduslov za maksimizaciju prihoda i profita i zadržavanje i privlačenje novih klijenta, zasniva na zadovoljnom osoblju. Takva strategija rezultira ukupno gledano kvalitetnijom uslugom, a to dalje rezultira zadovoljnim klijentom koji se vraća. Jedino na takav način banka može ostvarivati održivu i dobru konkurentsku poziciju na finansijskom tržištu.

4. MJERENJE KVALITETA BANKARSKIH USLUGA U CRNOJ GORI SERVQUAL METODOM

4.1. METODOLOGIJA ISTRAŽIVANJA

Predmet sprovedenog istraživanja je da se utvrdi koliko su korisnici bankarskih usluga u Crnoj Gori zadovoljni kvalitetom istih,, kao i da li banke prepoznaju značaj ulaganja u

znanje, obuku i razvoj zaposlenih, kao bitnog faktora unapređenja kvaliteta bankarskih proizvoda i usluga.

Cilj rada je da se utvrdi koliko je odstupanje primljenih u odnosu na očekivane usluge, sa sapekta dimenzija kvaliteta, zatim da se ukaže na probleme i glavne nedostatke u procesu pružanja usluge, kao važnog faktora percipiranog kvaliteta. Cilj rada je kreiranje adekvatnog pristupa za unapređenje konkurentske prednosti crnogorskih banaka, kroz poboljšanje kvaliteta usluge koju pružaju, a samim tim i poslovnog ambijenta, kao jednog od faktora konkurentnosti.

Hipoteza od koje se pošlo glasi: Unapređenje kvaliteta bankarskih usluga je bitan faktor za ostvarivanje konkurentne prednosti i jačanja položaja banaka na finansijskom tržištu, a sve kroz stvaranje zadovoljnih potrošača, koji su lojalni.

Pomoćne hipoteze glase:

1. Spremnost banke da ulaže u znanje, obuku i razvoj zaposlenih omogućiti će unapređenje kvaliteta bankarskih usluga
2. Unapređenjem kvaliteta, razvojem svijesti i uključivanjem svih zaposlenih u taj proces, obezbjeđuje se veći nivo poslovanja
3. Unapređenjem poslovnog ambijenta stvaraju se uslovi za razvoj konkurentnosti banaka i jačanja njihovog položaja na finansijskom tržištu

Kvantitativno eksplorativno istraživanje sprovedeno je na uzorku od 491 ispitanika [20]. Za potrebe istraživanja korišćen je namjerni prigodni uzorak. Podaci su prikupljeni anketnom metodom, putem posebno dizajniranog upitnika prilagođenog SERVQUAL metodi. Ispitivanje je vršeno terenski i on line u periodu februar/mart 2018. godine na teritoriji Crne Gore. Upitnik se sastojao iz dva dijela. Prvi dio upitnika se odnosio na prikupljanje opštih podataka o korisnicima bankarskih usluga, dok drugi dio upitnika mjeri dimenzije kvaliteta bankarskih usluga, kroz 21 par tvrdnji, SERVQUAL metodom. Svaku tvrdnju prati petostepena Likertova skala, kojom se izražava stepen slaganja ili neslaganja sa datom tvrdnjom (gdje je 1- u potpunosti se ne slažem do 5- u potpunosti se slažem). Za obradu podataka korišćen je statistički paket SPSS. Analiza je izvršena: „tvrdnja po tvrdnja“; analiza dimenzija i analiza ukupne jedinstvene mjere kvaliteta usluge tzv. SERVQUAL jaz.

Deskriptivnom statistikom je utvrđeno da je u istraživanju učestvovalo nešto više ispitanika ženskog pola (50,9%). Ispitanici koji su se izjasnili o godinama starosti podijeljeni su u pet starosnih grupa i to: ispitanici starosne dobi od 20 do 29 godina čine 20,1% uzorka, ispitanici starosne dobi 30-39 godina bili su najbrojniji u uzorku i obuhvataju 31,4%, ispitanici starosne dobi 40-49 godina obuhvataju 23,3%; starosne dobi 50-59 godina čine 12,8%, dok je 12,2% bilo ispitanika preko 65 godina. Najveći broj anketiranih ispitanika ima Visoku školsku spremu (50,9%), ispitanici sa srednjom školskom spremom čine 38,1% uzorka, ispitanici sa poslijediplomskim obrazovanjem ima 9,2%, dok je najmanji procenat onih sa osnovnom školom (1,8%). U ispitivanju su dominantno učestvovali zaposleni i njihov procenat iznosi 79,4%, dok je nezaposlenih i penzionera bilo ukupno 20,6%. Visina mjesečnih ličnih prihoda svrstana je u 5 kategorija u rasponu od po 300 eura i struktura uzorka ispitanika koji su odgovorili na ovo pitanje bila je sljedeća: najveći broj ispitanika (45,4%) ima mjesečne lične prihode u intervalu od 301-600 eura, dvije kategorije ispitanika su skoro podjednako zastupljene i to ispitanici sa mjesečnim ličnim prihodima do 300 eura (23,9%) i ispitanici sa mjesečnim ličnim prihodima od 601-900 eura (23,3%), ispitanici čiji mjesečni lični prihodi se kreću u rasponu od 901-1200 eura čine 5,3% uzorka, a ispitanici sa

mjesečnim ličnim prihodima preko 1200 eura zastupljeni su sa 2,1%. Ispitanici su se izjasnili i o najdužem vremenskom periodu korišćenja bankarskih usluga iste banke i rezultati su pokazali da najveći broj ispitanika (40,8%) koristi usluge iste banke preko 9 godina, što ukazuje na visok stepen lojalnosti korisnika bankarskih usluga.

4.2. REZULTATI MJERENJA KVALITETA USLUGA SERVQUAL METODOM

Izračunavanjem razlike između aritmetičkih sredina varijabli vezanih za percepciju (P) i očekivanja (E) ispitanika po pitanju kvaliteta bankarskih usluga, dobijeni su rezultati koji ukazuju na postojanje jaza primljenog u odnosu na očekivani nivo kvaliteta usluga. Uvidom u rezultate koji su prikazani u okviru Tabele 1, može se zaključiti da sve tvrdnje tj. varijable ukazuju na negativan jaz između primljenih i očekivanih usluga. Ovaj jaz se kreće od -0,35 do -1,03 i pokazuje da je stepen kvaliteta primljene usluge niži od očekivanog kvaliteta. Najmanji jaz se primjećuje kod tvrdnji koje se odnose na vizuelni identitet banke kao što je logo, dizajn odgovarajućeg materijala koji prati uslugu. Najveći jaz uočava se kod primljenog i očekivanog nivoa iskrenog interesovanja za rješavanje problema koji se mogu javiti pri vršenju usluge. Prosječni SERVQUAL jaz između primljene i očekivane usluge je negativan i iznosi -0,79.

Tabela 1. GAP između primljene i očekivane usluge

Varijable	Aritm. sredina (E)	Std. Deviacija	Aritm.s redina (P)	Std. Deviacija	GAP (P-E)
P1 Banka posjeduje modernu opremu	4.68	0.59	4.15	0.77	-0.53
P2 Banka ima prijatno uređen enterijer	4.51	0.69	4.01	0.80	-0.50
P3 Zaposlenih u banci su urednog i profesionalnog izgleda	4.63	0.63	4.14	0.81	-0.48
P4 Banka ima prepoznatljiv logo i dopadljivi dizajn odgovarajućeg materijala koji prati uslugu	4.36	0.80	4.00	0.87	-0.35
P5 Banka pruža uslugu u skladu sa obećanjima	4.76	0.55	3.83	0.90	-0.93
P6 Banka pokazuje iskreno interesovanje za rješavanje problema koji se mogu javiti pri vršenju usluge	4.69	0.63	3.66	0.94	-1.03
P7 Banka pruža uslugu na pravi način kontinuirano	4.67	0.57	3.75	0.86	-0.92
P8 Banka obavlja posao bez greške	4.57	0.64	3.69	0.94	-0.88
P9 Banka pruža uslugu u obećanom vremenskom roku	4.71	0.52	3.81	0.87	-0.89
P10 Zaposleni u banci informišu kada će usluga biti izvršena	4.57	0.64	3.64	0.97	-0.93
P11 Zaposleni u banci pružaju uslugu brzo	4.50	0.65	3.67	0.97	-0.83
P12 Zaposlenih u banci su uvijek spremni da pomognu i daju adekvatan savjet	4.57	0.63	3.67	0.96	-0.90
P13 Zaposleni u banci su spremni da odgovore na specifične zahtjeve	4.28	0.85	3.50	0.94	-0.77
P14 Ponašanje i profesionalan odnos zaposlenih u banci uliva povjerenje	4.65	0.59	3.79	0.94	-0.87
P15 Pri obavljanju transakcija banka pruža osjećaj sigurnosti i povjerljivost	4.80	0.48	3.89	0.90	-0.92
P16 Zaposleni u banci su uvijek ljubazni prema korisniku usluga	4.63	0.59	3.84	0.96	-0.80
P17 Zaposleni u banci posjeduju znanje d odgovore na sva pitanja i zahtjeve	4.58	0.65	3.71	0.91	-0.87
P18 Zaposleni u banci posvećuju ličnu pažnju klijentu	4.45	0.75	3.55	0.97	-0.90
P19 Radno vrijeme banke odgovara potrebama klijenata	4.02	1.02	3.57	1.03	-0.45
P20 Briga o najboljim interesima korisnika usluga je stalno prisutna	4.42	0.78	3.51	0.96	-0.91
P21 Zaposleni u banci razumiju specifične potrebe korisnika usluga i adekvatno odgovaraju na njih	4.41	0.72	3.56	0.91	-0.85

Za testiranje značaja navedenih razlika za sve navedene parove varijabli/tvrđnji korišćen je upareni t-test. Na osnovu dobijenih vrijednosti sprovedenog testa, prikazanih u Tabeli 2, možemo zaključiti, sa 99% sigurnosti, da postoje statistički značajne razlike između primljenog i očekivanog kvaliteta bankarskih usluga u Crnoj Gori za sve navedene tvrdnje ($t =$ od -6,851 do -21,691; $p = 0,000 < 0,05$).

Tabela 2. Upareni t-test razlike između kvaliteta primljene i očekivane usluge

Uparene dimenzije	Razlike u parovima					t	df	Sig. (2-tailed)
	Arit. sredina	STD	Arit. sred. STD greške	Interval 95-proc. povjerenja				
				Donji	Gornji			
Par 1	-.5255	.8600	.0388	-.6017	-.4492	-13.538	490	.000
Par 2	-.4980	.9704	.0438	-.5841	-.4118	-11.359	489	.000
Par 3	-.4857	.9286	.0420	-.5682	-.4031	-11.554	487	.000
Par 4	-.3566	1.0233	.0463	-.4476	-.2655	-7.697	487	.000
Par 5	-.9267	1.0256	.0463	-1.0176	-.8357	-20.022	490	.000
Par 6	-1.0265	1.0476	.0473	-1.1195	-.9335	-21.691	489	.000
Par 7	-.9165	.9600	.0433	-1.0016	-.8314	-21.155	490	.000
Par 8	-.8791	.9906	.0448	-.9672	-.7910	-19.605	487	.000
Par 9	-.8939	.9577	.0433	-.9789	-.8089	-20.661	489	.000
Par 10	-.9245	1.0703	.0484	-1.0195	-.8295	-19.120	489	.000
Par 11	-.8289	1.0839	.0489	-.9250	-.7328	-16.947	490	.000
Par 12	-.9035	1.0853	.0492	-1.0001	-.8069	-18.371	486	.000
Par 13	-.7714	1.1480	.0519	-.8733	-.6695	-14.875	489	.000
Par 14	-.8656	1.0333	.0466	-.9572	-.7740	-18.563	490	.000
Par 15	-.9185	.9506	.0429	-1.0028	-.8342	-21.412	490	.000
Par 16	-.7963	1.0744	.0485	-.8916	-.7011	-16.424	490	.000
Par 17	-.8755	1.0483	.0474	-.9686	-.7825	-18.487	489	.000
Par 18	-.9041	1.1498	.0519	-1.0061	-.8020	-17.405	489	.000
Par 19	-.4490	1.4508	.0655	-.5778	-.3202	-6.851	489	.000
Par 20	-.9100	1.1326	.0512	-1.0107	-.8094	-17.767	488	.000
Par 21	-.8473	1.0781	.0487	-.9428	-.7517	-17.414	490	.000

Shodno SERVQUAL metodu navedene tvrdnje su grupisane u pet dimenzija kvaliteta: opipljivost, pouzdanost, odgovornost, sigurnost i empatija. U cilju procjene pouzdanosti skala za mjerenje kvaliteta očekivanih i percipiranih bankarskih usluga korišćen je test pouzdanosti, odnosno Cronbach's Alpha (α). U Tabeli 3 su prikazani rezultati testa pouzdanosti za svaku dimenziju kvaliteta.

Cronbach's Alpha koeficijent je pokazao da postoji statistički značajna povezanost između tvrdnji koje čine elemente dimenzija za mjerenje kvaliteta očekivanih i primljenih bankarskih usluga u Crnoj Gori. Na osnovu dobijenih rezultata možemo zaključiti da je uslov o internoj konzistentnosti skale ($\alpha > 0,700$) ispunilo svih pet dimenzija kvaliteta, kako za očekivane tako i za percipirane bankarske usluge. Takođe, ukupna pouzdanost skale za mjerenje kvaliteta očekivanih usluga (uključujući 21 tvrdnju) iznosila je $\alpha = 0,930$, dok je kod mjerenja kvaliteta percipiranih usluga ukupna pouzdanost skale iznosila $\alpha = 0,964$ (uključujući 18 tvrdnji, dok 3 tvrdnje nije mjerilo kvalitet percipirane usluge i one su isključene iz analize).

Kod očekivanog kvaliteta za svaku pojedinačnu dimenziju postoji statistički značajna povezanost između unaprijed definisanog broja tvrdnji: opipljivost, odgovornost, sigurnost i empatija po četiri tvrdnje i pouzdanost pet tvrdnji. Sa druge strane, kod kvaliteta percipiranih

usluga za tri pojedinačne dimenzije postoji statistički značajna povezanost između predviđenog broja tvrdnji: opipljivost i sigurnost po četiri tvrdnje; pouzdanost: pet tvrdnji i sigurnost: četiri tvrdnje. Za preostale dvije tvrdnje kod kvaliteta percipirane usluge utvrđena je statistički značajna povezanost za dimenziju odgovornost kod tri od ukupno četiri predviđene tvrdnje i kod dimenzije empatija kod dvije od ukupno četiri predviđene tvrdnje. To znači da su za ocjenu dimenzija percipirane odgovornosti isključena varijabla P10, a kod dimenzije percipirana empatija varijable P18 i P19, jer je isključivanjem ovih varijabli došlo do povećanja Cronbach's Alpha koeficijenta.

Tabela 3. Pouzdanost skale za mjerenje kvaliteta očekivanja i percepcija bankarskih usluga

Skala	Dimenzije	Tvrdnje	α nakon brisanja tvrdnje
OČEKIVANJA $\alpha = 0,930$	Opipljivost $\alpha = 0,769$	P1 Banka posjeduje modernu opremu	$\alpha = 0,749$
		P2 Banka ima prijatno uređen enterijer	$\alpha = 0,686$
		P3 Zaposlenih u banci su urednog i profesionalnog izgleda	$\alpha = 0,702$
		P4 Banka ima prepoznatljiv logo i dopadljivi dizajn odgovarajućeg materijala koji prati uslugu	$\alpha = 0,717$
	Pouzdanost $\alpha = 0,819$	P5 Banka pruža uslugu u skladu sa obećanjima	$\alpha = 0,780$
		P6 Banka pokazuje iskreno interesovanje za rješavanje problema koji se mogu javiti pri vršenju usluge	$\alpha = 0,775$
		P7 Banka pruža uslugu na pravi način kontinuirano	$\alpha = 0,778$
		P8 Banka obavlja posao bez greške	$\alpha = 0,814$
		P9 Banka pruža uslugu u obećanom vremenskom roku	$\alpha = 0,768$
	Odgovornost $\alpha = 0,814$	P10 Zaposleni u banci informišu kada će usluga biti izvršena	$\alpha = 0,788$
		P11 Zaposleni u banci pružaju uslugu brzo	$\alpha = 0,751$
		P12 Zaposlenih u banci su uvijek spremni da pomognu i daju adekvatan savjet	$\alpha = 0,766$
		P13 Zaposleni u banci su spremni da odgovore na specifične zahtjeve	$\alpha = 0,761$
	Sigurnost $\alpha = 0,771$	P14 Ponašanje i profesionalan odnos zaposlenih u banci uliva povjerenje	$\alpha = 0,682$
		P15 Pri obavljanju transakcija banka pruža osjećaj sigurnosti i povjerljivost	$\alpha = 0,729$
		P16 Zaposleni u banci su uvijek ljubazni prema korisniku usluga	$\alpha = 0,737$
		P17 Zaposleni u banci posjeduju znanje da odgovore na sva pitanja i zahtjeve	$\alpha = 0,711$
	Empatija $\alpha = 0,828$	P18 Zaposleni u banci posvećuju ličnu pažnju klijentu	$\alpha = 0,784$
		P19 Radno vrijeme banke odgovara potrebama klijenata	$\alpha = 0,824$
		P20 Briga o najboljim interesima korisnika usluga je	$\alpha = 0,760$

		stalno prisutna	
		P21 Zaposleni u banci razumiju specifične potrebe korisnika usluga i adekvatno odgovaraju na njih	$\alpha = 0,772$
PERCEPCIJE $\alpha = 0,964$	Opipljivost $\alpha = 0,824$	P1 Banka posjeduje modernu opremu	$\alpha = 0,786$
		P2 Banka ima prijatno uređen enterijer	$\alpha = 0,755$
		P3 Zaposlenih u banci su urednog i profesionalnog izgleda	$\alpha = 0,780$
		P4 Banka ima prepoznatljiv logo i dopadljivi dizajn odgovarajućeg materijala koji prati uslugu	$\alpha = 0,790$
	Pouzdanost $\alpha = 0,911$	P5 Banka pruža uslugu u skladu sa obećanjima	$\alpha = 0,899$
		P6 Banka pokazuje iskreno interesovanje za rješavanje problema koji se mogu javiti pri vršenju usluge	$\alpha = 0,884$
		P7 Banka pruža uslugu na pravi način kontinuirano	$\alpha = 0,880$
		P8 Banka obavlja posao bez greške	$\alpha = 0,894$
		P9 Banka pruža uslugu u obećanom vremenskom roku	$\alpha = 0,897$
	Odgovornost $\alpha = 0,878$	P11 Zaposleni u banci pružaju uslugu brzo	$\alpha = 0,853$
		P12 Zaposlenih u banci su uvijek spremni da pomognu i daju adekvatan savjet	$\alpha = 0,793$
		P13 Zaposleni u banci su spremni da odgovore na specifične zahtjeve	$\alpha = 0,833$
	Sigurnost $\alpha = 0,902$	P14 Ponašanje i profesionalan odnos zaposlenih u banci uliva povjerenje	$\alpha = 0,867$
		P15 Pri obavljanju transakcija banka pruža osjećaj sigurnosti i povjerljivost	$\alpha = 0,866$
		P16 Zaposleni u banci su uvijek ljubazni prema korisniku usluga	$\alpha = 0,887$
		P17 Zaposleni u banci posjeduju znanje d odgovore na sva pitanja i zahtjeve	$\alpha = 0,872$
	Empatija $\alpha = 0,894$	P20 Briga o najboljim interesima korisnika usluga je stalno prisutna	$\alpha = 0,791$
P21 Zaposleni u banci razumiju specifične potrebe korisnika usluga i adekvatno odgovaraju na njih		$\alpha = 0,803$	

Prema dobijenim rezultatima, po svim dimenzijama postoji negativan jaz između primljene i očekivane usluge (Tabela 4). Najveći negativni jaz javlja se u okviru dimenzije pouzdanost (-0,93), dok je najmanji negativni jaz u okviru dimenzije opipljivost (-0,46). Zatim slijedi negativni jaz dimenzije empatija, dok je najbliži negativni jaz između primljene i očekivane usluge sa jednakim iznosom (-0,86) za dimenzije kvaliteta usluge odgovornost i sigurnost. Da se zaključiti da dimenzije kvaliteta: pouzdanost, odgovornost i sigurnost su dimenzije na kojima banke pri definisanju kvaliteta i procesa isporuke imaju prostor da porade na njihovom unapređenju ukoliko žele zadovoljne i lojalne potrošače. Prosječni SERVQUAL jaz između primljene i očekivane usluge je negativan i iznosi -0,78.

Tabela 4. Jaz između kvaliteta primljene i očekivane usluge po dimenzijama kvaliteta

OČEKIVANJA (E)			PERCEPCIJA (P)			GAP (P-E)
DIMENZIJE	Arit.sre dina	SD	DIMENZIJE	Arit.sre dina	SD	
Opipljivost	4.54	0.52	Opipljivost	4.08	0.66	-0.46
Pouzdanost	4.68	0.45	Pouzdanost	3.75	0.77	-0.93
Odgovornost	4.48	0.56	Odgovornost	3.62	0.86	-0.86
Sigurnost	4.67	0.45	Sigurnost	3.81	0.82	-0.86
Empatija	4.32	0.67	Empatija	3.54	0.89	-0.78

Za testiranje značaja navedenih razlika za sve navedene parove dimenzija (ukupno 5) korišćen je upareni t-test. Na osnovu dobijenih vrijednosti sprovedenog testa, prikazanih u Tabeli 5, možemo zaključiti, sa 99% sigurnosti, da postoje statistički značajne razlike između primljenog i očekivanog kvaliteta bankarskih usluga u Crnoj Gori za svaku od pet navedenih dimenzija ($t =$ od -14,141 do -25,195; $p = 0,000 < 0,05$).

Tabela 5. Upareni t-test između kvaliteta primljene i očekivane usluge po dimenzijama

Upareni par dimenzija	Razlike u parovima					t	df	Sig. (2- tailed)
	Arit.sredina	SD	Standardna greška Aritm sredine	Interval 95- proc.povjerenja				
				Donji	Gornji			
Par 1 (Opipljivost)	-.4664	.7308	.0330	-.5312	-.4016	-14.141	490	.000
Par 2 (Pouzdanost)	-.9281	.8162	.0368	-1.0005	-.8557	-25.195	490	.000
Par 3 (Odgovornost)	-.8630	.9445	.0426	-.9468	-.7793	-20.248	490	.000
Par 4 (Sigurnost)	-.8630	.8717	.0393	-.9403	-.7857	-21.938	490	.000
Par 5 (Empatija)	-.7873	1.0206	.0461	-.8778	-.6969	-17.095	490	.000

5. ZAKLJUČAK

Kvalitet bankarskih proizvoda i usluga posmatra se kroz prizmu klijenta bankarske usluge i kroz prizmu pružaoca te usluge. Cilj je stvotiti visoko kvalitetan bankarski proizvod i uslugu, kako bi obje strane imale koristi od iste. Turbulentna dešavanja na tržištu finansijskih usluga, zahtijevaju od banaka strategije koje će akcenat staviti na kreiranju superiorne usluge, koja mora biti poboljšana kroz sve segmente korišćenja iste. Od posebne važnosti pri formiranju strategije za unapređenje kvaliteta bankarskog proizvoda i usluge je ulaganje u osposobljavanje i usavršavanje osoblja koje dolazi u neposredan kontakt sa klijentima. Zaposleni banke su ti koji mogu u velikoj mjeri uticati na nivo zadovoljstva klijenta pruženom uslugom, jer dimenzije kvaliteta u velikoj mjeri zavise i od zaposlenih na prvoj liniji usluživanja.

U radu je dat teorijski prikaz uloge i značaja kvaliteta usluge u bankarstvu, dimenzija kvaliteta, pomoću kojih se isti mjeri, kao i praktična primjena SERVQUAL modela u bankarskom sektoru Crne Gore. Sprovedenim kvantitativni eksplorativnim istraživanjem potvrđene su postavljene hipoteze. Došlo se do zaključka o postojanju negativnog jaza u pogledu kvaliteta bankarske usluge u Crnoj Gori, po svim dimenzijama kvaliteta. Najveći jaz

javlja u okviru dimenzije pouzdanost, dok je najmanji jaz u okviru dimenzije opipljivost, pa se zaključuje da banke pri definisanju kvaliteta i procesa isporuke imaju prostor da porade na njihovom unapređenju, kroz ulaganja u znanje, obuku i razvoj zaposlenih, ukoliko žele zadovoljne i lojalne potrošače. Doprinos rada se ogleda u tome da se putem kvantitativnog eksplorativnog istraživanja došlo do rezultata koji ukazuju na postojanje jaza u pogledu onoga šta klijenti očekuju i onoga šta dobija u pogledu kvaliteta bankarske usluge, što daje polaznu osnovu za dalja istraživanja u cilju ostvarenja drugoročne koristi za obje strane.

REFERENCE

1. Molina A., Martin-Consuegra D., Esteban A., Relational benefits and customer satisfaction in retail banking, *International Journal of Bank Marketing*, 25 (4), 2007, 253-271.
2. Berry, L. L., Parasuraman, A., Zeithaml, V. A., Improved service quality in America: Lessons learned. *Academy of Management Executive*, 8(2), 1994, 32–52
3. Newman, K., Cowling, A., Service quality in retail banking: the experience of two British clearing banks, *International Journal of Bank Marketing*, 14(6), 1996, 3–11
4. Arasli, H., Mehtap-Smadi, S., Katircioglu, S. T., Customer service quality in the Greek Cypriot banking industry, *Managing Service Quality*, 15(1), 2005, 41-56
5. Bahia, K., Nantel, J., A reliable and valid measurement scale for the perceived service quality of banks, *International Journal of Bank Marketing*, 18(2), 2000, 84-91
6. Bick, G, Beric
6. Jamal, A., Naser, K., Customer satisfaction and retail banking: an assessment of some of the key antecedents of customer satisfaction in retail banking, *International Journal of Bank Marketing*, 20 (4), 2002, 146-160
7. Lianxi, Z., A dimension-specific analysis of performance-only measurement of service quality and satisfaction in China's retail banking, *Journal of Services Marketing*, 18(7), 2004, 534-546
8. Brown, A., Abratt, R., Customer perceptions of the value delivered by retail banks in South Africa, *International Journal of Bank Marketing*, 22, (5), 2004, 300-318
9. Ennew C.T., Waite N., *Financial services marketing: an international guide to principles and practice*, Oxford, Butterworth – Heinemann Elsevier Ltd, 2007, 315.
10. Zairi M., *Managing customer satisfaction: a best practice perspective*, *The TQM Magazine*, 12 (6), 2000, 389-394.
11. Harvey T., *The banking revolution: position your bank in the new financial services marketplace*, Irwin Professional Publishing, Chicago, 1996.
12. Gronroos C., *Strategic management and marketing in the service sector*, *Marketing science*, Cambridge MA, 1992, 182.
13. Zelenović V., *Marketing in banking*, 2nd supplemented and revised (Marketing u bankarstvu, drugo dopunjeno i izmijenjeno izdanje), Proleter ad., Bečej, 2015, 85.
14. Zelenović V., *Marketing in banking (Marketing u bankarstvu)*, Proleter ad., Bečej, 2012, 51-52.
15. Parasuraman A., Zeithaml A.V., Berry L.L., *Servqual: a multiple item scale for measurement consumer perceptions of service quality*, *Journal of Retailing*, 64 (1), 1988, 12-40.

16. Buttle, F., SERVQUAL: review, critique, research agenda, *European Journal of Marketing*, 30 (1) 1996, 8–31.
17. Nyeck S., Morales M., Ladhari R., Pons F., Ten years of service quality measurement: reviewing the use of Servqual instrument, *Cuadernos de Difusion*, 13, 2002, 101-109.
18. Radojević P., Marjanović D., Quality of banking services: Perception, GAPS, Dimensions and Research Tehniques for Qualitu Promotion, original scientific paper (Kvalitet usluga u bankarstvu: nesaglasnosti, odrednice i istraživačke tehnike za unapredjenje kvaliteta, originalni naučni rad), *Bankarstvo*, 7-8, 2011, 34-59
19. Parasuraman A., Berry L.L., Zeithaml A.V., A conceptual model service quality and its implications for future research, *Journal of Marketing*, 49 (4), 1985, 41-50.
20. Raičević, M., Preliminary research for the needs of the doctoral dissertation, working title Influence of internationalization on the quality of banking services in Montenegro (Preliminarno istraživanje za potrebe izrade doktorske disertacije, radnog naziva Uticaj internacionalizacije na kvalitet bankarskih usluga u Crnoj Gori), Fakultet za poslovne studije, Univerzitet Mediteran, 2018.



SATISFACTION OF EMPLOYEES - SOURCE OF EFFICIENCY

Mirha Bičo Ćar¹, Stupar Savo¹, Elvir Šahić¹, Munira Šestić¹, Omar Hodžić²

¹University of Sarajevo, School of Economics and Business, Sarajevo, Bosnia and Herzegovina; ²Dokuz Eylül Üniversitesi, Sosyal Bilimler Enstitüsü, İzmir, Turkey

Abstract: Employee satisfaction is considered to be one of the key motivators for work and an important factor in labor productivity. During the past century, a number of studies have been undertaken with the aim of understanding employee satisfaction as a factor of productivity. The motivation theories based on the assumptions of satisfaction and dissatisfaction as factors of productivity were also offered. The earliest studies of this phenomenon have not confirmed the assumptions about the impact of employee satisfaction on their performance. Only deeper analyzes that took into account not only job satisfaction, but the overall satisfaction of the person (including the satisfaction of private life) have shown that the impact of employee satisfaction on their performance effects is more important than shown by the first research related to employee satisfaction. The above results emphasized the importance of the impact of satisfaction with private life on work efficiency, as well as the connection of satisfaction in private life and job satisfaction. In this paper will be presented the state of satisfaction (at work and privately) with employees in BiH, the connection of employee satisfaction and their working efficiency, as well as the measures of connection between satisfaction at work and satisfaction privately with employees in BiH. Analyzes will be made on the basis of data collected by interviewing employees belonging to different professional groups of service professions. The results of the survey will enable a better understanding of the effect of employee (dis)satisfaction on their performance and productivity.

Keywords: employee satisfaction, connectivity and segmentation of satisfaction, overflow of satisfaction, compensation of satisfaction, productivity of employees

1. INTRODUCTION

Since the emergence of management as a science, scientists have tried to identify factors that affect the productivity and performance of individuals or organizations. These factors are numerous and diverse, hence in the literature are presented the whole series of classifications that classify these factors in different ways [1, 429]. In doing so, employee satisfaction, through motivation, is considered one of the central determinants determining the performance of employees.

The satisfaction of the employees came in the special focus of the scientists' attention after 1931 when Fisher and Hanna published *The dissatisfied worker* [2], but only after the publication of the Hawthorn experiment from the 1920s, employee satisfaction was rated as one of the key motivators for work and an important factor of labor productivity [3]. For this reason, a number of studies have been undertaken over the past century for the purpose of understanding employee satisfaction as a factor of productivity and labor efficiency, and

motivational theories based on satisfaction and dissatisfaction as productivity factors were offered (eg. Herzberg's dual factor, Alderfer's, Mc Clelland, Hackman and Oldham, Adams, Ryan & Deci SDT theory, etc).

The question of the impact of employee satisfaction on their work efficiency has been further updated in contemporary conditions when, due to the frequent state of the crisis in the economy, every worker exposed to numerous sources of stress and dissatisfaction, which is particularly emphasized in post-transition countries, such as Bosnia and Herzegovina.

Consequently, in this paper, after an appropriate overview of the literature and learning related to the subject of employee satisfaction, the results of the survey on: the state of satisfaction (job satisfaction and personal life satisfaction) with employees in Bosnia and Herzegovina will be presented collectively and analytically for employees from certain professional group; the nature and intensity of relation between related to the satisfaction of employees and their working efficiency (established on the basis of previous surveys realized in Bosnia and Herzegovina), and if, to what extent there is a connection between job satisfaction and personal life satisfaction of employees in Bosnia and Herzegovina as a whole and observed for individual groups inside the sample.

The analyzes will be carried out on the basis of data collected by interviewing employees from Bosnia and Herzegovina who belong to different professional groups of service occupations. The overall results of the survey will enable a better understanding of the effect(s) of employee satisfaction in Bosnia and Herzegovina on their performance and productivity.

2. TEORETICAL BACKGROUND AND LITERATURE REVIEW

The earliest studies of job satisfaction and the definition of job satisfaction can be found in papers from the thirties of the last century. In 1931, Fisher and Hanna defined the satisfaction of the job as "a product of non-regulatory mood tendency" [4], and Robert Hoppock in 1935 described job satisfaction as "a combination of biological, emotional and environmental circumstances that caused a person to say "I am satisfied with my job", ie "the affective reflection of employees in working or the subjective feelings about their working environment." (according to [5] and [4]).

During the decades of research of this phenomenon, numerous definitions of job satisfaction have been presented which more or less in detail explained the characteristics of this job-related attitude as can be seen in Table 1. Among the many definitions, the most frequently quoted and the most accepted definition of job satisfaction is the one given by Locke, 1969, according to which "the pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating the achievement of one's job values" [6], that is, "emotional state resulting from the appraisal (evaluation) of one's job or job experiences "[7, p.1].

Analyzing the different definitions of job satisfaction, it can be seen that recent definitions, from the 1980s to now, include and emphasize a multiple perspective, i.e. that the definitions from the single perspective go to the multiple perspectives. In the definitions first offered by Organ and Near [4] and Morman [4], job satisfaction along with an affective perspective also includes a cognitive perspective in terms of logical and rational evaluation of working conditions (logic and rational evaluation of working conditions), and includes several dimensions - ("supervisors, the jobs, the work colleagues, the compensation, and the promotion opportunities") [6].

Despite the firm belief of numerous authors about the significant impact of employee satisfaction on their work efficiency, the earliest research into the relationship between employee satisfaction and their performance has not confirmed these assumptions. According to Judge et al. [8] "the most influential narrative review of the job satisfaction - job performance" published in 1955 by Brayfield and Crocett, assessed that "the relationship between job satisfaction and performance minimal" [8].

The correlation between the satisfaction of employees and their work performance found in the earliest studies was poor (eg Vroom, 1964, $r = 0.14$; [9] Petty, McGee, Cavender, 1984, $r = 0.23$ [10]; Iaffaldano, Muchinsky, 1985, $r = 0.17$ [11]). However, further analyzes that took into account not only job satisfaction, but the overall well-being (including, therefore, personal life satisfaction), have shown that the impact of employee satisfaction on their performance is more significant than suggested by the first research related to this topic.

Wright and Cropanzano [12] found in their analyzes from 2000 that the correlation between total psychological well-being and performance $r = 0.32$ $p = 0.05$, and Abraham, $r = 0.601$ ($p < 0.01$) [13], which is significantly higher than the previously determined correlation coefficient values. The above results have brought back satisfaction of the employees the importance which belongs to it, emphasized the importance of the impact of personal life satisfaction on work efficiency, as well as the connection of personal life satisfaction and job satisfaction.

In accordance with the "a happy worker-productive worker thesis", the attention of the scientist was directed not only in terms of job satisfaction and its impact on productivity and work performance, but also on other aspects of life satisfaction, subjective well-being, such as personal life satisfaction. Life satisfaction Shin and Johnson [14] define as "a global assessment of a person's quality of life according to his chosen criteria", and Erdogan et al. "an individual's cognitive assessment of satisfaction with their life circumstances" [15].

Generally, subjective well-being involves multiple domains (family, health, leisure, etc.) [16] among which job satisfaction and personal life satisfaction constitute the most important components. These two dimensions of satisfaction can be in different relationships, which are referred to as spillover, compensation, and segmentation [17, 14]. Research on the interrelation between variables of job satisfaction and life satisfaction, as well as their impact on performance, has produced thousands of research papers in the last three decades [18].

Unfortunately, in Bosnia and Herzegovina, this type of research has not been carried out. Only in 2015, within the wider research of determinants of productivity [19], on the sample of 1736 (r.r. 77.32%) respondents from different professional groups and types of occupations, data were collected based on which analyzes related to employee (dis)satisfaction were carried out, as shown in Tables 1 to 3. In the framework of these analyzes, the satisfaction of the respondents regarding the: different dimensions of the satisfaction of the respondents (general situation and position at work, working conditions, income and interpersonal relations in the organization, and additional personal life satisfaction), as well as the correlation of satisfaction with work performance.

Table 1. Satisfaction and dissatisfaction of respondents from Bosnia and Herzegovina [adapted from 19, 179-190]

Satisfaction of the respondents	Expressed dissatisfaction	Expressed satisfaction
Work situation-general	11,29% (196)	88,71% (1540)
Work conditions	13,54% (235)	86,35% (1501)
Interpersonal relations	16,76% (291)	83,24% (1445)
Compensation	26,44% (459)	73,56% (1277)
Personal life satisfaction	6,51% (113)	93,49% (1623)

Table 2. Overview of satisfaction dimensions of respondents from Bosnia and Herzegovina sample [19, p: 186]

Relationship of Life Satisfaction and Job Satisfaction	N:	Percentage
Personal life satisfaction greater than job satisfaction	1257	72,41%
Job satisfaction greater than personal life satisfaction	227	13,08%
Personal life satisfaction equal to job satisfaction	252	14,52%
	1736	100,00%

As the most important, the analyzes in Bosnia and Herzegovina showed [according to 19, p.:179-190, 214-216]:

- The highest level of satisfaction of respondents from the sample was expressed in relation to the general situation at work (88.71%), and the highest level of dissatisfaction was expressed in relation to income (26.44% of the respondents of the entire sample). Men are generally less likely to report dissatisfaction (211 out of 638, ie 33.07%) compared to women (42.53% of 1098); respondents from all age groups in the BIH sample approximately equally report dissatisfaction (38.3% - 40.2%), persons who deal with combined-demanding occupations report more than others (in 42.07% of cases), and among professional groups, social workers report job dissatisfaction the most (even 2/3).
- Only 6.51% of respondents reported dissatisfaction with private life (93.49% of respondents reported privately satisfied), with 72.41% of respondents having private satisfaction more than job satisfaction (see Table 3).
- The satisfaction of employees in all dimensions is positively and significantly related to the performance of the respondents (subjectively assessed), with the highest coefficient of correlation $r : 0,254$ ($p: 0,000$) for general satisfaction with the position at work, and $r : 0,248$ ($p: 0,000$) for the average value of job satisfaction;
- Using the Judge-Watanabe method for defining the type of relationship between job satisfaction and satisfaction privately [17, p: 103], the respondents' responses were sorted to groups that manifest spillover ~~overflow~~, compensation or segmentation of these dimensions of satisfaction. It was found that the highest number of respondents (63.77%) had a spillover effect, with a 11.23% compensatory effect, and in 25% of the subjects the segmentation effect appears, as shown in Table 4. [adapted to 19, p: 190].

Table 3. Correlation of job satisfaction ratings with personal life satisfaction ratings (comparison of the results for the B&H sample with the results of previous research [adapted to 19, p.:190.]

Effect:	Judge, Watanabe (1994.)	Dolan, Goselin (1998.; 2000.)	Bičo Ćar, (2015.)
Segmentation	20.4% 0,089 (n.s.)	7,3%	N: 435 (25,00%) rho 0,089 (0,062) n.s.
Related satisfaction	79,6% 0,550 (0,001)	92,7%	N: 1301 (75,00%) rho 0,608 (0,000)
Spillover	67,7% 0,770 (0,000)	49,2%	N: 1105 (63,77%) rho 0,788 (0,000)
Compensation	11,9% -0,770(0,000)	43,5%	N: 196 (11,23%) rho -0,632 (0,000)
Whole sample	0,400 (0,000)		N: 1736 (100,00%) rho 0,360 (0,000)

Considering the results of the satisfaction of employees research from 2015 for BiH, we can conclude that in the case of the respondents from Bosnia and Herzegovina, the relations of satisfaction with work efficiency of the respondents are positive and significant and close to the results obtained in the previous research described in papers of Petty et al. $r: 0.23$ [10] and Wright, Cropanzano $r:0,32$ [12], and in papers Judge and Watanabe [17] for the relation of spillover, compensation and segmentation effects. This certainly points to the need for further study of employee satisfaction and identification of specificities related to this variable.

3. RESEARCH METHODOLOGY

Taking into account the importance of employees' satisfaction on the performance effects, with the aim of more complete understanding of the phenomenon of connection of the key dimensions of employee satisfaction, we decided to further examine the nature of mutual relations of personal life satisfaction and job satisfaction, taking into account the demographic characteristics of the respondents (sex, age) and type of occupation of the respondents. The research questions we wanted answers to were: whether there are differences in the frequency of the occurrence of the effects of segmentation, spillover and compensation in particular socio-demographic groups, and what are the characteristics of these effects in certain groups or segments within the sample of the respondents.

3.1. DATA COLLECTION PROCEDURES

The data used in the empirical research presented in this paper were collected in the period May - September 2014 in the territory of Bosnia and Herzegovina using a paper-pencil questionnaire and (for one part of the respondents) online questionnaires distributed by the method of snow chord. All respondents were given appropriate information on the research objectives, instructions on how to fill in the questionnaires, as well as information on the

anonymity of their answers. Respondents who were not able to fill in the questionnaire independently provided adequate assistance from trained interviewers or research authors.

3.2. RESPONDENTS

The research included adult employees (18-65 years old) working in service professions, in 13 different professional groups, grouped into over-categories of occupational groups (mentally demanding occupations, combined demanding occupations, and physically demanding occupations). A total of 2245 potential respondents were contacted. 1827 questionnaire was answered, out of which 1736 questionnaires were complete (77.32% response rate) on the basis of which the analyzes presented in this paper were made.

3.3. QUESTIONNAIRE

The analyzes done for the purpose of preparing the subject paper used demographic and social data of respondents (age, sex, professions), as well as a set of questions about the personal life satisfaction and job satisfaction of the respondents. As the answers were collected as a part of a more comprehensive questionnaire aimed at analyzing productivity determinants, there were a total of five questions in this group (one relating to personal life satisfaction and four related to job satisfaction: general situation and work, income, relationships in organization and working conditions), which is closely related to other similar studies [12]. The respondents answered a set of satisfaction questions by rounding out the offered five point scale (with answers: very satisfied, quite satisfied, partially satisfied, quite dissatisfied and very dissatisfied).

4. DATA ANALYSIS

All data analyzes were carried out using the statistical data processing package SPSS 20. The methodology described in the work of Judge and Watanabe [17, p: 103] was used to determine the manifestation of the effects of segmentation, compensation and spillover of satisfaction on the parts of the sample [p: 103], with the difference that the five point Likert scales were used in our survey (in the Judge and Watanabe survey the scale was four point) and that five questions were used to assess the satisfaction of the respondents: one that measured personal life satisfaction and four that measured job satisfaction.

In order to determine the percentage of three types of relationship between personal life satisfaction and job satisfaction present among respondents of individual groups, two differences (D1 and D2) were found. The D1 difference, (represented by formula 1.) determined as the absolute value of the difference of the absolute values of personal life satisfaction and job satisfaction, serves to separate the respondents into groups with personal and job satisfaction related, from the groups of respondents in which the segmentation mechanism operates, ie in which these two dimensions of satisfaction are independent. The D2 difference (represented by formula 2) serves to separate the groups of associated satisfaction into those in which the spillover effect acts and those in which the effect of compensation acts (and there is a negative correlation between the dimensions of satisfaction).

$$D1 = | \text{personal life satisfaction} | - | \text{job satisfaction} | \quad (1)$$

$$D2 = | \text{personal life satisfaction} - \text{job satisfaction} | \quad (2)$$

The high values of the D1 difference involve the disconnection of personal life satisfaction and job satisfaction. The low values of the D1 difference mean the connection between life and job satisfaction. In order to separate the high and low values of the D1 differential (and later D2), we sorted the data from the sample to the rising value of D1, and then established the correlation between life and job satisfaction for each consecutive 5% of respondents, starting from those with the lowest values of D1. High correlation values point to the existence of a relationship of satisfaction dimensions, and the low value of the correlation of life and job satisfaction mean absence of a connection, disconnection and independence of the personal life satisfaction in relation to job satisfaction, i.e. segmentation. [19, p: 180].

Below, for the respondents who have a relationship of satisfaction dimension (i.e. with low values of D1 and high correlation values), the same procedure was applied, but on the difference D2. The low values of D2 and the positive correlation value of the two dimensions of satisfaction were marked by respondents with a spillover effect (at the same time the presence of satisfaction or dissatisfaction in both dimensions of satisfaction), and the high values of D2 and the negative correlation value marked the effect of compensation (satisfaction in one segment, and dissatisfaction in another).

This procedure was applied to groups of respondents classified by gender, age and type of occupation, and the results obtained by the analysis are shown in Table 4, Table 5 and Table 5.

5. RESULTS OF RESEARCH

Analyzes done on the sample of respondents from Bosnia and Herzegovina showed that the distribution of relationship between personal and job satisfaction, is similar to the one reported in 1994 by Judge and Watanabe [17]. Namely, for the sample as a whole the effects of spillover, compensation and segmentation are present in the ratio of 63.8%: 11.2%: 25%. A detailed analysis done for individual groups of respondents showed slightly different results.

In some groups there is more compensation effect (women in relation to men, 11%: 7%), which we could interpret as a result of greater dissatisfaction with the work that women "compensate" for higher levels of life satisfaction. At the same time, the phenomenon of spillover of satisfaction is manifested in women the least. The group of the oldest respondents, with their responses, showed the most intense effect of the spillover. For the age group of 36-45 years and for respondents from physically demanding occupations, correlation value did not allow a clear separation of the groups. A summary overview of the ratio of the effect of spillover, compensation, segmentation for individual analyzed groups is shown in Table 7.

Table 4. Comparative overview of the effects of segmentation, compensation and spillover for the sample as a whole and parts of the sample - analysis by half of the respondents (source: own analysis and [19])

Effect:	Whole sample [19]	Man	Women
Segmentation	N: 435 (25,00%) rho 0,089 (0,062)n.s.	N: 160 (25,00%) rho 0,088 (0,270)	N: 275 (25,00%) rho 0,810 (0,181)
Related satisfaction	N: 1301 (75,00%) rho 0,608 (0,000)	N: 478 (75,00%) rho 0,691 (0,000)	N: 823 (75,00%) rho 0,546 (0,000)
Spillover	N: 1105 (63,77%) rho 0,788 (0,000)	N: 430 (67,39%) rho 0,802 (0,000)	N: 698 (63,57%) rho 0,756 (0,000)
Compensation	N: 196 (11,23%) rho -0,632 (0,000)	N: 48 (7,51%) rho -0,664 (0,000)	N: 125 (11,38%) rho -0,622 (0,000)
Whole sample	N: 1736 (100,00%) rho 0,360 (0,000)	N: 638 (100,00%)	N: 1098 (100,00%)

Table 5. Comparative overview of the effects of segmentation, compensation and spillover analysis by type of occupation (source: own analysis)

Effect:	Mental-demanding occupations	Combined-demanding occupations	Physically-demanding occupations
Segmentation	N: 280 (25,00%) rho 0,005 (0,927)	N: 95 (20,00%) rho 0,176 (0,088)	Correlation value did not allow a clear separation of the groups
Related satisfaction	N: 837 (75,00%) rho 0,603 (0,000)	N: 378 (79,91%) rho 0,570 (0,000)	
Spillover	N: 753 (67,41%) rho 0,788 (0,000)	N: 378 (79,91%) rho 0,570 (0,000)	Analysis D2 was not performed
Compensation	N: 84 (7,52%) rho -0,632 (0,000)	Effect does not apply	
Whole sample	N: 1117 (100,00%)	N: 473 (100,00%)	N: 146 (100,00%) rho 0,395 (0,000)

Table 6. Comparative Review of the Effects of Segmentation, Compensation and spillover - Analysis by Age of the Respondents (source: own analysis)

Effect:	Age group 18 -35	Age group 36 -45	Age group 46 -65
Segmentation	N: 163 (25,08%) rho 0,061 (0,441)	Correlation value did not allow a clear separation of the groups	N: 109 (20,19%) rho -0,011 (0,906)
Related satisfaction	N: 487 (74,92%) rho 0,618 (0,000)		N: 431 (79,815%) rho 0,611 (0,000)
Spillover	N: 438 (67,38%) rho 0,772 (0,000)	Analysis D2 was not performed	N: 409 (75,74%) rho 0,722 (0,000)
Compensation	N: 49 (7,54%) rho -0,464 (0,000)		N: 22 (5,00%) rho -0,569 (0,006)
Whole sample	N: 650 (100,00%)	N: 585 (100,00%)	N: 540 (100,00%)

Table 7. Flow ratio, compensation, segmentation (source: own analysis)

Group	N:	Spillover	Compensation	Segmentation
The whole sample	1736	63,77	11,23	25
Men	638	67,4	7,6	25
Women	1098	63,57	11,4	25
Mental-demanding occupations	1117	67,5	7,5	25
Combined-demanding occupations	473	79,91	0	20,09
Physically-demanding occupations	146	-	-	-
Age group 18-35	650	67,4	7,53	25,07
Age group 36-45	546	-	-	-
Age group 46-65	540	75	5	20

6. CONCLUSION

The results of numerous researches dealing with the topic of employee satisfaction and its relationship with work performance and productivity, point to the importance of this phenomenon. The results of the research that we conducted on a sample of 1736 respondents, show that among employees in Bosnia and Herzegovina, dominant effect is spillover. Therefore, managers in Bosnia and Herzegovina should take into account both the job satisfaction of employees, and the indirect impact and the effect of personal life satisfaction on the behavior of employees in the organization. Based on the effect of spillover, managers and organisations, by improving employee satisfaction, can contribute to their sense of wellbeing. Also, it is necessary to pay attention to the satisfaction of those groups of employees who more often report job dissatisfaction, in order not to allow their dissatisfaction to reduce their performance, and thus the short-term and long-term results of individuals, groups and organizations as a whole. The research shows that managers have at their disposal numerous opportunities for improving the efficiency of employees and the company itself by achieving job satisfaction and meeting the expectations of employees in all its dimensions. That way, investing in employees can become one of the key factors of success and

sustainability of the company. This is especially necessary in maintaining or improving the company's competitive position, regardless of the context in which the company operates.

REFERENCES

1. Bahtijarević-Šiber F., Management ljudskih potencijala, Golden marketing, Zagreb, 1999.
2. Fisher E., Hanna V., The Dissatisfied Worker. By New York: The Macmillan Co., 1931.
3. Mayo E., Hawthorne and the Western Electric Company, s.l., s.n., 1949.
4. Zhu Y., A Review of Job Satisfaction, Asian Social Science, 9 (1), (2013), 293-298.
5. Sen K., Relationship between Job Satisfaction & Job Stress Amongst Teachers and Managers, Indian Journal of Industrial Relations, 44 (1), (2008), 14-23.
6. Cleare, L., Personality as a Predictor of Job Satisfaction: Study of the Relationship between Personality and Job Satisfaction amongst Workers in the Bahamas, Journal of Management Research, 5 (3), (2013), 200-229.
7. Ilies, R., Judge, T., An experience-sampling measure of job satisfaction and its relationships with affectivity, mood at work, job beliefs, and general job satisfaction, European Journal of Work and Organizational Psychology, 13 (3), (2004), 367–389.
8. Judge, T., Thoresen, J., Bono, E., Patton, K. The job satisfaction-job performance relationship: A qualitative and quantitative review. Psychological Bulletin, 127 (3), (2001), 376-407.
9. Vroom V., Work and motivation, Wiley, New York, 1964.
10. Petty M., McGee G., Cavender J., A meta-analysis of the relationships between individual job satisfaction and individual performance, Academy of Management Review, 9: (1984). pp 712–721.
11. Iaffaldano, M., Muchinsky, P., Job Satisfaction and Job Performance: A Meta-Analysis, *Psychological Bulletin*, 97 (2), (1985), 251-273.
12. Wright, T., Cropanzano R, Psychological Well-Being and Job Satisfaction as Predictors of Job Performance *Journal of Occupational Health Psychology*, 5, (1), (2000), 84-94.
13. Abraham, S., Job Satisfaction as an Antecedent to Employee Engagement, *SIES Journal of Management*, 8(2), (2012), 27-36.
14. Alghamdi, F., (2015) Another Look at Job and Life Satisfaction among Employees: Evidence from a Developing Country, *American Journal of Industrial and Business Management*, 5, 11-19.
15. Erdogan, B., Bauer, T., Truxillo, D., Mansfield, L., Whistle while you work: A review of the life satisfaction literature, *Journal of Management*, 38 (4), (2012), 1038–1083.
16. Warr, P., Nielsen, K. Wellbeing and work performance, in Diener E., Oishi S., Tay, L. (Eds.), *Handbook of well-being*. UT: DEF Publishers., Salt Lake City, 2018.

17. Judge T., Watanabe S., Individual differences in the nature of the relationship between job and life satisfaction, *Journal of Occupational and Organizational Psychology*, 67, (1994), 101-107.
18. Mishra V., Nielsen I., Smyth R., Newman A., The Job Satisfaction-Life Satisfaction Relationship Revisited: Using the Lewbel Estimation Technique to Estimate Causal Effects Using Cross-Sectional Data, discussion paper 26/14, Monash University, Clyton, 2014.
19. Bičo Ćar M., Determinants of individual and organizational productivity in contemporary business conditions, (in Bosnian), School of Economics and Business in Sarajevo, University of Sarajevo, Sarajevo, 2015.
20. Dolan S., Gosselin E., Job satisfaction and life satisfaction: Analysis of a reciprocal model with social demographic moderators, *Economics working papers*, 484., Department of Economics and Business, Universitat Pompeu Fabra, 2000.



MEASURING NATIONAL INNOVATION SYSTEM EFFICIENCY: A CASE STUDY OF THE CZECH REPUBLIC

Eva Jurickova¹, Michal Pilik²

¹*Tomas Bata University in Zlín, Faculty of Management and Economics, Department of Industrial Engineering and Information Systems;* ²*Tomas Bata University in Zlín, Faculty of Management and Economics, Department of Management and Marketing, Czech Republic*

Abstract: Paper investigates technical efficiency of the Czech Republic and utilization of resources entering the National innovation system compared with further countries of the European Union. The sample was selected based on the European Union Scoreboard and includes a group of moderate innovators. The innovation performance of this group is below of the EU average and there is a potential to improve variables of the NIS. The efficiency is measured based on liner non-parametric models and shows how data envelopment analysis can be used for examination of technical efficiency and improvements of the particular units. The article shows differences of input and output constant-return-on scale models and discusses efficiency scores of decision-making units within the sample. The main aim of the study is to present differences of the chosen models and show how to improve inputs and outputs of the units to become more efficient and competitive.

Keywords: data envelopment analysis, innovation performance, moderate innovators, technical efficiency



PERFORMANCE MANAGEMENT TRANSPORT ORGANIZATION - ESTABLISHMENT CRITERIA FOR BUSINESS SUCCESS

Nena Tomović, Ištvan Bodolo, Pavle Galić

Faculty of Economics and Engineering management in Novi Sad, Serbia

Abstract: The traffic and transport theory and practice of the transport organization's performance is treated differently, especially when assessing the state of the organization, its subsystems, processes, and the results achieved. Differences arise depending on: the aspect of interest and importance of observation and their goals, policy development, goals and strategies in the country and the environment, the degree of comprehensiveness of technologies, the measurement and monitoring objects, the target use of the Key Performance Indicators of service - KPIs by decision levels (strategic, tactical, operational), as well as the approach to managing the organization. Given the complexity of the problem, the paper provides an overview of key business processes that significantly affect business success of the transport organization.

Keywords: transport organization, performance indicators, business success

1. UVOD

Transportne organizacije su proizvodno - tehnološki sistemi koji se bave organizacijom i pružanjem transportnih usluga, sa ciljem da se određeni obim i kvalitet transportne usluge realizuje uz ostvarenje maksimalnog profita (javni transport) ili minimalnih troškova po jedinici usluge (transport za sopstvene potrebe), što u osnovnim crtama čini poslovni uspeh organizacije, zasnovan na ekonomskim principima [10], pri čemu treba težiti zadovoljenju i ostalih principa održivog razvoja organizacije (sociološki, ekološki, tehničko-eksploatacioni i institucionalni).

Ekonomski uspeh je pretpostavka i uslov ostvarivanja ciljeva svih učesnika u poslovanju svake, pa i transportne organizacije, a preduslov za ostvarivanje ekonomskog uspeha je optimalno upravljanje tokovima reprodukcije zasnovanog na principu koji glasi: ostvariti maksimalne rezultate uz minimalna ulaganja. Kada se na sve faktore proizvodnje primeni osnovni ekonomski princip reprodukcije [12] tada se ostvaruje i optimalna ekonomska efikasnost.

Kvantifikacija uspeha organizacije je aktivnost kojom se identifikuje stepen uspešnosti u realizovanju prethodno postavljenih ciljeva poslovanja, od strane strateških menadžera, kako na nivou organizacije, tako i na nivou njenih organizacionih jedinica, funkcija, procesa i aktivnosti, a posebno na nivou odgovornosti nosilaca pojedinih radnih zadataka [13].

Put do uspešnosti u uslovima liberalizovane trgovine, rastućeg uticaja multinacionalnih korporacija u pojedinim delovima sveta, koji se prelivaju na ekonomski

manje razvijene regione, nije lak. Uslovi u kojima rade savremene organizacije su sve složeniji i neizvesniji, a okruženje sve raznovrsnije i dinamičnije. Zahtevi koji se postavljaju pred organizacije su sve složeniji i brojniji. Od njih se zahteva da budu inovativne, da reaguju brzo i pravovremeno, da budu fleksibilne i profitabilne i da dosledno zadovoljavaju različite potrebe korisnika. Svi navedeni aspekti organizacije su međusobno povezani i moguće ih je realizovati samo uz podršku i angažovanje svih zaposlenih [21].

Sve značajnija postaje kreativnost, koju pojedinci nose u sebi i koja može da dođe do izražaja samo u odgovarajućoj klimi organizacije. Uloga menadžmenta organizacije je da prepozna kreativnog pojedinca i osigura uslove rada u kojima će doći do izražaja njegove sposobnosti, što dugoročno predstavlja doprinos uspešnosti poslovanja organizacije. Znanje zaposlenih jača konkurentnu poziciju organizacije, a posebno važnu ulogu ima znanje menadžmenta koje to znanje prenosi na sve zaposlene. Upravljanje uspešnošću organizacije se temelji na timskom radu, a učenje stvara i jača timski duh [1].

Pored navedenih elemenata za uspešan rad transportne organizacije potrebno je i stalno investiranje u tehnologiju i opremu, a primena savremenih metoda upravljanja obezbeđuje i kontinualno unapređenje konkurentnosti na tržištu, na kome organizacija posluje.

Danas postoji veliki broj studija, projekata, modela upravljanja performansama i uspešnošću transportnih organizacija, jer se veliki broj autora širom planete bavi ovom temom. Naučnici, eksperti i stručnjaci u oblasti transporta razvili su veliki broj smernica za izbor indikatora za procenu uspešnosti: poslovanja organizacija u transportnom sektoru CalTrans 2008 [4], TRB 2008 [22], strateškog planiranja CTE 2008 [5], održivog planiranja transporta CST 2003 [6], STI 2008 [18].

Neosporna je činjenica da sve organizacije u Srbiji žele da budu uspešne, međutim, ne može se izbeći spoznaja da se dostignuti nivo primene naučnih saznanja u praksi primenjuje selektivno i nedovoljno, što je i osnovni razlog da se napiše rad koji obrađuje teme koje se odnose na merila uspešnosti poslovanja transportne organizacije.

2. USPOSTAVLJANJE MERILA USPEŠNOSTI TRANSPORTNIH ORGANIZACIJA

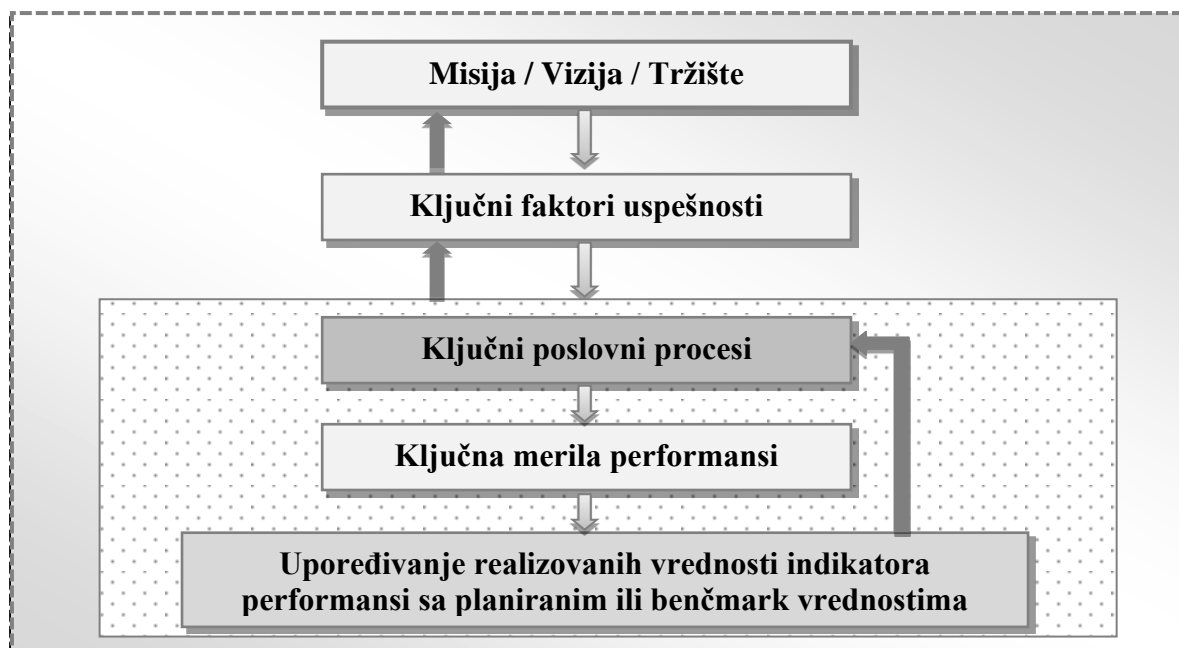
Najnoviji trendovi u upravljanju performansama podrazumevaju orijentaciju ka rezultatima, što podrazumeva ne samo upravljanje efektivnim ponašanjem, već i postizanje visokih rezultata. Ovaj princip podrazumeva da je svaki zaposleni odgovoran za postizanje rezultata u cilju doprinosa organizacionoj uspešnosti. Kada se govori o definisanim rezultatima, tu se pre svega misli na ciljeve i definisane vrednosti indikatora ključnih performansi.

Proces upravljanja performansama podrazumeva upravljanje uspešnošću i strateškim razvojem kompanije kroz upravljanje ponašanjem zaposlenih i dodeljenim ciljevima zaposlenih. Proces sadrži kako kvantitativne, tako i kvalitativne mere uspešnosti. Osnova za kreiranje baznih elemenata sistema su misija i vizija kompanije iz kojih se izdvajaju vrednosti i strateški ciljevi kao ključne komponente za definisanje standarda ponašanja (potrebnih kompetencija) i ciljeva, odnosno indikatora ključnih performansi kojima se upravlja u pravcu realizacije organizacione vizije [7].

U saobraćajno-transportnoj teoriji i praksi uspešnost poslovanja organizacije se različito tretira, posebno kada se daju ocene stanja organizacije, njenih podsistema, procesa, postignutih rezultata. Razlike nastaju u zavisnosti od: aspekta zainteresovanosti i značaja posmatranja i njihovih ciljeva, politike razvoja, ciljeva i strategija u zemlji i okruženju, stepena obuhvatnosti tehnologija, objekata merenja i praćenja, ciljnog korišćenja Indikatora

ključnih performansi Usluga – KPIs“ (eng. Key Performans Indicator Services KPIs) po nivoima odlučivanja (strateški, taktički, operativni), kao i pristupa upravljanju organizacijom [8].

Ključni faktori uspeha transportne organizacije se uglavnom izvode na osnovu definisane strategije i osnova su za identifikovanje ključnih procesa i ključnih merila performansi, a proizilaze iz misije i vizije organizacije i strategijske ocene tržišta transportnih usluga [13]. Na slici 1 je prikazan odnos ključnih faktora uspeha organizacije, poslovnih procesa i merila performansi.



Slika 1. Odnos ključnih faktora uspeha organizacije, poslovnih procesa i merila performansi [13]

Ilustracija pokazuje da se ključnim faktorima uspeha ne može direktno upravljati, zbog čega je potrebno povezivanje na drugom nivou sa ključnim poslovnim procesima, preko kojih se u trećem koraku dolazi do ključnih merila performansi procesa i aktivnosti upotrebe svih resursa organizacije. Ključni faktori uspešnosti transportnih organizacija su kompleksnog karaktera, zbog čega je potrebno detaljnije objasniti značenje procesnog pristupa upravljanju performansama organizacije, zasnovanom na ključnim poslovnim procesima i merilima ključnih performansi, na putu ka stvaranju uslova za merenje uspešnosti poslovanja.

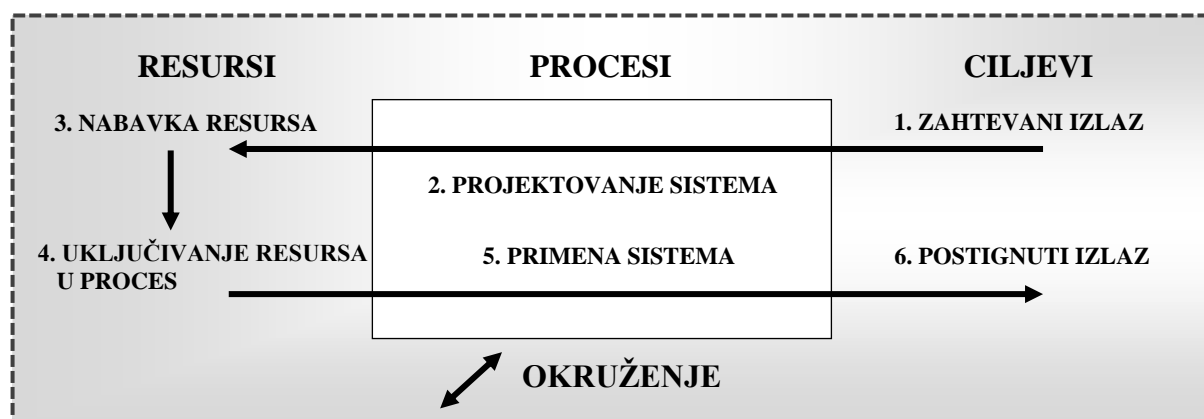
3. PROCESNI PRISTUP UPRAVLJANJU PERFORMANSAMA ORGANIZACIJE

Uspeh poslovanja svake organizacije je posledica primene i održavanja sistema menadžmenta, u čijem fokusu je i stalno poboljšavanje efektivnosti i efikasnosti performansi organizacije [2].

Istraživanje literature, radova u kojima su dati primeri najbolje prakse ukazuju da se procesni pristup može primeniti na bilo koji sistem menadžmenta i bez obzira na vrstu i veličinu organizacije, a njegova svrha je jačanje efikasnosti i efektivnosti u realizaciji postavljenih ciljeva organizacije pri čemu se mogu, između ostalog, očekivati sledeće koristi [3]:

- usmerenje napora na efikasnost i efektivnost procesa i smanjenje troškova efektivnim korišćenjem resursa
- bolji, merljivi i predvidivi rezultati aktivnosti i stalno povećanje usmerenosti ka korisniku
- orijentacija na eksternu komunikaciju (veze sa okruženjem)
- stvaranje poverenja kod korisnika u vezi sa performansama organizacije
- stimulisanje aktivnijeg učešća zaposlenih, analiza i merenje sposobnosti
- sistematsko definisanje aktivnosti potrebnih za ostvarivanje željenih rezultata
- uspostavljanje jasne odgovornosti za upravljanje ključnim aktivnostima
- fokusiranje na faktore, kao što su resursi, metode i materijali, koji će poboljšati ključne aktivnosti organizacije.

Proces organizacije ne može se posmatrati izolovano od okruženja, a međuzavisnost ciljeva, procesa i resursa se može objasniti grafičkim modelom sistema prema prikazanim na slici 2 [24].



Slika 2. Međuzavisnost ciljeva, procesa i resursa [24]

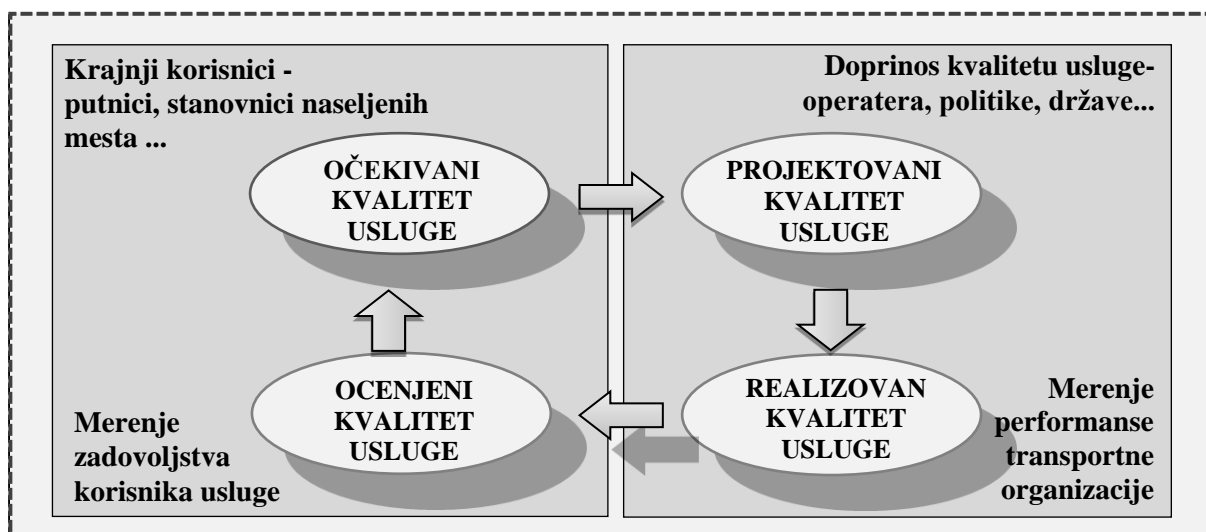
Globalno gledajući, svaka organizacija se može smatrati jednim procesom u kome se koriste sirovine, pomoćna i pogonska sredstva, informacije i koja prema određenim pravilima to pretvara u proizvode/uslugu.

3.1 KLJUČNI POSLOVNI PROCESI

Sistemski pristup u analizi funkcionisanja transportnih organizacija, pretpostavlja utvrđivanje uzajamnih veza između svih procesa, podprocesa i aktivnosti koji ih karakterišu, a sve u cilju proizvodnje transportne usluge određenog nivoa kvaliteta. U cilju obezbeđenja kvalitetne transportne usluge i njenog stalnog unapređenja neophodno je realizovati određene konkretne procese, podprocese i aktivnosti [19].

Navedeni podprocesi su uzajamno povezani sa međusobnim vezama, i svaki od podprocesa ima izlazni rezultat koji predstavlja ulaz u naredni podproces.

Kada se govori o kvalitetu usluge organizacije koja se bavi prevozom putnika, može se reći da je to pojam kompleksnog karaktera, a osnovni procesi i dokumenti koji prate obavljanje transportne usluge usaglašeni su sa tzv. "petljom kvaliteta" i prikazani na slici 3. [23]



Slika 3. Petlja kvaliteta organizacije za prevoz putnika [23]

Kao što se može na slici primetiti, problem vezan za korisnike transportne usluge je dvostruk: radi se o tome da treba saznati koja su njihova očekivanja (očekivani kvalitet usluge) i izmeriti njihovo zadovoljstvo (ocenjeni kvalitet usluge). Dopuna merenju satisfakcije korisnika transportne usluge je merenje performansi (ili merenje kvaliteta) koje omogućava proizvođaču usluge da poredi ciljeve koje je fiksirao (projektovani kvalitet usluge) i rezultate koje je uspeo da dostigne (realizovani kvalitet usluge).

Procesi, podprocesi i aktivnosti sadrže veze između korisnika transportne usluge i operatora kao subjekata koji pružaju uslugu. Problem vezan za korisnike transportne usluge je dvostruk: potrebno je saznati koja su njihova očekivanja (očekivani kvalitet usluge) i izmeriti njihovo zadovoljstvo (ocenjeni kvalitet usluge).

Klasifikujući sve procese, podprocese i aktivnosti osnovni procesi u transportnom procesu koji kao rezultat daju transportnu uslugu su: marketing, planiranje i projektovanje operativna priprema, realizacija (funkcionisanje) i analiza i ocena realizacije transportnog procesa od strane organizatora transportnog procesa (prevoznika=operatora) i korisnika transportne usluge [10].

2.1.1 Marketing u transportnom procesu

Jedan od vodećih eksperata u svetu, Filip Kotler, dao je više definicija marketinga: "Isporuka zadovoljstva potrošaču uz ostvarenje profita", „profitabilno zadovoljavanje potrošača“, „marketing nije umetnost pronalazjenja načina za isporuku proizvedenih proizvoda/usluga“, „marketing je umetnost stvaranja vrednosti za potrošača“ [11]. Slika 4 prikazuje jednostavan model procesa marketinga, koji ima 5 koraka.



Slika 4. Marketing proces u 5 koraka [11]

Kada se govori o marketingu u transportnim organizacijama, jedan od njegovih najznačajnijih zadataka je utvrđivanje karakteristika tržišta, odnosno karakteristika transportnih potreba i transportnih zahteva svih zainteresovanih strana na posmatranom tržištu transportnih usluga. Navedene karakteristike se nazivaju kvantitativni i kvalitativni pokazatelji transportnih potreba i transportnih zahteva.

2.1.2 Planiranje i projektovanje transportnog procesa

Obuhvata aktivnosti usmerene na pretvaranje sažetih informacija o segmentima tržišta i zahtevanoj transportnoj usluzi (transportni zahtevi po obimu i kvalitetu i parametri (pokazatelji) kvaliteta transportne usluge merodavni za proračun potrebnih kapaciteta) u projektovanu transportnu uslugu. Zasnovano je na sledećim komponentama [14]:

- Principi - osnovno pravilo ili koncept koji se koristi za odlučivanje
- Vizija - opšti opis željenog rezultata procesa planiranja
- Problem – nepoželjno stanje koje treba ublažiti (rešiti, smanjiti ili nadoknaditi)
- Opšti ciljevi - opšte poželjno stanje koje treba postići, obično suviše uopšteno da bi moglo da se kvantifikuje
- Specifični ciljevi - potencijalno kvantifikovani načini za postizanje ciljeva, kao što su povećanje prihoda i ekonomske aktivnosti, smanjenje broja vanrednih događaja i nesreća, poboljšani pristup korisnicima usluga
- Ciljevi i standardi - kvantitativni nivoi ciljeva koje treba dostići, uz primenu standarda koji su propisani zakonom ili direktivama
- Pokazatelji poslovanja - praktični načini za merenje napretka ka ciljevima, kao što su specifične definicije prihoda, Crash stope i dostupnost
- Planovi - šeme ili set akcija u određenom vremenskom periodu i nivou
- Opcije - mogući načini da se postigne cilj ili rešenje postavljenog problema
- Politike ili strategije – pravac i način realizacije planiranih aktivnosti u nadležnosti transportne organizacije
- Programi - poseban set ciljeva, odgovornosti i zadataka u okviru transportne organizacije

- Zadaci i aktivnosti – definisani programom
- Rangiranje – definisanje ranga svih činilaca koji su uključeni u proces
- Kriterijumi za ocenjivanje – različiti uticaji (troškovi i koristi) koji se posmatraju u analizi
- Metodologija evaluacije - proces vrednovanja i poređenja opcija.

Informacije o transportnoj usluzi moraju da budu egzaktno, kompletne, nedvosmislene, definisane i specificirane tako da obuhvataju identifikovane zahteve korisnika i sve druge zahteve viših sistema koji su od suštinskog značaja za planiranje i projektovanje transportnog procesa. Cilj ovog procesa je usmeren na transformaciju zahtevane transportne usluge u projektovanu [19].

2.1.3 Operativna priprema transportnog procesa

Aktivnost koju čine svi podprocesi i aktivnosti, koje imaju za cilj da se obezbede uslovi za izvršenje konkretnog transportnog zadatka. Za izvršenje konkretnog transportnog zadatka vrši se obezbeđenje i priprema vozila, vozača i odgovarajuće dokumentacije koja prati transportni proces, odnosno vrši se priprema i obezbeđenje: tehničkih resursa (opreme, postrojenja i vozila), informaciono-tehnoloških resursa, materijalno-finansijskih resursa, kadrovskih resursa i operativnih planova za izvršenje svih podprocesa i aktivnosti.

Izlazni rezultat podprocesa operativne pripreme transportnog procesa je vozilo sa odgovarajućom posadom i organizovanom logističkom podrškom spremno da izvrši konkretan transportni zadatak [10].

2.1.4 Realizacija transportnog procesa

Predstavlja ključni podproces proizvodnje transportne usluge, odnosno vršenja usluge i podrazumeva realizaciju procesa transporta saglasno planiranoj, projektovanoj i pripremljenoj usluzi, a obuhvata sledeće aktivnosti: prijem dokumentacije neophodne za funkcionisanje (dokumenti vezani za vozilo, posadu vozila i predmet transporta), izlaska vozila i posade iz auto baze, prijem i izmena putnika, neposrednu realizaciju prevoznog procesa (vožnja i prateće aktivnosti), monitoring, upravljanje i regulisanje kretanja vozila i voznog osoblja, otklanjanje poremećaja i prekida u funkcionisanju, povratak sa vozila i posade u autobazu i eksploatacionu analizu i obradu podataka [10].

Eksploataciona analiza i obrada podataka zahteva adekvatan specijalizovan informacioni sistem koji treba da definiše informacijske potrebe i zahteve, razne vrste izveštaja, načine njihove obrade kao i njihove tokove.

Dobar informacioni sistem je onaj koji može da obezbedi "...prave informacije, na pravom mestu, u pravom trenutku vremena...", a to znači da informacije moraju biti brze – pravovremene, sveobuhvatne i pouzdane [16].

Izlazni rezultat izvršenja transportnog procesa predstavlja istovremeno i izlaz iz procesa. Rezultat realizacije ovog podprocesa je proizvod - transportna usluga (sistemski organizovan proces čiji je rezultat proizišao iz niza međusobno povezanih aktivnosti prevoznika (operatora) i poslovnog okruženja u cilju zadovoljenja zahteva korisnika usluge) opisana transportnim učincima (broj transportovanih putnika, izvršen transportni rad, iskorišćenje resursa), realizovanim kvalitetom usluge, troškovima i prihodom, itd... [20].

2.1.5 Analiza i ocena realizacije transportnog procesa

Poslednji korak u transportnom procesu, predstavlja i proceduru sistemski zasnovanog i sistematski vođenog postupka prikupljanja, obrade, izdvajanja, prikazivanja i analize izdvojenih podataka i oblikovanje podloga za utvrđivanje uzroka odstupanja od zahtevanih parametara kvaliteta usluge. Osnovne aktivnosti u procesu kontrole usmerene su na merenje kvaliteta ostvarene transportne usluge i njihovom upoređivanju i merenje odstupanja od planiranih (očekivanih) vrednosti, kao i preuzimanje aktivnosti usmerenih ka proveru potrebe uvođenja promena u transportnom procesu u cilju dovođenja u željno projektovano stanje.

Prilikom sprovođenja procesa dijagnostičkog ispitivanja uzimaju se u obzir dva glavna vektora analize: a) istraživanje stavova korisnika ocene kvaliteta usluga transportne organizacije podrazumeva razvoj i primenu tehnika bihevioralne analize kojima se mogu meriti i analizirati potrebe i stavovi korisnika i b) ocena kvaliteta realizacije transportnog procesa od strane transportne organizacije počinje ocenjivanjem nivoa realizacije postavljene ciljne funkcije sistema, čijom se realizacijom meri efektivnost upravljanja sistemom i ocenjuje stepen dostizanja ciljeva sistema kojim se upravlja, izraženih skupom parametara u okviru ciljne funkcije. [20].

4. MERILA KLJUČNIH PERFORMANSI TRANSPORTNIH ORGANIZACIJA

U nameri da kvantifikuje svoj uspeh, transportna organizacija mora uspostaviti odgovarajuća merila za željene rezultate. Istraživanja, koja se bave uspostavljanjem merila performansi ukazuju da veliki broj dobro uspostavljenih merila performansi ne mora da znači da su ona i efektivna. Čest je slučaj da samo trećina uspostavljenih merila performansi ima značajan uticaj na performanse, dok skoro 47% ima umeren uticaj [9].

U cilju pravilne ocene rezultata(uspeha)/performansi organizacije, potrebni su i adekvatni instrumenti merenja, koji se mogu svrstati u četiri kategorije: mere, merila, indikatori performansi, indikatori ključnih performansi, čije definicije su date u tabeli 1 [19].

U praksi, mnoge organizacije koriste veliki broj pogrešnih mera performansi, od kojih se mnoge netačno nazivaju ključni indikatori performansi. Veoma mali broj organizacija zaista prati svoje prave KPI. Razlog proizilazi iz toga što je samo nekolicina organizacija, poslovnih lidera, autora, računovođa i konsultanata istražilo indikatore ključnih performansi i šta KPI zaista znači. Najčešće se navodi da postoji četiri tipa indikatora [17]:

1) Indikatori rezultata (Result Indicators-RI) – pokazatelji onoga što je ostvareno. Oni sumiraju aktivnosti, te mogu biti finansijski i nefinansijski (na primer, dnevna ili nedeljna analiza prodaje je veoma koristan rezime). Radi celovitog shvatanja šta povećati ili smanjiti, potrebno je istražiti faktore koji utiču na prodaju (rezultat). Indikatori prodaje (rezultata) mogu obuhvatiti: neto profit ključnih proizvodnih linija, jučerašnji ostvaren nivo prodaje, žalbe ključnih potrošača itd.

2) Indikatori ključnih rezultata (Key Result Indicators-KRI) – pokazatelji ostvarenog kritičnog faktora uspeha. Mogu biti finansijski i nefinansijski. Oni obuhvataju: zadovoljstvo kupaca, zadovoljstvo zaposlenih, platežna sposobnost kupaca, neto profit pre poreza, povrat na uloženi kapital itd. Smatra se da u okviru preduzeća ne bi trebalo da bude više od 10 KRI. Između KRI i KPI nalazi se mnoštvo indikatora rezultata i indikatora performansi, čiji obim ne bi trebalo da bude veći od 80.

Tabela 1. Definicija: mera, merilo, indikator performansi i ključni indikatori performansi [19]

Termin		Definicija
Mera		Kvantifikacija vrednosti. Meriti znači kvantitativno izraziti stepen u kojem organizacija, njen deo ili proces poseduje traženu karakteristiku
Merilo		Postavlja meru u određeni kontekst. Merilo definiše jedinicu mere i referentnu tačku. Merilo je merenje poslovne aktivnosti [9]
Indikator performansi (performance indicator – PI)		Pomoćno merilo koje delimično odražava performansu neke organizacione jedinice. Merilo koje meri poslovnu aktivnost u odnosu na postavljene ciljeve predstavlja indikator performansi [9]
Indikatori ključnih performansi (Key Performance Indicator – KPI)		Predstavljaju skup indikatora performansi koje su odabrane od strane menadžmenta

3) Indikatori performansi (Performance indicators-PI) – pokazatelji onoga što preduzeće treba da radi. Vrlo često se ovaj indikator naziva i indikatorom ključnih akcija/aktivnosti (Key Action/Activity Indicators-KAI). Indikatori performansi, mada su važni, nisu ključni za poslovanje. Ovi indikatori pomažu pri usklađivanju timova sa strategijom preduzeća. Indikatori performansi su nefinansijski i predstavljaju dopunu KPI. Prikazuju se zajedno sa KPI u izveštaju za organizaciju, diviziju, odeljenje i tim.

4) Indikatori ključnih performansi usluga (Key Performans Indicator Services KPIs) – pokazuju način za realizaciju dramatičnih poboljšanja performansi transportne usluge. KPIs predstavlja set mera fokusiranih na one aspekte organizacionih performansi koje su kritične za trenutni i budući uspeh transportnih organizacija.

Smatra se da na nivou organizacije ne bi trebalo da bude više od 10 KPIs, koje karakterišu sledećih sedam osobina [15]:

- predstavljaju nefinansijske indikatore (nisu izraženi u monetarnim jedinicama)
- mere se frekventno (svakodnevno ili na nedeljnom nivou)
- proističu od top i srednjeg nivoa menadžmenta
- jasno ukazuju šta se zahteva od zaposlenih (npr. zaposleni bi trebalo da razumeju indikatore, da znaju šta je potrebno preduzeti ukoliko dođe do njihovog pada, tj. preduzimanje korektivnih akcija)
- zahtevaju odgovornost od tima ili pojedinca
- imaju značajan uticaj (utiču na jedan ili više kritičnih faktora uspeha i na više od jedne perspektive u okviru liste uravnoteženih ciljeva (BSC))
- podstiču odgovarajuće akcije (imaju pozitivan uticaj na ostale performanse, dok loše osmišljeni KPI mogu dovesti do disfunkcionalnog ponašanja).

Značajan doprinos razvoju naučne misli koja se odnosi na unapređenje uspešnosti transportnih organizacija dao je i Victoria Transport Institute iz Kanade radovima Toda Litmana, koji ukazuje na potrebu da se stara paradigma vezana za indikatore performansi (brzina saobraćaja, kvalitet puta, emisija gasova i aksidenti i nesreće na putevima) zameni novom u kojoj se govori o multimodalnom pristupu transportnoj usluzi, sa kompleksnim

pristupom modelovanju, istovremenim kalkulisanjem vremena, troškova, udobnosti, bezbednosti, sigurnosti i zaštite životne sredine, koji se preduslov realizacije transportne usluge [2].

5. ZAKLJUČAK

Ključne promene u okruženju i poslovanju transportnih organizacija, koje su se desile u poslednjih nekoliko decenija, uslovile su i promenu osnovnih pretpostavki na kojima je moguće obezbediti konkurentsku poziciju na tržištu transportnih usluga. Savremeno informatičko doba izmenilo je osnovne pretpostavke uspešnog poslovanja i postavilo nove zahteve pre svega u pogledu merenja performansi i upravljanja organizacijom. U savremenim uslovima konkurentski uspeh transportne organizacije zavisi od njene sposobnosti da angažuje i efikasno upotrebi svoje materijalne, a isto tako i nematerijalne resurse, od sposobnosti da se brzo prilagodi stalno promenljivim uslovima u okruženju i da pre drugih prepozna i zadovolji stalno promenljive potrebe i zahteve potrošača.

U cilju uspešnog odgovora na sasvim jasne zahteve savremenog poslovnog okruženja, transportne organizacije moraju jasno definisati svoje opredeljenje u pravcu povećanja efikasnosti funkcionisanja, odnosno prihvatanja logike tržišta, primenom savremenih metoda upravljanja i stalnog merenja dostignutog nivoa razvoja, što čini suštinu filozofije koja vodi organizaciju ka uspehu, odnosno dugoročnom održivom poslovanju.

Cilj rad je da ukaže na značaj uspostavljanja merila uspešnosti u svakoj organizaciji, zasnovanih na ključnim procesima, kao i merilima ključnih performansi svakog procesa pojedinačno.

REFERENCE

1. Arsić, Lj., Cvetković, K., Adžić, M., (2011) Primena metodologije 20 ključeva u funkciji unapređenja kvaliteta poslovanja preduzeća, I Međunarodni naučni skup o ekonomskom razvoju i životnom standardu, 1st International Scientific Conference on economic development and standard of living “ EDASOL 2011 - Economic Development and Standard of Living”, Banja Luka
2. Aquinis, H., (2007) Performance management. Pearson Prentice Hall; Upper Saddle River, New Jersey
3. Belton, V., Steward, T. (2002). Multiple Criteria Decision Analysis: An Integrated Approach. Kluwer Academic Publishers: Boston, MA.
4. CalTrans (2008), Transportation System Performance Measures (TSPM), California Department of Transportation (www.dot.ca.gov/hq/tsip/index.php)
5. CTE (2008), Improved Methods For Assessing Social, Cultural, And Economic Effects Of Transportation Projects, NCHRP Project 08-36, TRB (www.trb.org) and AASHTO; at www.statewideplanning.org/resources/234_NCHRP-8-36-66.pdf.
6. CST (2003), Sustainable Transportation Performance Indicators, Centre for Sustainable Transportation (www.cstctd.org); at <http://cst.uwinnipeg.ca/completed.html>.

7. Daum, H., J., (2002) Performance Management and Business Controlling in the 21st Century, SAP AG, A02 (Daum), www.juergendaum.com/mybook.htm
8. Davidović, B., (2008) Menadžment kavaliteta u transportu. Intelekt. Visoka tehnička škola. Kragujevac
9. Eckerson, W., (2006) Performance Dashboards. New Jersey, John Wiley & Sons
10. Filipović, S., (2005) Osnovi tehnologije transporta - Osnovni pojmovi Teorije transporta i tehnologije drumskog transporta, pisana predavanja, Saobraćajni fakultet, Univerzitet u Beogradu
11. Kotler, P. & Armstrong, G., (2011) Principles of Marketing, Pearson Prentice Hall, Library of Congress Cataloging-in-Publication Data
12. Kozuharov, S., (2011) Mezzo economics analytical approach as the propulsive part of managerial economics in tourism. UTMS Journal of Economics , 2 (2), 213-219.
13. Krstić, B., Sekulić, V., (2013) Upravljanje performansama preduzeća (drugo izdanje), Ekonomski fakultet, Niš
14. Litman, T., (2013) Planning Principles and Practices, Victoria Transport Policy Institute, <http://www.vtppi.org/planning.pdf>
15. Litman, T., (2005) Well Measured: Developing Indicators for Comprehensive and Sustainable Transport Planning, VTPI, www.vtppi.org/wellmeas.pdf; summarized in “Developing Indicators For Comprehensive And Sustainable Transport Planning,” Transportation Research Record 2017, TRB (www.trb.org), 10-15
16. Paul, S., Mc Lennan, J., Tang, Z. & Oveson, S., (2005) Data Mining Tutorial, Microsoft Corporation
17. Parmenter, D., (2007) Key Performance Indicators: Developing, Implementing and Using Winning KPIs. New York: John Wiley
18. STI (2008), Sustainable Transportation Indicators: A Recommended Program To Define A Standard Set of Indicators For Sustainable Transportation Planning, Sustainable Transportation Indicators Subcommittee, VTPI, <http://www.vtppi.org/sustain/sti.pdf>
19. Samsonowa, T., (2012) Industrial Research Performance Management - Key Performance Indicators in the ICT Industry, Contributions to Management Science, Springer-Verlag Berlin Heidelberg, 23
20. Tica, S., (2015) Transportni proces, Saobraćajni fakultet, Univerzitet u Beogradu, http://nastava.sf.bg.ac.rs/pluginfile.php/29558/mod_resource/content/1/TTP2015/Transportniproces.pdf
21. Tomović, N., Pejčić-Tarle, S. & Gladović, P., (2012) Sistem upravljanja kvalitetom u funkciji unapređenja performansi transportnih organizacija, International Convention on Quality – ICQ 2012, Belgrade, 05th June – 07th June 2012., Belgrade, Serbia
22. TRB (2008), Performance Measurement Practice Performance Measurement Committee (ABC30), Transportation Research Board, <http://www.trb-performancemeasurement.org>

23. TCRP – Transit Cooperative Research Program, Annual Report of Progress, (2010) Transportation research board, Washington, D.C.
24. Willborn, W., Cheng, E., (1994) Global management of quality assurance systems, McGraw-Hill engineering and technology management series, McGraw-Hill



STAKEHOLDER ANALYSIS APPLICATION FOR RENEWABLE ENERGY PROJECT PLANNING: CASE MUNICIPALITY OF ŠTRPCE

Bojan Stojčetić¹, Đorđe Nikolić², Dejan Bogdanović², Živče Šarkoćević³

¹High technical school of professional education Zvečan; ²Technical faculty in Bor; ³Faculty of technical sciences, Kosovska Mitrovica, Serbia

Abstract: The planning and implementation of renewable energy (RE) projects is a very complex undertaking. Very often the realization of projects or any activity of the organization can be endangered by different interests, fears and misunderstandings by numerous and different stakeholders. Therefore, it is very important to identify all key stakeholders. In order to ensure the successful realization of the planned undertaking in the literature, stakeholder analysis is often used. Grimble et al. (1995) define a stakeholder analysis as an approach to understanding the system by identifying key stakeholders or stakeholders in the system, and assessing their interest in that system.

First of all, it is necessary to identify all individuals, groups, communities or institutions that have certain interests or influences on the subject of research (project, organization, etc.). Certain authors Reed et al., 2009, consider the stakeholder analysis as an iterative process during which stakeholders are added during the analysis progress using different techniques or their combinations (opinion of experts, focus groups, semi-structured interviews, snow-ball sampling). In this work to identify the stakeholders, the Brainstorming method is used.

Each stakeholder can have a different impact on the project. In order to define the relevant reactions / strategies for each stakeholder, they need to be classified into appropriate groups. The stakeholder grouping can be done using an impact matrix that combines the influence / power and interest of the stakeholder.

Stakeholder involvement in decision making process can greatly contribute to making the relevant decisions. However, on the other hand, the inclusion of all stakeholders is usually impossible for many reasons (time, money, lack of information by stakeholders, lack of desire for participation by stakeholders, etc.). Therefore, it is necessary to determine which stakeholders should be involved in certain decision-making phases and in what form this participation should be. Certainly, different stakeholders will have a different share that can be divided into the global at the following:

- Informing
- Consultation
- Participation
- Control
- Reporting.

The participation matrix can be used to define the participation of stakeholders. This matrix provides us with a clear insight into the defined stakeholder participation for each phase of the life-cycle decision-making/project. The stakeholder involvement matrix needs to be reviewed during the entire decision-making/project life cycle as the relationship of the stakeholders to

the project is dynamic and the resulting changes must be taken into account. Also, different decision/project phases require different stakeholder participation. In the work that follows, a stakeholder analysis will be conducted for the needs of planning RES projects in order to improve energy security in municipality of Štrpce.

Keywords: stakeholder analysis, stakeholders, RES, decision making



ROLE AND SUPPORT OF THE STATE FOR INNOVATION AS A FACTOR FOR THE DEVELOPMENT OF THE ECONOMY

Irena Ashtalkoska, Emilija Nasteska

FON-First Private University, Macedonia

Abstract: When we talking about entrepreneurship, management and strategic management, the main word which is used in many book is connected with the term “innovation”. Innovation is a set of activities that are interconnected and organized, and at the same time targeted to create changes. These changes relate to the introduction of new products, new production processes, organizational structures as well as to new management lessons. When we think of technology advancements, we actually think of innovations. Innovation is a new product or service that is created by our own or other scientific research work, which are proportional values placed on the market.

When we talking about an economy in which innovation is characterized as a stable, normal and regular phenomenon then we are talking about an entrepreneurial economy. The utilization of a given space by an individual or a larger group of individuals taking advantage of that organized space is in order to exploit the good opportunities available and at the same time to create a certain value regardless of which resources they possess by fulfilling certain tasks by means of innovation, uniqueness and creativity represents a process called entrepreneurship.

This paper elaborates the link between the state and innovations as a factor for the development of the economy in Republic of Macedonia. The survey was conducted in the Republic of Macedonia and the survey was conducted on trade companies that are beneficiaries of some of the grants offered by the Fund for Innovation and Technological Development. The sample contains 60 employees. The basic data in this study has been obtained through structured questionnaire, and the results have been analyzed using SPSS - Statistical Program for Social Sciences.

Keywords: innovations, economy, entrepreneurship, support

1. DEFINISANJE INOVACIJE I NJEN ZNACAJ

“Inovacijesu specifičan instrument preduzetništva. Akt koji dozvoljava resursima novi kapacitetima za stvaranje bogatstvama”¹⁹

Peter Drucker

Kada govorimo o neotkrivenom, necemu novom, necemu sto nije isprobano u poslovnom svetu, au isto vremenu na trzistu, razmisljamo o inovacijama. Preduzetnik je onaj

¹⁹P. Drucker, Innovation and Entrepreneurship, Forword by Christopher Bones, 2007,25

koji ima najveću ulogu i donosi citav teret inovacije. Svako poslovanje koje preduzetnik stvara predstavlja određenu vrstu inovacije. Prepoznavanje mogućnosti stvaranja neceg novog ili stvaranja vrijednosti kroz koje ideje ozivljavaju podvucene su pojmom inovacije. U zavisnosti od oblika samog znacaja, moze doći do drustvenih promena ili rasta poslovanja, ali glavna ulogu lezi u ljudskom duhu i zelji da se stvore odgovarajuće promene. Potrebu za opstankom je takođe povezana sa inovacijama. Probleme bi bili neizbezni ako svaka organizaciju ne uvodi promjene, odnosno ne menja plan kreiranja i isporuke, kao i samu ponudu. S druge strane, pružanje konkurentske prednosti je mnogo lakse ako postoje inovacije i istovremeno postizu uspeh u organizacijama. Inovacije se posmatra kao sredstvo za postizanje postavljenih ciljeva, bilo da se radi o obezbeživanju akcionarske vrednosti preduzeća u privatnom sektoru, ili stvaranju mogućnosti za otvaranje novih preduzeća i njihovom rastu i razvoju. Za preduzetnistvo se moze reći da je jedan od najvaznijih inovacionih motora i bez njega ne moglo biti nikakvih inovacija. Neophodna motivacija za inovacije je: viziju, posvećenost, eversioniranje rizika, razumnosti i slicno. Inovacije je slozen proces koji sam po sebi donosi velike izazove i velika posvećenost. Postizanje i odrzavanje konkurentske prednosti na trzistu zahtijeva znacajnu paznju usmerenu na razvoj tehnologije i uvoženje inovacije. Kao rezultat velikog napretka u tehnologiji i njegove prakticne primene, doslo je do povećanja obima i brzine inovacije, a to je iz jednostavnog razloga sto je razvoj ideje blisko povezan sa ulaganjem u istrazivanje. Kao sto smo već rekli, inovacije danas se smatraju jednim od kljucnih faktorima koji su neophodni za pružanje konkurentske prednosti, zajedno sa tehnologijom. Kad pomislimo na napredak u tehnologiji, mislimo na samu inovaciju. Inovacije je novi proizvod ili usluga koji je stvoren sopstvenim ili drugim naucnim istrazivackim radom, koji su proporcionalne vrednosti postavljene na samom trzistu. Piter Draker istice da: “Inovacija je posao koji obrađuje resurse sa novim kapacitetima za stvaranje bogatstva. U svetu ne postoji takva stvar kao “resurs” dok osoba ne pronaje korisnu vrednost necega u prirodi i ne obrađujejeu ekonomskoj vrednosti.”²⁰

Korisćenje datog prostora od strane pojedinca ili veće grupe pojedinaca koji iskoriscava taj organizovani prostor je da iskoristi dobre raspolozive mogućnosti i istovremeno stvori određenu vrijednost, bez obzira na resurse koje poseduju ispunjavanjem određenih zadataka inovacijom, jedinstvenost i kreativnost je proces koji se zove preduzetnistvo. U pogledu ove definicije preduzetnistva, fokus je na: ²¹

- Potraga za povoljnim prilikama - praćenje aktuelnih i popularnih trendova i odgovarajućih promena koje se javljaju u okruzenju je uglavnom najvaznije za preduzetnistvo. Stvaranje preduzetnickih mogućnosti i nivo vlasnistva je glavni preduslov za bilo koji novi pocetak ili poduhvat. Kada govorimo o povoljnim prilikama, mislimo na uvoženje novih tehnologija, uvoženje dinamike demografskih trendova i odgovarajućih promjena u poslovnom okruzenju.
- Inovacije - samo preduzetnistvo zahtijeva i podrazumijeva odgovarajuće promjene u smislu uvoženja novih proizvoda ili usluga, uvoženje novih nacina rada i transformacije, odnosno preduzetnistva zahtijeva inovacije.
 - Rast - ne moze se uvek reći da su preduzetnici zadovoljni velicinom svojih organizacija, imaju stalnu zelju da prosire svoje poslovanje i ulazu u svoj rast.

²⁰P. Drucker, Innovation and Entrepreneurship, Forword by Christiopher Bones, 2007,56

²¹ S. Robins, M.Kolter. Management, 8th Edition. Belgrade, Data Status, 2005, 40

2. POSTAVLJANJA CILJEVA

Svaki cilj je buduća država, situaciju ili željeni rezultat na koji je ciljana određena planiranu aktivnost. Istovremenom postizujući ciljeve, dolazi i do realizacije misijama. Kada govorimo o cilju, mislimo na rezultat koji želimo postići u određenom vremenskom periodu. Cilj je takođe pronaći najbolju strategiju kroz koju će vizije preduzetnika biti realizovane.

Svrha ovog istraživanja je da istakne važnost inovacije, što mogu donijeti brojne pozitivne efekte. Svrha ovog istraživanja je rešiti probleme, odnosno dileme koji se najčešće javljaju u inovacijama. Istovremenom, cilj je naglasiti ulogu koju država ima u podsticanju uvođenja inovacije i podrške koju potencijalni inovatori imaju od države. Iz istog istraživanja mogli bih formirati sliku inovacije sirom sveta i napraviti poređenje sa onim što se desava u našoj zemlji. Globalizacije i preduzetništvo kao glavni krivci za rast inovacije samo dokazuju potrebu za ulaganjem u inovacije.

Ne smijemo zaboraviti da kada govorimo o inovacijama, ne znači samo inovaciju novog proizvoda, usluge ili procesa, to je njihovo poboljšanje, poboljšanje koje će bolje i bolje riješiti potrebe, želje i zahtjeve potencijalnih kupaca. Videćemo da kada govorimo o inovacijama, razmišljamo o novim tehnologijama koje se koriste i primenjuju, inovacije se odnose i na odnose sa potrošačima i slično. Istovremenom, svrha ovog istraživanja je da razume način na koji država podržava inovacije.

3. VRSTE INOVACIJE

Postoji nekoliko klasifikacija inovacije, ali podjela po Schumpeter je sljedeća:²²

- Uvođenje novog proizvoda
- Otvaranje novog tržišta
- Stvaranje novih organizacija
- Uvesti novog načinama proizvodnje
- Osvajanje novog izvora sirovina ili poluproizvoda

Sa druge strane, podjela prema OECD -a je sljedeća:²³

- Inovacije proizvoda ili usluge
- Inovacije organizacije
- Inovacije procesa
- Inovacije marketinga

Inovacije proizvoda se odnose na kompletno uvođenje potpuno novog proizvoda ili usklađivanje sa specificiranim karakteristikama proizvoda. Uvođenje novog proizvoda može imati pozitivan uticaj na kompaniju i dati prednosti konkurentnosti s jedne strane, a sa druge strane, da ojača marketinga. Inovativnost usluge je od velike važnosti jer je ekonomski efekat usluge odličan. Uslugepredstavlja nematerijalni proizvod čija se vrijednost troši odmah

²²J.Schumpeter, Business Cycles, New York, Mc Graw Hill, 1939,87

²³OECD, Eurostat. Oslovo Manual – Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition, OECD Publishing, 2005

nakon što je proizvedena i ne može se uskladiti.²⁴ Svaka usluga karakterise nedeljivost i ravnodusnost i utice na inovacije. Veoma dobro znamo da ih ne možemo probati ili viditi. Ono što je karakteristično za usluzi je neophodnost prisustva i provajdera i njegovog korisnika koji obojica igraju aktivnu ulogu. Usluge su takođe varijable što znači da kupci prikupljaju dodatne informacije pre nego što odluče o određenim uslugama. Promjene koje se mogu napraviti za opremu ili organizaciju, kao i za tehnološku proizvodnju podnose se inovacijama procesa. Sve promene koje se javljaju u organizaciji ili u implementaciji novih metoda odnose se na inovacije organizacije. Promene koje se pojavljuju na samom proizvodu u smislu dizajna proizvoda, njegove cijene i promocije odnose se na inovacije u marketingu.

4. ANALIZE INOVACIJE I NJIHOV UTICAJ NA EKONOMIJU U REPUBLICI MAKEDONIJI

Relevantne hipoteze su testirane korišćenjem jednostavne ANOVA i t-testa za određivanje značaja razlika. Kvantitativni podaci se obrađuju pomoću statističkog programa SPSS (Statistical Package for Social Sciences). Priprema ovog rada zasnovana je na rezultatima dobijenim iz ankete za zaposlene u organizacijama u Makedoniji, čiji zavrsetak traje oko 30-45 minuta. Upitnik je dat zaposlenima iz različitih organizacija, ali pri izboru, uzimaju se u obzir relevantne varijable, odnosno organizacije koje se razlikuju po veličini i mjestu djelatnosti. Istovremenom, iako je slučaj odabran uzorak ispitanika, naglaseni su smjernice i uputstva za popunjavanje upitnika, upitnik treba popuniti od strane nekoliko predstavnika organizacije koja se razlikuje po polu, položaju, starosti i plati

5. TESTOVANJE HIPOTEZAMA

Osnovne ili glavnu hipotezu ovog istraživanja je: državna podrška u razvoju inovacija javlja se kao značajan faktor razvoja ekonomije u Republici Makedoniji. Glavna hipoteza nije mogla biti realizovana ako se ne uzmu u obzir specijalne (pomoćne) hipoteze:

- Grantovi kao mogućnosti koje pruža Fond za inovacije i razvoj pozitivno utiču na finansijske rezultate preduzeća i na taj način pozitivno utiču i na ekonomiju u Republici Makedoniji.
- Organizovanje javnih događaja, prezentacija i sajmova inovacije pozitivno utiče na podsticanje građana da počnu razmišljati o inovacijama i istovremeno o razvoju privrede.
- Mogućnost otvorenog poziva za prototip natprevara pozitivno utiče na ekonomiju i rastući interes za inovacije.

Glavne hipoteze i podhipoteze su testirane određivanjem korelacije između varijabli primjenom koeficijenta Pirsona na cijeli uzorak. Uz pomoć ove korelacije utvrđeno je da li je podrška države u razvoju inovacija vezana za razvoj privrede u Republici Makedoniji.

Da bi se testirala glavna hipoteza pod kojom postoji veza između podrške države u razvoju inovacija i razvoja ekonomije u Republici Makedoniji, izračunat je koeficijent Pirsona.

²⁴P.Jovanovic, Management Lexicon, Belgrade, FON, 2003, 46

Tabelu br. 1 daje rezultate interkorelacije između dve varijable iz kojih se može videti da postoji pozitivna veza između podrške države u razvoju ekonomije i razvoja ekonomije u Republici Makedoniji ($r = ,317$, $p < 0,01$), čime se potvrđuje prvom hipotezom.

Tabelu 1. Odnos državne podrške u razvoju inovacije i razvoju privrede u Republici Makedoniji

	Razvoj biznisa
Državna podrška	$r = ,317$

- Korelacije značajna na nivou 0.05
- Korelacije značajna na nivou od 0,01

Tabelu 2. Veza između grantova, organizacija manifestacija i otvorenih poziva sa razvojem privrede u Republici Makedoniji

	Razvoj biznisa	Grantove	Organizovanje manifestacija	Otvorite poziv
Razvoj privrede	1	$,425^{**}$	$,823^{**}$	$,319^{**}$
Grantove		1	$,864^{**}$	$,111$
Organizovanje manifestacija			1	$,247^*$
otvoreni poziv				1

- Korelacije značajna na nivou 0.05
- Korelacije značajna na nivou od 0,01

Tabelu br. 2 daje rezultate interkorelacije između tri varijable i njihovog uticaja na razvoj privrede, iz kojeg se može videti da postoji *pozitivna veza* između svih podfaktora i razvoja privrede u Republici Makedoniji, s kojom su *potvrđene tri podhipoteze*.

Pored toga, postavljena je još jedna podhipoteza, iz koje proizlaze iz relevantnih varijabli:

Postoje razlike u stavovima zaposlenih prema razvoju ekonomije među zaposlenima koji se razlikuju u smislu kalendarskog doba, pola, nivoa obrazovanja i veličine preduzeća.

U tabelama 3 i 4, presmetane su ANOVA i Fiserov test koje su izračunati za utvrđivanje razlika između zaposlenih različitih starosnih grupa u odnosu na stavove o razvoju privrede.

Sa Fiserovim testom, *jedina razlika je utvrđena između zaposlenih od 18-25 godina i onih starijih od 36 godina, pored zaposlenih starijih od 36 godina* ($q = -3,161$, $p < 0,05$).

Deo hipoteze koji se odnosi na stavove o razvoju privrede i starosne dobi je delimično potvrđen.

Tabele 3. ANOVA rezime za razlike između zaposlenih različite starosne dobi u odnosu na stavove o razvoju privrede

		Zbir kvadrata	Df	Kvadrat aritmetičke sredine	F	p
Razvoj privrede	Između grupa	173,656	2	86,828	2,692	<0,05
	U grupama	3193,491	67	32,257		
	Ukupno	3367,147	59			

Tabele 4. Fiserov test za utvrđivanje značaja razlika između zaposlenih različitih uzrasta u odnosu na stavove o razvoju privrede

Zavisne varijable	voznost	voznost	Razlika u aritmetičkim okruženjima (I-J)	p
Razvoj privrede	18-25	26-35	-2,458	>0,05
		36>	-3,161*	<0,05
	26-35	18-25	2,458	>0,05
		36>	,702	>0,05
	36>	18-25	3,161*	<0,05
		26-35	,702	>0,05

Podatci koji se odnose na zaposlene sa različitim stepenom obrazovanja prikazani su u Tabele 5 i 6. Kod ANOVA utvrđeno je da *postoje statistički značajne razlike* između ispitanih grupa ($F = 3.389$, $p < 0.038$).

Tabele 5. Rezime od ANOVA za razlike između zaposlenih sa različitim stepenima obrazovanja sa stavovima za razvoj privrede

		Zbir kvadrata	Df	Kvadrat od aritmetička sredina	F	p
Razvoj privrede	Između grupa	215,753	2	107,877	3,389	<0,05
	U grupama	3151,394	67	31,832		
	Ukupno	3367,147	59			

Uz pomoć Fiserovog testa, utvrđeno je da razlike između uporednih grupa postoje samo između srednje visokog obrazovanja i magistarskog stepena ($q = -3,031$, $p < 0,05$), pored onih sa visokim obrazovanjem.

Tabele 6. Fisherov test za utvrđivanje značaja razlika između zaposlenih sa različitim nivoima obrazovanja u pogledu pogleda na razvoj privrede

Zavisna varijabla	Stepen obrazovanja	Stepen obrazovanja	Razlika u aritmetičkim okruženjima	p
Razvoj privrede	Srednje	Visoko	-,031	>0,05
		Magistarski stepen	-3,017*	<0,05
	Visoko	Srednje	,031	>0,05
		Magistarski stepen	,014	>0,05
	Magistarski stepen	Sredno	3,017*	<0,05
		Visoko	-,014	>0,05

Tabele br. 7 pokazuje t-test za utvrđivanje važnosti zaposlenih različitih polova u odnosu na stavove o razvoju privrede. Utvrđeno je da se zaposleni *razlikuju po polu, a žene imaju pozitivniji stav prema razvoju privrede* ($t = 2,158, p < 0,05$).

Tabele 7. Značaj razlike između zaposlenih sa različitim polovima u odnosu na stavove o razvoju privrede

	Pol	N	M	SD	t	p
Razvoj privrede	Zenski	12	48,82	6,012	2,158	<0,05
	Maski	48	46,35	5,383		

Poslednji segment ove hipoteze odnosi se na razlike u stavovima o razvoju privrede sa zaposlenima različitih preduzeća. ANOVA je utvrdila da se zaposleni ne razlikuju jedni od drugih

Tabele 8. Rezime od ANOVA za razlike između zaposlenih sa različitim velicinama preduzeća i stavova za ekonomski razvoj

		Zbir kvadrata	Df	Kvadrat od aritmetička sredina	F	p
Razvoj privrede	Između grupa	54,458	2	27,229	,814	>0,05
	U grupama	3312,689	57	33,462		
	Ukupno	3367,147	59			

Podaci prikazani u Tabeli 3-8 potvrdili su hipotezu B u pojedinim segmentima, odnosno ustanovili su da *postoje razlike u stavu zaposlenih za razvoj privrede sa zaposlenima koji se razlikuju po kalendarskoj starosti, nivou obrazovanja i polu*.

5.ZAKLJUCAK

Potrebno je veće učešće institucijama koje pružaju mikro finansiranje, a posebno za početnike u menadžmentu. U odsustvu privatnog kreditnog biroa i nerealnog prikazivanja novčanih tokova malih i srednjih preduzeća, njihovo kreditiranje je tesko i ograničeno. Kod

kreditiranja malih i srednjih preduzeća ostaju visoki zahtjevi za hipotekom, kao i nedostaci koji se javljaju u rezimu sigurnih transakcija.

Ipak, trziste alternativnih finansijskih instrumenata nije dobro razvijeno, između ostalog, zbog nedovoljno razvijene svijesti o njihovoj većoj upotrebi. Banke igraju glavnu ulogu u ozivljavanju ekonomije. Jeftini kredite za sigurne plasmane su najbolji način za poboljšanje ekonomije.

Neophodno je nastaviti reformu i liberalizaciju bankarskog sektora i finansijskog posredovanja, liberalizacijom ulaska na trziste i praćenjem direktiva EVROPSKE UNIJE radi poboljšanja pristupa finansiranju. Nauka, tehnologija i inovacije (NTI), kao ključni razvojni faktori u konkurentnim ekonomijama zasnovanim na znanju, marginalizirani su u Republici Makedoniji, sa vrlo niskom vrijednošću koja je odvojena od BDP-a. Kao rezultat, kapacitet inovacije malih i srednjih preduzeća je veoma ograničen. Sa druge strane, mala i srednja preduzeća izdvajaju veoma mala sredstva u novim tehnologijama. Nekoliko kompanija nije voljno odluciti koji portfelj će imati, odustati od stare proizvodnje i fokusirati se na nove. Veliki broj kompanije rade ono što su radile očekujući bolje vreme, ali za to su potrebne promjene. Veze između univerziteta i privrede su nedovoljno razvijene, a postoji nedostatak svesti o prednostima NTI-a za povećanje konkurentnosti. Ne postoji rizicnom kapitalu za inovativne aktivnosti preduzetnika. Nema finansijskih podsticaja ili podsticaji za investiranje u nove tehnologije i inovacije, i ne postoje institucije koje pomazu malim i srednjim preduzećima u oblasti novih tehnologija i inovacija.

Kroz promotivne aktivnosti treba da se podigne svest među malim i srednjim preduzećima o pitanjima koja se odnose na NTI, a sa tim trebalo bi se obezbediti veći absorpcionen kapacitet. Povećana sredstva za ovu svrhu treba obezbediti inovativnim programima i projektima, a naučna i poslovna saradnja treba ojacati. Pored državne pomoći da se olaksa operativnih procedura, smanjenje poreza, preduzetnicke obuke i obrazovanja, podsticanje mladih ljudi da misle u tom pravcu, što stvara nove finansijske instrumente koji će omogućiti brzo otvaranje malih i srednjih preduzeća, jer sada postoji situacija u kojoj krediti zahtevaju velike obaveze.

Mladi preduzetnici, s druge strane, trebaju znati da neuspeh nije sramota. Neko je jednom pokušao i propustio u poslu, nije lose. Onstice veliku vrednost i iskustvo, koji bi trebao biti samo jedan korak blizi uspjehu. Neuspeh je samo korak blize uspjehu.

REFERENCES

1. Peter Drucker, Innovation and Entrepreneurship, Foreword by Christopher Bones, 2007
2. Robbins, Stephen P. and Timothy A. Judge. Organizational Behavior, 13th Edition. Prentice Hall, 2008
3. Robins, Stephen P., Meri Kolter. Menadžment, 8. izdanje. Beograd, Data Status, 2005
4. Joseph Huber, New Technologies and Environmental Innovation, Chair of Economic and Environmental Sociology, Martin – Lauther – University, Halle, Germany, Edward Elgar Publishing Limited, 2004

5. OECD, Eurostat. Oslo Manual - Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition. OECD Publishing, 2005
6. Robert D. Hisrich, Claudine Kearney, Managing Innovation and Entrepreneurship, SAGE Publications, 2013
7. Shery Beverley, Maria Jakovljevic, Knowledge Management Innovations for Interdisciplinary Education, Information Science Reference, 2012
8. Malcolm Goodman, Sandra Dingli, Creativity and Strategic Innovation Management, Routledge, 2013
9. Hugo Tschirky, Hans-Helmuth Jung, Pascal Savioz, Technology and Innovation Management on the Move: From Managing Technology to Managing Innovation-driven Enterprises Volume 8 of Technology, innovation and management, Orell Fuessli Verlag, 2003



CONCEPTUAL MODELING AND EVALUATION OF E-BUSINESS PROCESSES USING CLOUD BASED FRAMEWORK INSIGHT MAKER

Ramona Markoska¹, Petra Bilic²

¹Faculty of ICT UKLO-Bitola, Macedonia; ²Deloitte Consulting GmbH- Berlin, Germany

Abstract: Today's e-business processes require constant qualitative adjustments and improvements. Regarding economics implications, the best approach is to evaluate their conceptual modeling, after planning and prior to implementation. The basic idea is to make savings, which in the following examples will be a shortening of the time of the process, and therefore a cheaper price of a product, service, or both. To achieve those goals and the expected guidance for making decisions for changes, in this paper is described and used Insight Maker which is web-based, general-purpose modeling and simulation tool. It is designed to make modeling and simulation accessible to a wider audience of users. Insight Makers has integrated all three general modeling approaches: agent-based modeling, system dynamics and imperative programming in one modeling framework. This open source framework, give an opportunity to making different conceptual models, rearranging and reengineering the business processes, simultaneously making re evaluation of changes. In this paper, the used examples, specifically, models and simulations, show us, graphical and numerical results that allow an unambiguous evaluation of the changes.

Keywords: e-business modelling, evaluation, Insight Maker

1. INTRODUCTION

The concept of business process re-engineering (BPR) was introduced in the late 1990s as an idea that periodically a redesign and reorganization of an organization is needed to reduce costs and increase productivity and service quality. The role of ICT as an enabler for organisational rethinking has been enfaced in much literature from the field of conceptual modelling and business processes re-engineering. [1],[2],[3],[8]. Given the relationship between conceptual modelling and the business processes development it is very important to note the following items: Business is managed as a set of specific but interconnected business processes that are modelled using software solutions, and furthermore, the ICT strategy should be integrated with business strategy [1]. Many studies have shown that prior re-engineering of business processes, simulation and evaluation is recommended, as support for decision-making for change [2],[3],[4],[9]. Depending on the modelling process, different approaches were developed, such as process processes (EPCs, ARIS House of Business), Semantic Object Model (COM), Bonaparte and ACCESS / STAR and many others. At the same time, e-Commerce" and e-Office indicate that in the future more and more business processes will be implemented electronically, which implies parallel development and change of business processes and software solutions for their reorganization [6]. The enhanced

process should be better support for organizational goals, which means removing unnecessary procedures, and then redesign assisted and realized using ICT, as well as "streamlining" of organizational operations [10].

2. CONCEPTUAL MODELLING AND SIMULATION AS A TOOLS OF BPR

A model is a representation of some system of interest. The model should be always, similar with system, but simpler. Before doing any changes on the real system, the model should be build and tested.

1. 1. CONCEPTUAL MODELLING

Building a model is time consuming process which requires good knowledge of a system that is being modeled. In this context, conceptual modeling has particular significance for capturing the basics of the system that needs to be realized. The conceptual model is always only approximation of the real system, and it is very important to find a balance between simplicity and real situation. To ensure the model validity, it is necessary the use of model validation techniques which includes simulation procedures where under a known common input, the outputs of the simulation model and the real system are compared [1]. The simulation model is a mathematical model developed with the simulation software, which is able to use deterministic or dynamic variables, depending of values of inputs and outputs (according the time – static or dynamic, according the values- fixed or stochastic) [1], [11].

1. 2. SIMMULATION

The simulation means experimenting with different conceptual models to understand and predict behaviour of the proposed system. In order to obtain accurate results, the simulation needs to be done before an existing system is altered or new system built. Based on the real result of simulation, suitable improvement measures can be identified without lengthy real-time walkthroughs. These possible improvements can be verified before implementation, and can be easily evaluated without impacting existing processes. All these benefits substantiate simulation as an essential activity before updating and implementing processes within the organization [2]. Simulation is a component of a business rules engine. It is a solution to both off-line design and on-line operational management problems. Engineers derive rules from the mental models experts provide on how their processes work and how to make decisions that will help them forecast how a change might impact those decisions. Formalizing and simulating these models makes the automation of business rules more robust. In the design of new business rules, simulation provides a way to validate that processes will work as designed [3].

1.2.1. Simulation of business process models (BPM)

There are a lot of different BPM tools in market, which usually follow different methods. Each of them follows a standard approach, but the most modern being BPMN standard. Some of modelling software support simulation as an extra feature, but not as a main purpose of a software. The modelling software is not there to provide simulation, but to

provide an environment to model processes, maintain and share these models. The business process models provide a static representation of the process being studied, in contrast to the simulation which adds a dynamic component, representing the process as active, although it is still a model. Additional information is required in the BPMs, such as activity times, arrival information, resource availability and routing logic that can be executed within the simulation. Some of those information, it is not always easily added, for example process modelling tools do not tend to have objects to represent queues and constraints for these queues. Additionally, the overall control method that determines the routing or prioritization of the work, the ability to add this logic, which was a large part of stand-alone simulation tools, is usually not well covered in the simulation provided for BPMs. Business process tools can be very detail oriented. Given that these tools are likely to be owned by ICT or business analysts they are very suited towards the design and implementation steps of the project cycle [4].

3. E-BUSINESS PROCESS MODELLING AND SIMULATION

The business models are usually represented by a mixture of informal textual, verbal and ad-hoc graphical representations. Very often there is a gap between business executives and the IT developers who need to create e-business information system.

3.1. E-BUSINESS PROCESS MODELLING

There is a lot of different approaches concerning e-business process modelling. Some of them are ARIS/EPC, SOM, Bonapart and INCOME/STAR. In the practice EPC (Event-driven Process Chains) of the ARchitecture of integrated Information Systems has a dominant role. There are several reasons of EPCs popularity: a variety of commercial tools for EPC, the great success of the SAP suite of business applications tremendously promoted the use of this method, EPCs have also been investigated quite thoroughly in research. When ARIS is used for business process modelling, first step is to identify the core process of the business and represent them as EPC, which consists of an alternating sequence of events and processes, also called functions. The resulting process model serves the documentation of existing process, the planning of new process or their combination. If the EPC contains some new processes, the reengineering should be done. E-business process demand a high degree of automation, due to quick changes in electronic markets, a fast realization of the process models. The large percentage of electronic parts in the overall business process leads to huge software projects delaying realization [6]. There are two reasons for delay:

- *A lot of details necessary for the implementation of the model typically require a reorganization of the original model*- The solution of the first problem is making syntax and semantics of the modelling language as precise as possible. There is a gap between precision and intelligibility. Exact formal models like Petri nets are usually not well understood. On the other hand, models like the EPC are easily understandable, but have a lack of formality.
- *In the EPC, business objects, such as information and documents processed and manipulated by the process, are associated with a large degree of freedom* - This fact makes it difficult to object-oriented approach in the modelling and implementation of software solutions [6]. The solution of this problem requires the integration of

business objects into the process model. An object-oriented concept needs to be chosen for integration and extend EPC to EMC (Event-driven Method Chains).

Today on the market there is a great number of tools that can be used for creating EPC diagrams. Some of these tools support the tool-independent Event-driven Process Chain Markup Language (EPML) interchange format. There are also tools that generate EPC diagrams from operational data, such as SAP logs. The EPC diagrams use symbols of several kinds to show the control flow structure (sequence of decisions, functions, events, and other elements) of a business process. To product software from models of complex business processes, control structures alone are not enough. For example, almost any process in a company includes business objects such as documents. If they are not considered in the process model right from the start, a later integration will be very difficult.

In object-oriented EPC is visible which methods are invoked, but not in which order. If some weak spot is discovered in a later phase it leads to a revision of the EPC and going back to a modelling phase. To avoid such cycles, methods should take the place of the functions, not classes. The class is connected to its methods via an edge, likewise all attributes are connected to the class. The resulting diagram is called Event-driven Method Chain (EMC).

3.2. E-BUSINESS PROCESS SIMULATION

The simulation has an important role in modelling and analysing the activities in introducing BPR since it enables quantitative estimations to be made on the influence of the redesigned process on system performances. Many organizations use the simulation to analyse e-business processes at some stage [2]. But not all of them use it in a structured and efficient way. The reason for this is a lack of training, a limitation of existing tools, or a greater focus on design rather than the simulation itself. The majority of simulation software implements a model using the discrete-event method[3]. The reasons for introducing a simulation in the modeling process can be summarized as follows: simulation enables modeling of the process dynamics, possibility to examine the influence of random variables on the process development, quantitative approach for determining the effects of reengineering, providing visualization and animation processes and facilitating communication between clients and analysts.

4. INSIGHT MAKER- CLOUD BASED OPEN SOURCE TOOL FOR MODELLING AND SIMULATION

Insight Maker is an open source, web based software for modeling and general purpose simulation tools. It is designed to make modeling and simulation available to a wider audience of users. Insight Maker integrates all three general modeling models: agent-based modeling, system dynamics, and imperative programming in a single modeling framework. Its graphical interface has a client side implementation, which means that the code can be executed on each user's machine. It support some advanced features like model scripting and optimization. There are the possibilities to build a model, run a simulation, and embed the model in the web site. [11]

4.1. WORKING FEATHURES OF INSIGHT MAKER

Insight maker as a high performance environment, which quickly performs the simulations with minimal resource requirements, has three basic criteria that its own modelling and simulation tools should possess: performance, features and accessibility. The highest priority is given to the accessibility over other components, which means that it is user friendly tool. The second priority is given to the features, and the lowest priority is given to performance. The final result is reduced speed of tool, and significant limitations of the performance. Insight Maker, as a web based tool, provides user account management and model sharing and searching.

4.1.1. Technologies used behind Insight Maker

Insight Maker uses standard open-source technologies and runs on a generic Linux/Unix server. Existing open source technologies and solutions were used to increase the portability of the system and also to reduce the cost of development. The technologies that are used are:

- MySQL database to store the data on the server
- PHP and content management system Drupal are used to store data and implement server-side logic
- Lighttpd is used as the actual server software

While building Insight Maker authors included number of previously developed packages from third party: Ext JS, MxGraph, JQuery, Durpal, Oxygen Icon Pack, Scratchpad-Kan Academy.

4.1.2. Modelling paradigms

Insight Maker support two different modelling paradigms and using each paradigm alone or using both of them together, it is able to create the most of the planned models.

- *System dynamics modelling*- concerns itself with the high-level behaviour of a system. It helps to understand and aggregate operations of system on a macro-scale. It is great for focusing on really important in the model and cutting unnecessary details. The main building blocks for constructing system dynamics models, also known as primitives are: Stocks, Flows, Variables, and Links.
- *Agent Based Modelling*- purpose is to allow the user to model individual agents within a system or/and population, and explore the differences between individuals in population. The primitives, known as main building blocks for constructing agent based models, are: States, Transition (with triggers: timeout, probability, condition), Agent population, and Actions.

5. AN EXAMPLE OF E-BUSINESS PROCES MODELLING AND SIMULATION USING INSIGHT MAKER

This section shows the use of the tool in modelling and simulating the B2B process, using Insight Maker. The aim was to explore the possibilities of the tool in the domain of modelling e-business processes. This example does not show all the features of the tool, since only one set of them was sufficient to complete the Agent Based Modelling task. To accomplish this goal, B2B process which is described in an early works [8], has been modelled and simulated using Insight Maker. Following study refers to a business change effort undertaken by a virtual company. Further, the processes AS IS and TO BE, both of them has been modelled and simulated. The study emphasizes the assessment of savings in terms of time and cost for one purchase transaction execution. Briefly described, an AS IS business process defines the current state of the business processes in an organization, and the analysis goal in putting together the current state process is to clarify exactly how they works today. Unlike them, TO BE business process define the further state of a business processes in an organization, and the goal of analysis is putting together the future state, and to clarify how the business process will work, at some point in the future, once change was made.

The capabilities of e-business process modelling in Insight Maker are limited. There is no activities and decision constructs so for implementing the process agent based modelling was used and their constructs agent state and transitions.

5.1. AS IS – MODELLING AND SIMULATION OF A VIRTUAL COMPANY

Each activity is represented as an Agent State. Also, each activity of the process has its duration. This duration was used as timeout trigger in Insight Maker to trigger the transition between the States. For example activity Order approval is implemented as Agent State. It transits to next State “Sending order to supplier” after 10 minutes expires. All the transitions are made like that. When the activity last for some random period in interval of 1 to 3 hours, timeout is random number where minimum is 1 hour and maximum is 3 hours. Generally, In general, all the primitives should be presented on models created in Insight Maker. All rectangles represent the States, and for all of them, their start activity is “false”, which means, that at the beginning they are inactive. The other primitives shown on the models are Transitions. They come in form of arrows. Because of this constraints the model in Insight Maker looks slightly different. Figure 1., present AS IS model of following virtual company.

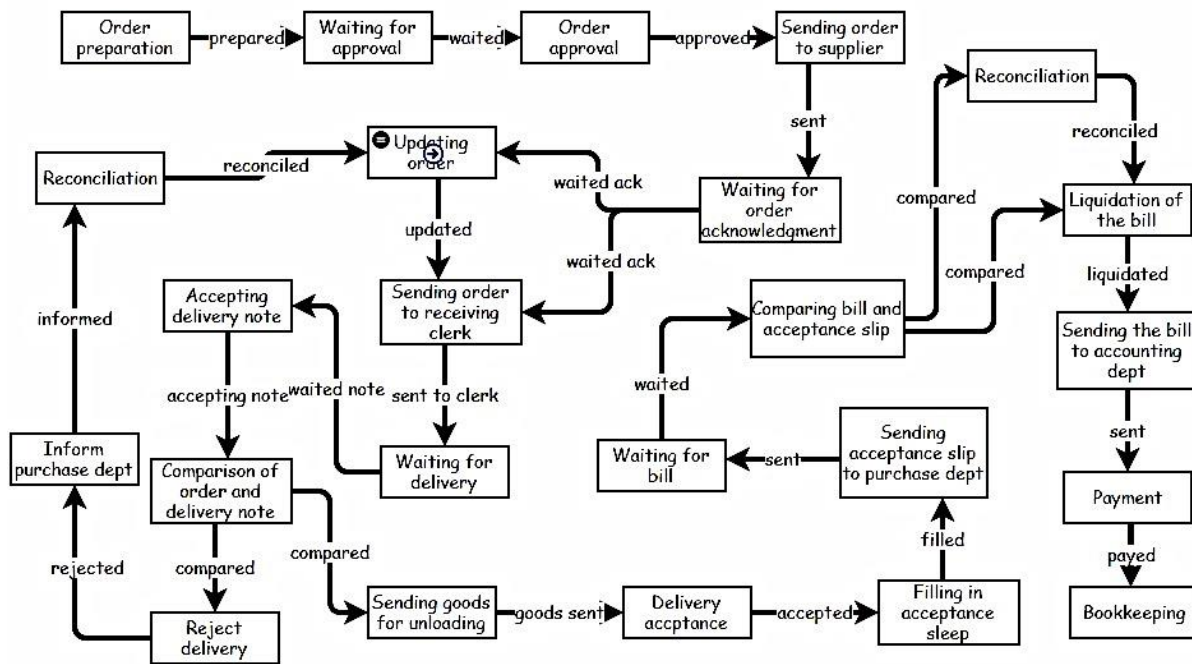


Figure 1. AS IS model in Insight Maker

The process is changing from one State to other, through Transition. Depending on the role, some Transitions are triggered with different time intervals that can be tolerated during the execution of the process, and can be marked as “waited”. During the simulation of processes, they can accept a random value, under the proposed time intervals, and then State “Waiting for approval will stop being “active”, and State “Order approval” will become “active”, as it has presented on Picture 2. After making five simulations, of AS IS process, with different time of processes execution, experimental result shown that:

$$\text{AS IS Average time (hours)} = [\text{Simulation1.time}(172\text{hours}) + \text{Simulation2.time}(144\text{hours}) + \text{Simulation3.time}(242\text{hours}) + \text{Simulation4.time}(202\text{hours}) + \text{Simulation5.time}(223\text{hours})] / 5 = 983/5 = 196.6 \text{ hours}$$

Depending of activity, there are many different time intervals to finish the activity tasks, for example, such as for some of them “Sending order to supplier” – duration 10min, “Waiting for order acknowledgment” –duration (0.5- 48 hours), “Waiting for bill” – duration (1-3days), “Waiting for delivery”- (1-7days).

On Figure 4. are defined the further state of a business processes in previously considered virtual company.

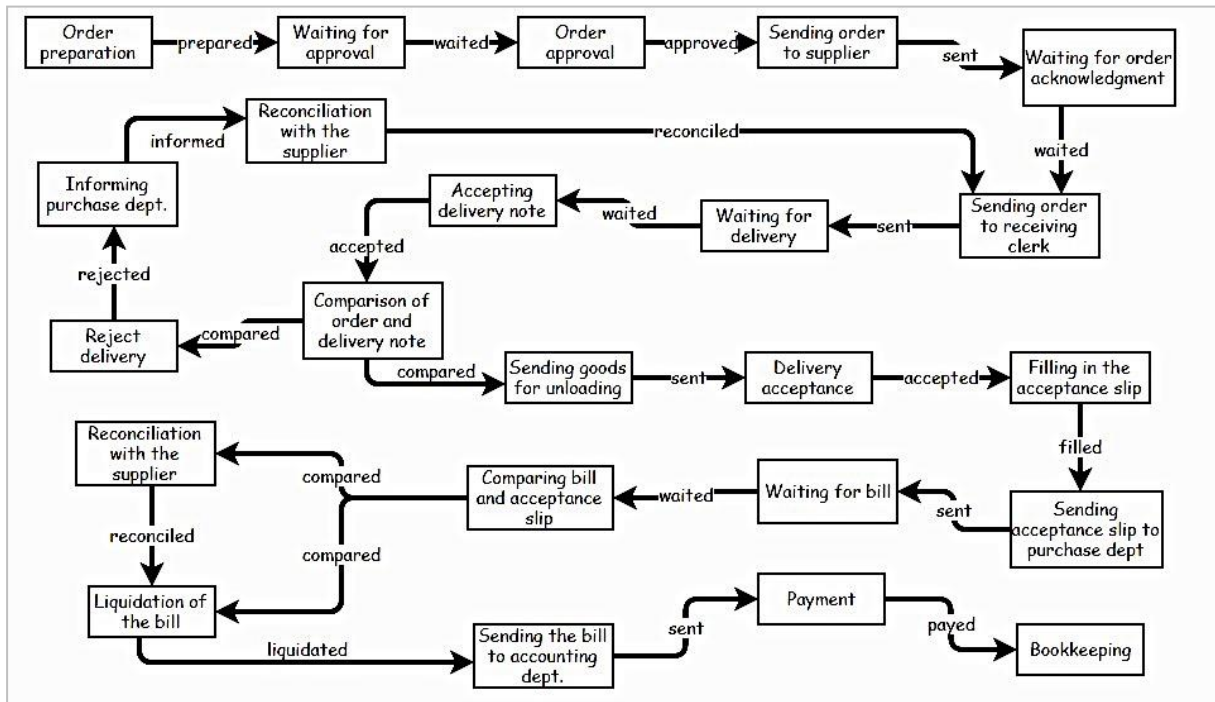


Figure 4. BE model of previous virtual company

It can be noted that, in the TO BE model, some of previously present States in AS IS model, such as, “Order Acknowledgement” and “Updating order” are discarded.

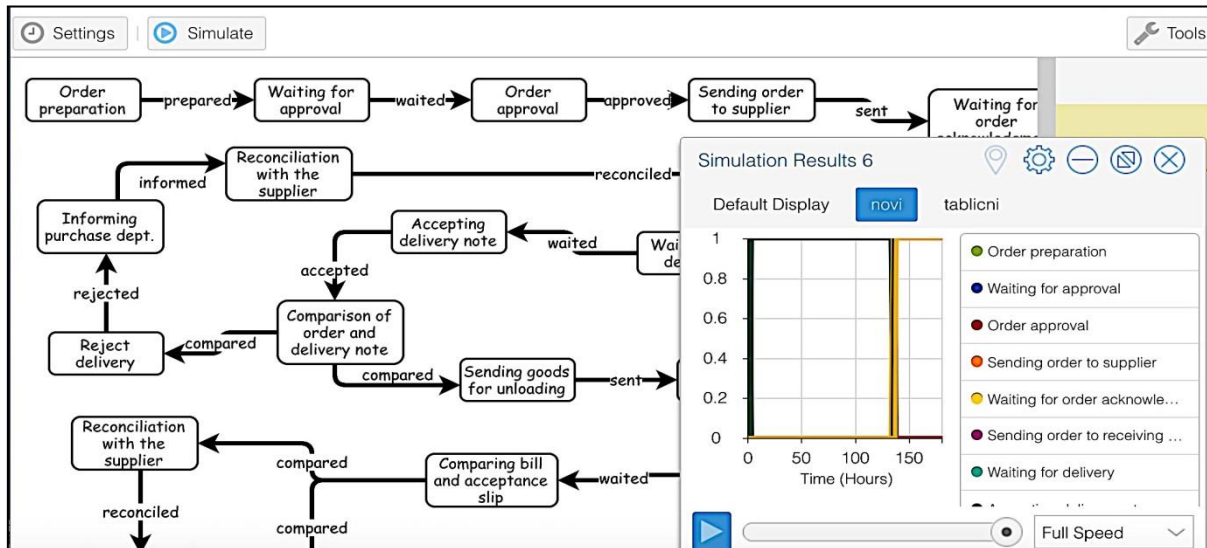


Figure 5. TO BE simulation

There are also changes in the duration of some time intervals, such as State “Waiting for bill” –duration (10-120min), and other. Figure 5., shown the result of one of simulations. After making five simulations, of TO BE process, with different time of processes execution, experimental result shown that:

$$\text{TO BE Average time (hours)} = [\text{Simulation1.time}(156\text{hours}) + \text{Simulation2.time}(120\text{hours}) + \text{Simulation3.time}(63\text{hours}) + \text{Simulation4.time}(83\text{hours}) + \text{Simulation5.time}(120\text{hours})] / 5 = 542/5 = 108.4 \text{ hours}$$

5.3. EVALUATION AND INTERPRETATION OF ACHIEVED RESULTS

After 5 simulation cycles made for both models, using Insight Maker : AS IS model created for an initial virtual company and TO BE model, created for the same company with proposed changes whose impact needs to be evaluated, it can be perceived that TO BE process should be improved. The average time to complete all task and business processes, for TO BE model is 108.4 hours, which is significant shorter than average time for AS IS model, 196.6 hours. The result will be different if more simulation cycles are performed. Use of Insight Maker, for e-business process modeling prove that re-engineering would be successful in this case, because, shortened time to perform activities, means saving for a company. But, even the reduce of time is significant, the Insight Maker does not have the option of calculating the money spent on resources and duration of the activities which could influence the results.

6. CONCLUSION

Insight Maker is an open source tool and all of its functionalities are completely free to use. Its main strength is that it is collaborative tool so more person can work on the same time. Moreover, it is web based application so to use it, it is necessary to have just internet connection and browser. No installation is required. Employees on community forum answers very quickly on user problems. There is plenty of video tutorials and user manual as a source of learning to work with this tool.

Big weakness of this tool is its slow learning curve. It takes a time to learn to work with it. User need to be familiar with 2 types of modelling and all the building blocks. The modelling and simulating e-business processes in this tool is extremely challenging task. The biggest problem is that it is not the primary purpose of the tool, so there is no explanation of how to do that. Since it is new tool user community is very small and no one until now how worked on this problem. The tool does not support BPMN process modelling so there is no constructs like activities or decisions. In order to make model and simulate in Insight Maker, the advices of employees on community forum were listen.

Today there is growing trend of popularity of cloud. Everything is trying to move on the cloud. That is the big opportunity of this tool. It is completely web based. Moreover, user can create different models, and they even trying to improve Insight Maker. On community forum they can suggest what could be implemented next.

The treats to the tool are based on financial support. Since everything is on servers, increasing the price of the servers could eventually lead to situation where use of the tool will not be free of charge any more. Also, its creators and supporters can cancel financial support and stop maintaining and developing the product.

All in all, Insight Maker is very powerful tool, but in purpose of e-business process modelling is still not the best choice because it is not supporting BPMN, there is no explanation of how to do it and there is no possibility to add the costs to sources or activities. The simulation gives accurate directions and results, but only sufficient for pre-evaluation. Additional measures are needed to confirm the results.

REFERENCES

1. Anu M. ,”Introduction to modeling and simulation”, State University of New York at Binghamton, USA, 1997
2. Clauberg K., William T., “BPM and Simulation” , Signavio Inc, Spain, 2013
3. Barnett M.W., “Modeling and simulation in business process management”, Gensym Corporation, USA, 2003
4. Geoffrey H., “Business process modeling and simulation”, Proceedings of the Winter Simulation Conference, Phoenix, Arizona, 2011, 773-778
5. Gunasekaran A., Kobu B.”Modeling and analysis of business process reengineering”, INT. J.PROD. RES. Taylor&Francis, 2002, vol. 40, no. 11, 2521-2546
6. Rittgen P., “From process model to electronic business process”, University Koblenz-Landau, Germany
7. Scott Fortmann R., “Insight Maker: A general-purpose tool for we-based modeling & simulation”, Simmlaton Modelling Practice and Theory 47, 2014, 28-45.
8. Vukšić V., “Simulation modelling toward e-business models development” , International Journal of Simulation Systems, Science & Technology, Special Issue on: Business Process Modelling, 2011, p.16-29
9. Yahaya, J. “Conceptual model of business processes re-engineering: a case study of a cargo company in Malaysia” ,The International Conference on Informatics and Applications (ICIA2012). 36-48.
10. Yih–Chang Chen, Empirical Modelling for Participative Business Process Reengineering, The University of Warwick, United Kingdom, 2001
11. <https://insightmaker.com/>



SWOT ANALYSIS BASED STRATEGIES DEVELOPMENT TO ENERGY SECURITY IMPROVEMENT: CASE MUNICIPALITY OF ŠTRPCE

Bojan Stojčeto¹, **Đorđe Nikolić²**, **Dejan Bogdanović²**, **Ruža Marković¹**

¹High technical school of professional education Zvečan; ²Technical faculty in Bor, Serbia

Abstract: The problem of energy (in)security is being paid increasing attention at the global level because it can endanger the national, political and economic interests of every society. However, the problem of energy (in)security of the serbian communities in Kosovo and Metohija is not sufficient, and it can be said not considered at all. Therefore, the aim of this paper is to examine the current energy situation in Štrpce, and then define strategies for improving energy security. For this purpose, SWOT/TOWS analysis will be used.

Keywords: SWOT analysis, strategy, RES, Štrpce



GEOGRAPHICAL DISPERSION PATTERNS OF UNIVERSITY SPIN-OFF COMPANIES IN THE REGION TWENTE IN THE NETHERLANDS

Jacques Bazen

Saxion University of Applied Sciences, Netherlands

Abstract: Public policy makers increasingly identify entrepreneurship as a valuable contribution to regional economic development policies. The idea behind this being that start-ups that are established by graduates and/or former staff of higher education institutes offer high quality and high paying jobs and that these companies are more likely to stay in the region close to the higher education institution they originate from. It is not clear whether this desire to be located close to the higher education institution they originate from, also applies to regions that are more peripheral. The effect of location on decisions of these before mentioned start-ups has been studied for large entrepreneurial hotspots, so-called “totemic sites of the new economy”, like Silicon Valley or Silicon Fen, but more peripheral regions have been somewhat neglected. This study aims at identifying patterns of migration among start-ups and scale-ups within the region Twente, a more peripheral region in the eastern part of The Netherlands. This study incorporates over 2000 start-ups and scale-ups from the region Twente, all started by either staff or graduates of the higher education institutions in the region. Results of the analysis indicates that most companies do stay in the region of origin; however, the ones that continue to grow beyond a certain size are likely to move out from the region.

Keywords: spin-off, migration, economic geography



FINANCIAL ANALYSIS OF OPERATIONS OF PUBLIC ENTERPRISES IN THE TERRITORY OF THE MUNICIPALITY OF BOR

Saša Krstić, Dejan Riznić, Aleksandra Fedajev

University in Belgrade, Technical faculty in Bor, Serbia

Abstract: Public enterprises are enterprises majority owned by the state. They perform the production and distribution of goods and services of vital (essential) importance for cities and municipalities and operate in the public interest. They may be established by the Republic of Serbia, an autonomous province or a local self-government unit and they are established and operate in accordance with the Law on public enterprises. Public enterprises are formed in areas of interest to the state (electric power, water power, telecommunications, railways, oil industry, utility services, etc.). Public enterprises are of great importance for each local self-government, because, besides working in the public interest, they employ a significant number of workers with different profiles and level of education. Public utility companies operating in the municipality of Bor are: Water utility company, Public utility company “3rd October”, Public utility company “Heating plant”, Public company “Bogovina”, Public utility for residential services and Public company “Zoo”. In this study, based on the appropriate financial parameters, a financial analysis of the performance of the listed public enterprises was performed, that is, the analysis of the Balance sheet, Income statement and appropriate ratios. The obtained results indicate that public enterprises of greater public interest in Bor, still largely rely in their operation, on the help of local self-government. In a situation where they operate as independent economic operators on the market, their efficiency and business would be endangered in a short time interval.

Keywords: public enterprises, economic-financial analysis, balance sheet, income statement, ratios, municipality of Bor

1. UVOD

Bifša SFRJ, i u njoj Republika Srbija, bila je višedecenijski sinonim za centralno-plansku privredu. Kako je centralno-planski sistem ispoljio brojne slabosti i pojave brojnih strukturnih neravnoteža [1], jednom je usled globalnih promena na privrednoj sceni, proces tranzicije morao uzdrmati i srpsku privredu, a proces tranzicije dovoljno bolan sam po sebi, u Republici Srbiji izazvao je privredne, ekonomske i socijalne tektonske poremećaje. Jedna od najvažnijih komponenti reformi u procesu tranzicije jeste promena vlasničke strukture u privrednim subjektima, s obzirom da se poslovanje u tržišnim uslovima zasniva na privatnom vlasništvu.

Posle petooktobarskih promena, dolazi do intenziviranja svih reformskih procesa, pa i onih u oblasti privatizacije i restrukturiranja. Veliki broj preduzeća je privatizovan u prvim godinama nakon usvajanja Zakona o privatizaciji 2001. Sprovođenje privatizacije pratile su

brojne sporne privatizacije, raskidanje istih, korupcijske afere, stotine hiljada zatvorenih radnih mesta, nedovoljan priliv sredstava u državnu kasu. Tako bi se u najkraćim rečima opisala surova realnost dosadašnjeg toka procesa privatizacije u Srbiji, negde nazadovanje, negde stagnacija, a retko gde prosperitet i perspektiva, zapravo sve nasuprot očekivanom oporavku privrede i značajnog priliva javnih prihoda.

Ono što od početka procesa tranzicije pa i danas karakteriše javna preduzeća u većini opština i gradova u Republici Srbiji, jeste loša organizacija rada, nedovoljna produktivnost prekomernog broja zaposlenih, dugogodišnja nerentabilnost, prevelika zavisnost od subvencionisanja jedinica lokalnih samouprava, [2] a sve to implicira da još uvek postoje tragovi prošlih vremena koji su duboko ukorenjeni u srpskoj privredi i mentalitetu zaposlenih, a komunistički način rukovođenja doživeo je reinkarnaciju u vidu rukovodilaca isključivo iz vladajućih političkih partija.

Navedeno stanje karakteristično je i za javna preduzeća čiji je osnivač Opština Bor. U poslednjih nekoliko godina situacija u ovim preduzećima je postala postala toliko složena, da bi bez pomoći opštine njihovo normalno funkcionisanje, a time i isporuka dobara i usluga od opšteg interesa, bilo gotovo nemoguće. U tom smislu, cilj ovog rada je da se analizira položaj borske opštine u odnosu na region Južne i Istočne Srbije, kao i finansijski položaj javnih preduzeća u borskoj opštini u 2013. i 2016. godini, analizom osnovnih kategorija bilansa stanja i bilansa uspeha i primenom racio analize.

2. OCENA NIVOVA RAZVIJENOSTI OPŠTINE BOR U ODNOSU NA REGION JUŽNE I ISTOČNE SRBIJE I PRIVREDU REPUBLIKE SRBIJE

Geografski položaj, prirodna bogatstva, istorijske okolnosti i mnogi drugi faktori uticali su na donošenje odluke od strane državnih organa koja će privredna delatnost dominirati u svakom regionu, gradu ili opštini u Republici Srbiji. Na teritoriji sadašnjeg borskog okruga početkom XX veka počinje se sa eksploatacijom rude bakra. Dolazi do velike migracije radnika iz čitave zemlje, i pored lokalnog stanovništva nastaje Bor kakvog danas poznajemo. RTB Bor bio je jedan je od najvećih industrijskih giganata u bivšoj SFRJ, dok je njegovo poslovanje u XXI veku izazivalo podeljena mišljenja i polemisanja pre svega kod onih koji rukovode ekonomskom politikom Republike Srbije al i stručne javnosti. Jedno je sigurno, istraživanja su pokazala da je eksploatacija rude bakra moguća i u narednih 100 godina, a na nosiocima ekonomske politike je da izaberu put kojim žele da ide, ali da je on i dalje potencijalni izvor razvoja lokalne, regionalne i nacionalne privrede.

U Tabeli 1, prikazani su određeni pokazatelji, na osnovu kojih je moguće izvršiti poređenje gde se Opština Bor i njeni stanovnici nalaze u odnosu na region Južne i Istočne Srbije kao i cele Republike Srbije.

Tabela 1. Pokazatelji razvijenosti opštine Bor u odnosu na region Južne i Istočne Srbije i Republike Srbije [3]

Opis	Srbija	Region Južne i Istočne Srbije	Bor
% ukupnog broja nezaposlenih u odnosu na ukupan broj radno sposobnog stanovništva na dan 31.12.2016. godine	14,48	18,03	18,31
% ukupnog broja nezaposlenih koji prvi put traže posao u ukupnom broju nezaposlenih na dan 31.12.2016. godine	31,62	33,31	34,55
Prosečna neto zarada po zaposlenom u 2016. godini u rsd	46.097	39.959	48.487
Ostvarene investicije u nova osnovna sredstva po stanovniku u 2016. godini u rsd	75.599	37.422	45.113

Iz Tabele 1 jedan može se zaključiti da je procenat nezaposlenosti u Opštini Bor 18,31% što je na kraju 2016. godine za nijansu više od tradicionalno slabije razvijenog regiona jugoistočne Srbije. Stopa nezaposlenosti u Srbiji je na nešto nižem nivou (14,48%), zahvaljući direktnim stranim investicijama i otvaranju novih radnih mesta u regionu Beograda i nekih drugih većih gradova u Republici Srbiji koji su bili primamljiviji investitorima. Opština Bor se tradicionalno već duže od jednog veka oslanja na zapošljavanje radnika u RTB-u Bor, dok preduzetnički duh nije utemeljen u poslovnoj prirodi Borana. Da je teško zaposliti se u struci nakon svršenih studija, ili zaposliti se prvi put inače, govori podatak da je procenat onih koji traže prvo zaposlenje približno isti kako u Opštini Bor (34,55%), tako i u regionu (33,31%) ali i na republičkom nivou (31,62%). Razlog je jednostavan, u nedovoljno rastućoj ekonomiji, gde je najveći problem pad industrijske proizvodnje i nedovoljna razvijenost tercijarnog sektora koji bi apsorbavao određenu količinu nezaposlenih, zaposliti se bez radnog iskustva je noćna mora velikog broja mladih i prva prepreka u izgovoru poslodavaca kada se traži prvo zaposlenje.

Kada je u pitanju prosečna neto zarada po zaposlenom, kao jedna od najvažnijih pokazatelja standarda stanovništva (ne i kvaliteta života), kao svojevrsna anomalija javlja se činjenica da Opština Bor prednjači u toj kategoriji (48.487 rsd) u odnosu na region (39.959 rsd) ali i na republički prosek (46.097 rsd). Poznavaoci prilika u Boru znaju da su razlog tome nešto veće neto zarade u borskom gigantu RTB-u (pitanje je da li bi tako bilo da RTB izmiruju svoje astronomske obaveze prema drugim javnim preduzećima i tako koči njihov razvoj, ali o toj zaštiti strateški bitnih državnih preduzeća je već bilo reči), ali takođe oni koji kroz decenije prate ovaj trend, znaju da je to uslovljeno kretanjem cene bakra na svetskom tržištu, odnosno berzi. Ne tako davno, cena koštanja proizvodnje bakra po toni je bila takva da se nisu mogli pokriti ni troškovi poslovanja niskom prodajnom cenom. Dakle u pitanju su ciklični procesi, karakteristični za ovu granu privrede na svetskom nivou. Već vek i jače, Borani se vode parolom, bilo je lepo dok je trajalo, a nije se investiralo pre svega u razvoj tercijarnog sektora, koji bi u godinama niske cene bakra punio opštinsku kasu i zapošljavao višak industrijske radne snage. Pored RTB-a, tu je još nekoliko kompanija koje se bave istraživanjem rudnih nalazišta i koje se zaradama pozitivno izdvajaju od republičkog proseka.

Kada su u pitanju ostvarene investicije u nova osnovna sredstva po stanovniku, Opština Bor je u sredini (45.113 rsd) između regiona Južne i Istočne Srbije (37.422 rsd) i

republičkog proseka (75.599 rsd). Razlog je već pomenuta činjenica da je država Srbija dovođenje inostranih kompanija stimulisala finansijskom pomoći za zapošljavanje, davanjem besplatnog građevinskog zemljišta, oslobađanjem poreza na zarade u prvim godinama poslovanja (što su činile i neke jedinice lokalne samouprave), uglavnom u većim gradovima koji su i samim investitorima bili interesantniji zbog većeg tržišta, bolje saobraćajne povezanosti sa prestonicom, većom nezaposlenošću u većim gradovima, a samim tim i mogućnošću davanja nižih zarada, iako je bilo i malobrojnih privatizacija gde su strani investitori opravdali ulogu koja se od njih očekivala, a to su dodatne investicije u osavremenjivanje proizvodnje, povećanje broja zaposlenih, rast izvoza a samim tim i uvećanom ubiranju poreza koji su punili kase jedinica lokalne samouprave i dovodile do razvoja čitavih regiona stimulišući i razvoj domaćih privrednika koji su kao kooperanti saradivali sa inostranim kompanijama.

3. JAVNO-KOMUNALNA PREDUZEĆA NA TERITORIJI OPŠTINE BOR

Od snage i finansijske stabilnosti opštine i mogućnosti da pruži podršku, u velikoj meri zavisi i položaj i uspešnost poslovanja samih JK preduzeća, koja još uvek gledaju u državu i jedinice lokalne samouprave očekujući bilo kakvu pomoć.

Javno-komunalna preduzeća koja posluju na teritoriji borske opštine su: JKP „Vodovod“ Bor, JKP „3. oktobar“ Bor, JKP „Toplana“ Bor, JP „Bogovina“ Bor, JP za stambene usluge „Bor“ Bor i JP „Zoološki vrt“ Bor. [4]

3.1. JKP „VODOVOD“ BOR

Glavna delatnost ovog JKP-a je snabdevanje vodom i odvođenje otpadne vode na teritoriji opštine Bor, a osim opštine Bor, vodom za piće su snabdevena i sela Brestovac, Brezonik, Donja Bela reka, Zlot, Krivelj, Oštrej i Slatina. Početkom organizovanog vodosnabdevanja se smatra izgradnja i puštanje u rad vodovoda „Surdup“ 1949 godine, dok je zvanično osnivanje od strane skupštine opštine Bor bilo 1962.godine, a 1990 godine se registruje kao Javno komunalno preduzeće „Vodovod“ Bor. JKP „Vodovod“ organizovano snabdeva vodom privredu i 45.000 građana, od čega je 38.000 u samom Boru. Takođe, odvodi otpadnu vodu privrede i oko 90% priključenih na vodovod. Snabdevanje vodom Bora karakteriše dobar kvalitet i dovoljna količina raspoložive vode lokanih izvorišta. Prosečan broj zaposlenih u 2016. je iznosio 202 radnika. [5]

3.2 JKP „3. OKTOBAR“ BOR

Ovo preduzeće je osnovano kao javno-komunalno preduzeće sa sadašnjom organizacijom 14.12.1989. Preduzeće je zaduženo za obavljanje sledećih poslova: izvoz i deponovanje smeća, održavanje javne higijene grada (čišćenje i pranje ulica), održavanje gradske deponije smeća, podizanje i održavanje zelenih površina i parkovskih rekvizita, održavanje ulica, puteva i dr. javnih površina u gradu, održavanje saobraćajnica i trotoara u zimskim uslovima, čišćenje zajedničkih prostorija u stambenim zgradama, pružanje pogrebnih i drugih usluga na groblju, održavanje robne pijace, obavljanje poslova humanog hvatanja pasa i mačaka lualica, u obimu i vrsti za koje su obezbeđeni uslovi. Prosečan Broj zaposlenih u 2016. iznosio je 206 radnika. [6]

3.3. JKP „TOPLANA“ BOR

Toplani Bor osnovana je 1. novembra 2002. godine, izdvajanjem iz RTB-a Bor. Preduzeće se isključivo bavi proizvodnjom i distribucijom toplotne energije i proizvodnjom tople vode, kao i pružanjem usluga trećim licima u oblasti održavanja toplotne instalacije.

Bor je opština, sa procentualno gledano najvećim brojem domaćinstava priključenih na daljinski sistem grejanja, na čak 95% teritorije. Od 14.200 domaćinstava centralno grejanje ima 11.600 domaćinstava. Prosečan broj zaposlenih u 2016. je iznosio 154 radnika. [7]

3.4. JP „BOGOVINA“ BOR

Da bi se opštini i industriji obezbedila dovoljna količina vode, 1996. godine je započeta izgradnja I faze regionalnog vodovodnog sistema „Bogovina“ koji je pušten u rad 2002 godine. Bogovina vrši vodosnabdevanje, navodnjavanje, odbranu od poplava, proizvodnju električne energije, prečišćavanje sirove vode i transport čiste pijaće vode do korisnika pomoću cevovoda i sistema pratećih objekata (šahtovi na cevovodu, merno-regulacioni blokovi, pumpne stanice i prekidne komore). Prosečan broj zaposlenih u 2016. iznosio je 20 radnika. [8]

3.5. JP ZA STAMBENE USLUGE „BOR“ BOR

Ovo javno preduzeće je među pionirima organizacije objedinjene naplate komunalnih usluga u Republici Srbiji još od polovine 1970-ih godina. Kao javno preduzeće za stambene usluge „Bor“ otpočinja sa radom 31.03.1990 .godine. Poslovi tekućeg i investicionog održavanja zajedničkih delova zgrada osnovna su delatnost ovog Javnog preduzeća kao i naplata komunalnih usluga za korišćenje stanova, održavanje i izdavanje poslovnog prostora u Boru. Prosečan broj zaposlenih u 2016. iznosio je 42 radnika. [9]

3.6. JP „ZOOLOŠKI VRT“ BOR

JP „Zoološki vrt“ Bor je mlado preduzeće osnovano 08.12.2011. godine i u svom sastavu poseduje oko 60 vrsta životinja i preko 100 jedinki. Nalazi se u samom gradu, na mestu na kome je prethodno bila šuma koja je dobrim delom sačuvana što daje posebnu autentičnost ovom zoo vrtu. Sve životinje imaju kompletno opremljena staništa. Afričke životinje smeštene su u adekvatnim ozidanim objektima koji se greju. Staništa za zveri čak imaju i podno grejanje. Definitivno najveću pažnju posetilaca privlači naš beli lav Dušan, pripadnik treće generacije belih lavova u Srbiji. Beli lav u Srbiji može se videti jedino u beogradskom i borskom zoo vrtu. [10]

4. FINANSIJSKA ANALIZA POSLOVANJA JAVNO-KOMUNALNIH PREDUZEĆA U BORU

Kako bi se stekao uvid u finansijsko poslovanje posmatranih javnih preduzeća u opštini Bor, izvršena je finansijska analiza nekih od najbitnijih kategorija Bilansa stanja i

Bilansa uspeha. Tako je u Tabeli 2 prikazana ukupna imovina (Aktiva) po radniku u 2013. i 2016. godini. [3]

Tabela 2. Ukupna imovina (Aktiva) po radniku u 2013. i 2016. godini (u 000)

God.	JKP "Vodovod"	JKP "3. oktobar"	JKP "Toplana"	JP "Bogovina"	JP za stambene usluge "Bor"	JP "Zoološki vrt"
2013.	3.388	921	11.284	60.253	16.402	326
2016.	3.409	929	12.077	59.424	24.209	325

Iz tabele 2 može se videti da najveću ukupnu imovinu po radniku ima JP "Bogovina" u obe posmatrane godine. Sledeće je JP za stambene usluge, kod koga je u 2016. u odnosu na 2013. došlo do povećanja ukupne imovine po radniku na šta su uticala povećana obrtna sredstva. Slede JKP "Toplana" i JKP "Vodovod", a za njima JKP "3. oktobar" i JP "Zoološki vrt", kod kojih je imovina po radniku praktično nepromenjena u posmatrane dve godine, a prosečan broj radnika je ostao približno isti i 2013. i 2016. godine. Dakle nije bilo ulaganja u stalnu imovinu ni povećanja obrtne imovine.

U tabeli 3 je predstavljen odnos između osnovnih i obrtnih sredstava u 2016. godini.

Tabela 3. Odnos između osnovnih i obrtnih sredstava u 2016. godini (u 000)

Opis	JKP "Vodovod"	JKP "3. oktobar"	JKP "Toplana"	JP "Bogovina"	JP za stambene usluge "Bor"	JP "Zoološki vrt"
Osnovna sredstva	562.180	129.545	945.333	1.173.151	10.951	4.547
Obrtna sredstva	126.602	61.857	914.605	15.336	1.005.851	2.612

U tabeli 3 su evidentirani apsolutni iznosi, pa se može videti da su samo u JP za stambene usluge obrtna sredstva veća od osnovnih, i to poprilično, jer u svojoj strukturi osnovnih sredstava ovo JP ne raspolaže velikom vrednošću nekretnina, postrojenja i opreme. Potraživanja od kupaca dominiraju u strukturi obrtnih sredstava sa preko 700 miliona. Ostala JP imaju veću osnovnu imovinu od obrtne, najviše JP "Bogovina", potom JKP "Toplana", JKP "Vodovod" i JKP "3. oktobar, iz razloga jer se radi o kapitalno intenzivnim delatnostima gde dominira bilansna pozicija nekretnine, postrojenja i oprema, a JP "Zoološki vrt" takođe ima više osnovnih u odnosu na obrtna sredstva, ali u znatno manjem obimu nego ostala JP.

U Tabeli 4 predstavljena je tehnička opremljenost rada (osnovna sredstva po radniku) u 2013. i 2016. godini.

Tabela 4. Tehnička opremljenost rada (osnovna sredstva po radniku) u 2013. i 2016. godini (u 000)

God.	JKP "Vodovod"	JKP "3. oktobar"	JKP "Toplana"	JP "Bogovina"	JP za stambene usluge "Bor"	JP "Zoološki vrt"
2013.	2.962	668	5.867	59.348	1.893	165
2016.	2.783	628	6.138	58.657	260	206

Iz tabele 4 dolazi se do zaključka da su u svim JP u 2016. osnovna sredstva po radniku približno ista iznosu iz 2013. godine, znajući pritom da se prosečan broj radnika nije menjao u pomenutim godinama, sem u JP za stambene usluge gde je značajno smanjena tehnička opremljenost rada, jer se u Bilansu stanja u 2016. godini ne nalazi pozicija investicione nekretnine, inače bi iznos bio približno isti kao i 2013. Najveću tehničku opremljenost rada ima JP "Bogovina", jer ima veliku vrednost osnovnih sredstava, a relativno mali broj zaposlenih. Prate je JKP "Toplana", JKP "Vodovod" i JKP "3. oktobar", a najmanju tehničku opremljenost rada ima JP "Zoološki vrt".

U tabeli 5 prikazan je kapital po radniku u 2013. i 2016. godini.

Tabela 5. Kapital po radniku u 2013. i 2016. godini (u 000)

God.	JKP "Vodovod"	JKP "3. oktobar"	JKP "Toplana"	JP "Bogovina"	JP za stambene usluge "Bor"	JP "Zoološki vrt"
2013.	253	503	1.693	51.928	1.879	232
2016.	0	566	0	53.351	0	257

Iz tabele 5 se vidi da su JKP "Vodovod", JKP "Toplana" i JP za stambene usluge u 2016. imali kapital po radniku 0, jer im je i ukupni kapital te godine iznosio 0. Jedina razlika je što je od navedena 3 preduzeća, JP za stambene usluge u 2016. jedino poslovalo sa neto dobitkom, ali akumulirani gubici iz ranijih godina su i kod njega eliminisali kapital i sveli ga na nulu. U preostala 3 javna preduzeća, kapital po radniku čiji se prosečan broj nije značajno menjao u 2016. u odnosu na 2013. najveći kapital po radniku imalo je JP "Bogovina", jer nema mnogo radnika a ima veliki ukupni kapital. Prate ga JKP "3. oktobar" i JP "Zoološki vrt".

U tabeli 6 predstavljen je odnos između kratkoročnih u dugoročnih obaveza u 2016. godini.

Tabela 6. Odnos između kratkoročnih u dugoročnih obaveza u 2016. godini (u 000)

Opis	JKP "Vodovod"	JKP "3. oktobar"	JKP "Toplana"	JP "Bogovina"	JP za stambene usluge "Bor"	JP "Zoološki vrt"
Kratkoročne obaveze	580.210	58.371	1.607.612	102.555	901.077	1.496
Dugoročne obaveze	235.560	0	362.831	18.641	116.923	0

Iz tabele 6 se jasno vidi da JKP "3. oktobar" i JP "Zoološki vrt" nemaju dugoročne obaveze. Sva ostala javna preduzeća imaju veće kratkoročne od dugoročnih obaveza u 2016. Kod JP za stambene usluge "Bor" one su 7,7 puta veće, kod JP "Bogovina" 5,4 puta, kod JKP "Toplana" 4,4 puta i kod JKP "Vodovod" 2,5 puta. U strukturi kratkoročnih obaveza dominante su obaveze prema dobavljačima, dok su u nekim JP u velikom iznosu prisutna i pasivna vremenska razgraničenja (PVR).

U tabeli 7 prikazani su prihodi od subvencija u ukupnom prihodu (%) u 2013. i 2016. godini.

Tabela 7. Prihodi od subvencija u ukupnom prihodu (%) u 2013. i 2016. godini

God.	JKP "Vodovod"	JKP "3. oktobar"	JKP "Toplana"	JP "Bogovina"	JP za stambene usluge "Bor"	JP "Zoološki vrt"
2013.	3,94%	4,63%	20,80%	51,26%	0,00%	91,30%
2016.	9,53%	4,72%	9,27%	76,18%	0,00%	88,03%

Iz Tabele 7 dolazi se do zaključka da je JP "Zoološki Vrt" i u 2013. i u 2016. godini imalo ubedljivo najveći procenat učešća prihoda od subvencija u ukupnom prihodu (91,30% i 88,03%) a to je donekle i razumljivo jer je ovo JP osnovano kao turistička atrakcija za građane Bora i druge posetioce, sa unapred planiranim malim prihodima od prodaje proizvoda i usluga, jer su cene za posetioce simbolične. JP "Bogovina" je drugo po redu kada su u pitanju prihodi od subvencija u ukupnim prihodima. 2013. je taj iznos u procentima bio 51,26% a 2016. je narastao na 76,18%. Razlog za ovolike procenat subvencionisanja je niska prodajna cena vode po kubnom metru, opet sa željom da to bude socijalno prihvatljiva cena za građane. U JKP "Vodovod" prihodi od subvencija u ukupnom prihodu su porasli iz 2013. sa 3,94% na 9,53%. U JKP "3. oktobar" Bor odnos je gotovo nepromenjen za posmatrane godine, dok su se u JKP "Toplana" smanjili u 2016. na 9,27% u odnosu na 20,80% koliko su iznosili 2013. Zanimljivo je da JP za stambene usluge u posmatranim godinama nije imalo prihode od subvencija.

U apsolutnom iznosu, pomoć u vidu subvencija je u 2016. za JKP "Vodovod" i JP "Zoološki vrt" bila približno ista, oko 35 miliona dinara, ali je zbog velike razlike u ukupnim prihodima ova dva JP-a razlika u procentualnom iznosu velika.

U tabeli 8 prikazan je neto rezultat po radniku u 2013. i 2016. godini.

Tabela 8. Neto rezultat po radniku u 2013. i 2016. godini

God.	JKP "Vodovod"	JKP "3. oktobar"	JKP "Toplana"	JP "Bogovina"	JP za stambene usluge "Bor"	JP "Zoološki vrt"
2013.	-161.307	20.479	-425.239	-357.700	6.938	37.545
2016.	-217.832	1.728	-992.221	-270.000	54.548	136

U tabeli 8 može se videti da su javna preduzeća u Boru koja su u 2013. ostvarila neto gubitak, imala su neto gubitak i 2016. Isti je slučaj i sa preduzećima koja su ostvarila neto dobitak, pa je u skladu s tim i neto rezultat po radniku bio pozitivan ili negativan u pomenutim godinama. Najdrastičniji rast neto gubitka po radniku imalo je JKP "Toplana", za čak 133%, JKP "Vodovod" je takođe imao rast neto gubitka po zaposlenom, dok je JP "Bogovina" smanjilo neto gubitak po radniku za pomenute godine. Nasuprot njih, JKP "3. oktobar" je ostvarilo smanjenje neto dobitka po radniku skoro 12 puta u 2016. u odnosu na 2013. a JP "Zoološki vrt" čak 276 puta. Jedino je JP za stambene usluge povećalo neto dobit po radniku u analiziranim godinama 7,8 puta. Ono što je najvažnije, posmatrana preduzeća nisu ostvarila povećanje ili smanjenje neto gubitka, odnosno neto dobitka po radniku zbog promene broja zaposlenih, jer je taj broj u 2013. i 2016. bio približno isti, već zbog pozitivnih ili negativnih tendencija u poslovanju.

5. ANALIZA EKONOMSKIH I FINANSIJSKIH POKAZATELJA POSLOVNJA JAVNO-KOMUNALNIH PREDUZEĆA ČIJI JE OSNIVAČ OPŠTINA BOR

Ekonomski i finansijski indikatori ukazuju na najznačajnije performanse privrednih subjekata u prethodnom periodu, njihovom analizom se dolazi do zaključaka o tome šta su ključne prednosti i ograničenja u poslovanju određenog privrednog subjekta. Menadžment kasnije koristi ove podatke za definisanje mera poslovne politike kojima će se poboljšati njihove ekonomske i finansijske performanse i ostvariti strateški ciljevi u budućem periodu. [11]

Privredni subjekti u analizi najčešće koriste različite kombinacije indikatora, u zavisnosti od predmeta analize i postavljenih ciljeva. U ovom radu su izabrani sledeći indikatori poslovanja JKP-a na teritoriji opštine Bor:

1. Opšti racio likvidnosti,
2. Racio zaduženosti,
3. Racio finansiranja
4. Stopa prinosa na ukupnu imovinu (SPNUI),
5. Stopa prinosa na kapital (SPNK).

U Tabeli 9 prikazani su dobijeni rezultati na osnovu formula za izračunavanje istih.

Tabela 9. Ekonomski i finansijski indikatori poslovanja JKP-a u opštini Bor

Javna preduzeća u Opštini Bor	Pokazatelj likvidnosti	Pokazatelji zaduženosti		Pokazatelji profitabilnosti	
	(ORL)	(RZ)	(RF)	(SPNUI)	(SPNK)
JKP „Vodovod“ Bor	0,22	1,19	/	-6,39	/
JKP „3. oktobar“ Bor	1,06	0,39	0,64	0,19	0,305
JKP „Toplana“ Bor	0,57	1,07	/	-8,22	/
JP „Bogovina“ Bor	0,15	0,10	0,11	-0,45	-0,005
JP za stambene usluge „Bor“ Bor	1,12	1,00	/	0,23	/
JP „Zoološki vrt“ Bor	1,75	0,21	0,26	0,04	0,001

Analizom dobijenih pokazatelja u Tabeli 9 može se zaključiti da JP „Bogovina“ Bor ima najniži opšti ratio likvidnosti (0,15). To praktično znači da je 1 dinar kratkoročnih obaveza pokriven sa 0,15 dinara obrtnih sredstava. Imajući u vidu da se radi o preduzeću koje nema zalihe a da su potraživanja po osnovu prodaje činila 95% obrtnih sredstava, ne iznenađuje tako nizak iznos ORL za pomenuto preduzeće. U nezavidnom položaju sa aspekta opšte likvidnosti je i JKP „Vodovod“ (0,22) gde su takođe potraživanja po osnovu prodaje činila visok udeo obrtnih sredstava (86%) a neizmirene obaveze iz poslovanja čine preko 50% ukupnih kratkoročnih obaveza. Ispod donje granice vrednosti je i JKP „Toplana“ Bor (0,57) gde su obaveze iz poslovanja činile visok udeo kratkoročnih obaveza (68%), a potraživanja po osnovu prodaje 60% obrtnih sredstava. U nešto boljoj situaciji su JKP „3. oktobar“ i JP za stambene usluge „Bor“ koja su zabeležila nešto veći ORL od donje granice vrednosti koja iznosi 1, dok samo JP „Zoološki vrt“ ima stabilan ORL (1,75).

Sledeći veoma važan aspekt poslovanja, koji se neizostavno sagledava u finansijskoj analizi poslovanja privrednih subjekata jeste stanje zaduženosti. [12] U analizi su korišćeni ratio zaduženosti i ratio finansiranja. Kao što se može videti iz tabele 9, JKP „Vodovod“ ima najnepovoljniji indikator zaduženosti (1,19), mada su u sličnoj situaciji i JKP „Toplana“ (1,07) i JP za stambene usluge (1,00). U normalnim uslovima poslovanja ovaj pokazatelj ne trebalo da bude veći od 0,5. Međutim, gubici ovih preduzeća iz prethodnih godina značajno prevazilaze ukupnu vrednost izvora finansiranja i samim tim smanjuju ukupnu vrednost pasive, i zbog toga je koeficijent zaduženosti ovih JP veći od 1 iako je maksimum 1. Preduzeća se praktično zadužuju preko visine kapitala. To se desilo je im je država omogućila da ne izmiruju svoje obaveze na vreme. U najpovoljnijoj poziciji je JP „Bogovina“ koja ima ratio zaduženosti 0,10, odnosno imaju visok iznos sopstvenih izvora finansiranja. Zatim slede JP „Zoološki vrt“ (0,21) i JKP „3. oktobar“ (0,39). Kod racia finansiranja je poželjan odnos pozajmljenih i sopstvenih izvora finansiranja 1:1. Iz tabele 9 vidimo da kod JKP „Vodovod, JKP „Toplana“ i JP za stambene usluge ovaj koeficijent ne postoji. Razlog je taj jer je iznos kapitala ovih preduzeća 0 (sva imaju gubitak iznad vrednosti kapitala), odnosno,

postoje samo obaveze kao pozajmljeni izvori finansiranja. U najpovoljnijem položaju je JKP „3. oktobar“ sa indeksom 0,64, zatim JP „Zoološki vrt“ (0,26) i na kraju JP „Bogovina“ (0,11).

S obzirom na to da je osnovni motiv poslovanja svih privrednih subjekata ostvarivanje dobiti, pokazatelji profitabilnosti predstavljaju veoma bitnu ulogu u ekonomsko-finansijskoj analizi poslovanja. Posmatranjem stope prinosa na ukupnu imovinu može se zaključiti da je najpovoljnije stanje kod JP za stambene usluge, koje je ostvarilo zanemarljivih 0,23 dinara neto dobitka na angažovanih 100 dinara imovine. Zatim slede JKP „3. oktobar“ (0,19) i JP „Zoološki vrt“ (0,04). Razlog za ovako niske stope prinosa jesu veoma mali neto dobitci u pomenutim JP u odnosu na ukupna sredstva. Preostala tri javna preduzeća imaju negativnu stopu prinosa na ukupnu imovinu jer su ostvarila neto gubitak u poslovanju. Ukoliko se posmatra stopa prinosa na kapital, situacija je slična. Najveću stopu prinosa ostvarilo je JKP „3. oktobar“, sa takođe zanemarljivih 0,305 dinara neto dobitka na svakih 100 dinara angažovanog sopstvenog kapitala. JP „Bogovina“ ostvarilo je negativnu stopu prinosa na kapital (-0,005) jer je poslovalo sa neto gubitkom. S obzirom na to da je kod preostalih javnih preduzeća vrednost kapitala 0, stopa prinosa nije mogla biti iskazana, iako je JP za stambene usluge ostvarilo neto dobit.

6. PREPORUKE ZA UNAPREĐENJE POSLOVANJA JAVNIH PREDUZEĆA NA TERITORIJI OPŠTINE BOR

Na osnovu dobijenih rezultata sprovedene finansijske analize javnih preduzeća u opštini Bor može se zaključiti da se ona nalaze u brojnim velikim problemima i da je u budućnosti njihovo normalno funkcionisanje ugroženo, jer pomoć države i jedinica lokalne samouprave imaju svoje limite. Jedan od načina da se izađe iz stanja apatije jeste promena cenovne politike u pojedinim JP. Cene usluga su i do nekoliko puta jeftinije u odnosu na region, ali razlog je to što su cene svedene na socijalnu kategoriju, pa pritom treba biti obazriv koliko građani mogu da podnesu (ili bolje reći prihvate) rast cena, uzevši u obzir da mnogi nisu zadovoljni pruženom uslugom, što otežava naplatu potraživanja a to je svakako prva stvar koju sva JP u Boru moraju da podignu na viši nivo. Takva je situacija sa JKP „Toplana“ čiji su kapaciteti u startu predimenzionisani i ne koriste se u potpunosti, već sada su stari i glomazni a nije se razmišljalo o tome da opština neće zauvek da subvencionise njen rad. Održavanje je skupo, a neki dugoročni plan bi trebalo da podrazumeva rekonstrukciju postojećeg sistema, jer se ogromna energija gubi od toplane do krajnjih korisnika usled dotrajale infrastrukturne mreže. Za rešavanje ovakvih problema je neminovna i redukcija postojećeg prekomernog broja zaposlenih u administraciji kojih je neretko znatno više nego u proizvodnji, a govorimo o kapitalno intenzivnoj delatnosti. Javno-privatna partnerstva bi mogla da budu jedan od načina za rešavanje problema nerentabilnosti javnih preduzeća, gde bi privatni sektor uneo neophodan kapital za pomenutu rekonstrukciju mreže koji opština nema, ali bi ubirao i deo prihoda, dok bi jedinica lokalne samouprave morala da zadrži učešće u vlasništvu zbog nadzora, kako ne bi došlo do pojave privatnog monopola koji je mnogo teže kontrolisati nego državni i gde bi cene privatnika zanemarile socijalni problem, nego bi se težilo pokriću troškova i ostvarivanju profita. Slična je situacija i sa JKP „Vodovod“ gde je cena usluge nedovoljna da pokrije troškove. Poboľjšati naplatu potraživanja, povećati cenu do socijalno prihvatljive, neka su od rešenja kao i kod toplane, ali nerentabilno poslovanje JKP „Vodovod“ uslovalo je nastanak ogromnog duga prema JP „Bogovina“, dakle pravi se lančana reakcija uvođenja u nerentabilno poslovanje jednog JP od strane drugog. Takođe, projektovana cena vode po kubnom metru bi trebalo da bude 3,2 puta viša uz

subvencionisanje od strane opština Bor i Boljevac, odnosno 3,75 puta viša bez subvencionisanja, i to samo da bi se pokrili troškovi, bez ostvarivanja pozitivnog rezultata u poslovanju. S obzirom na to da se radi o JP koja su osnovana od strane jedinice lokalne samouprave u Boru, lokalni funkcioneri imaće izuzetno težak zadatak da sa direktorima JP, naročito onih koja izuzetno loše posluju a baš ona imaju malo veći značaj za samu opštinu, pokušaju da pronađu dugoročno rešenje za njihovo racionalno funkcionisanje, uz vođenje računa o tome da se sva muka ne svali na leđa stanovnika Bora i okoline.

7. ZAKLJUČAK

Ono što od početka procesa tranzicije pa i danas karakteriše rad javnih preduzeća u većini opština i gradova u Republici Srbiji, jeste loša organizacija rada, nedovoljna produktivnost prekomernog broja zaposlenih, dugogodišnja nerentabilnost, prevelika zavisnost od subvencionisanja i slično. Umesto da država i jedinice lokalne samouprave kao osnivači preko javnih preduzeća utiču na ekonomsku politiku zemlje kroz praćenje njihovog funkcionisanja, ona su postala kamen spoticanja srpske ekonomije.

Njihov protekcionistički odnos prema javnim preduzećima doveo je do toga da ogroman broj istih posluje nerentabilno već dugi niz godina. Akumuliranje gubitaka javnih preduzeća na nivou nacionalne privrede dovešće do kolapsa u strukturi javnih prihoda, a država i jedinice lokalne samouprave su bespomoćne da uspostave njihovo poslovno ozdravljenje. Problem je utoliko veći, što su i sama javna preduzeća navikla na višedecenijsku zaštitničku politiku svojih osnivača, i vode se parolom da “ne mogu” da propadnu. Sami rukovodioci i zaposleni bi trebalo sebi da postave pitanje kako su se našli u toliko nezavidnoj situaciji i koliko su oni doprineli nazadovanju poslovanja javnih preduzeća u kojima rade, umesto što stalno upiru prstom u organe vlasti očekujući da nešto urade za njih. Sve to implicira da još uvek postoje tragovi prošlog vremena koji su duboko ukorenjeni u srpskoj privredi i mentalitetu zaposlenih u javnim preduzećima, te da je proces tranzicije u Republici Srbiji u stanju hibernacije, dok je komunistički način rukovođenja doživeo reinkarnaciju u vidu sadašnjih javnih preduzeća, gde se rukovodioci biraju isključivo iz vladajućih političkih partija na osnovu svojih stranačkih zasluga, a ne na osnovu kvalifikovanosti.

REFERENCE

1. Arsić M., Reforme državnih i društvenih preduzeća, Kvartalni monitor, 28 (2017), 72-82.
2. Fiskalni savet, Analiza državnih preduzeća, Fiskalni aspekt, 31. jul 2014.
3. Republički zavod za statistiku, Opštine i regioni u Republici Srbiji, Beograd 2017.
4. Sajt opštine Bor, <http://opstinabor.rs/>
5. Sajt JKP „Vodovod“ Bor, <http://vodovodbor.com/>
6. Sajt JKP „3. oktobar“ Bor, <http://www.jkpbor.rs/>
7. Sajt JKP „Toplana“ Bor, <http://toplana.rs/>
8. Sajt JP „Bogovina“ Bor, <http://www.jpbogovinabor.com/pocetna.html>

9. Sajt JP za stambene usluge „Bor“, <http://www.jpbor.rs/>
10. Sajt JP “Zoološki vrt“ Bor, <http://www.zoovrtbor.com/>
11. Krstić J., Stojiljković M., Finansijska Analiza, Ekonomski fakultet u Nišu, Niš, 2000.
12. Vučković B., Veselinović B., Drobnjaković M., Finansiranje trajnih obrtnih sredstava u poljoprivredi, *Ekonomika poljoprivrede*, 64 (3), (2017), 1065-1080.



RESTRUCTURING OF A LEGAL ENTITY BY SPIN-OFF AND CREATION SUBSIDIARY ENTERPRISES AS A BUSINESS DEVELOPMENT

Victor Dubolazov, Arina Zakirova

Peter the Great St. Petersburg Polytechnic University, Russia

Abstract: The study researched the problem of restructuring of a legal entity by spin-off and creation subsidiary enterprises, arrangement of the restructuring goals, comparison of these methods, recommendation of exploitation them and forming of authorized capital.

What is better - to reorganize of a legal entity by spin-off or creation subsidiary enterprises? It is complicated question, as well as the question how to share assets and liabilities between the restructuring participants and how to create authorized capital of new enterprises. This article learnt these questions for limited liability companies as the most popular commercial structure.

Both of these methods have its advantages and disadvantages. In practice like in publications people mix up these elements that's why we decided to clear up differences between restructuring of a legal entity by spin-off and creation subsidiary enterprises and give some using recommendation.

The paper studies the matters reorganization by spin-off the companies (mainly limited liability company) and creation of subsidiary company according to last changes in legislation, differences between it, some variants of forming authorized capital, distribution of rights and liabilities between reorganized and new companies. It can help entrepreneurs to understand all problems, make a right decision about the way of reorganization, to avoid some problems during forming the capital and distribution of rights and liabilities which can have an adverse effect on taxing and relationship with contra party and founders; taxman and auditors to understand what focus on during inspection of reorganized and new companies.

Keywords: business restructuring, reorganization by spin-off, subsidiary enterprise, authorized capital

1. INTRODUCTION

Nowadays, especially under the financial and economic crisis conditions, many companies try to develop and improve the activity effectiveness by different methods of business restructuring, which includes restructuring of a legal entity by spin-off or creation subsidiary enterprises.

Over the last years there are some changes in Russian legislation regarding business reorganization. According to the section 57-62 of Civil Code of the Russian Federation read with Federal Law № 99 05.05.2014:

reformation of commercial legal entity to uncommercial is forbidden;
reorganization process with the mix of some types of reorganization is possible;
mixed reorganization with 2 or more legal entities among other of different business legal structure is possible;
the only one document of transferring rights and duties is transfer act;
creditors guarantee is reconciled.

2. LITERATURE REVIEW

The question about reorganization is widespread in the legislation, conclusions of adjudicatory organ, expert publications [1, 2, 3] such as Vertakova Y.V., Baranova P.V., Ferceva V.A., Isaeva V.A., Sozinova A.A. and many others. What is better - to reorganize of a legal entity by spin-off or creation subsidiary enterprises? It is complicated question, as well as the question how to share assets and liabilities between the restructuring participants, and how to create authorized capital of new enterprises.

The goal of this article to analyze restructuring methods (reorganization by spin-off and creation subsidiary enterprises), define the best way of restructuring for limited liability companies as the most popular commercial structure according the last changes in the legislation. Also we analyze ways of creation of authorized capital of new enterprises (for limited liability companies) and sharing assets and liabilities between the restructuring participants.

3. RESEARCH METODOLOGY

The main idea of any business restructuring is effectivization which is achieved by business development, enhancement of soundness on the market, cost cutting, reallocation of corporate control etc. On the definite level of business development it is necessary to breaking up the corporation into smaller units [4].

The general goals of business restructuring by spin-off or creating the subsidiary enterprises are:

new name promotion;
improvement the specialization by deliverance of secondary activities;
adaptation to the dynamic environment;
creation several independent legal entities from one company where success of one company compensate failing of another;
management optimization by transforming the units of the company to independent ones, enhancement responsibility and motivation in raising of efficiency of all employees;
cutting tax payments by means of using different tax treatments for different kind of business such as simplified tax system, single tax on imputed income, single agricultural tax, and registration of legal entity in concessional taxation area;
motivation of legal entity participants to independence;

sharing the business between opponent participants of legal entity;
dissipation of assets from legal entity on behalf of its main participants or its top managers which aim at independence;
creation new company without debts of reorganized one;
protection from hostile take-over.

Sometimes unfair entrepreneurs use business restructuring for default on commitments by [5]:

dissipation of the most fluid assets or disproportional sharing assets and liabilities during reorganization, creation new company only with illiquid asset and bills receivable;
creation new companies only with illiquid assets and bills receivable with future bankruptcy proceeding in order to eliminate of bankruptcy of all reorganized legal entity;
creation new companies with liquid assets for future sell-off of assets by selling these companies;
non-payment of taxes or its reducing.

There are two ways of creations a new company: during restructuring of a legal entity by spin-off and creation subsidiary enterprises. The last one is not a restructuring because subsidiary company has not any rights and obligations of the main enterprise.

Both of these methods have its advantages and disadvantages. In practice like in publications people mix up these elements that's why we decided to clear up differences between restructuring of a legal entity by spin-off and creation subsidiary enterprises and give some using recommendation.

1. Both of these methods of restructuring have that in common, such as the result of it is two or more new independent companies which have own property, corporate bodies, which is liable for debts by their property, have a right and a duty etc. Subsidiary enterprises are not liable for debt of the parent company like enterprises created during the reorganization by spin-off are not liable for debt of the reorganized company.

Also there are some differences between these methods. Reorganized company is not liable for debt of enterprises created during the reorganization by spin-off [6], but parent company is liable for debt of subsidiary enterprises solidary, if these debts appear in the line of duty, or if subsidiary enterprise is out of business by the fault of parent one. Also parent company is liable for debt of subsidiary enterprises in case when the last one took part in making a decision (item 2 section 67/3 of Civil Code of the Russian Federation read with Federal Law № 99 05.05.2014).

Reorganized company can give up its liability to the new firm created by spin-off. In this case a new firm is liable to former creditors of reorganized company [7]. Also both of these companies are liable to former creditors of reorganized company if creditors demanded pre-schedule fulfilment of obligations or discharge and payment of damages but not got it (item 3 section 60 of Civil Code of the Russian Federation). This applies to the case in which it is impossible to identify the liability cessionary or when assets and liabilities were shared in bad faith and it lead to violation of creditors interests (item 5 section 60 of Civil Code of the Russian Federation).

Summarizing the above, creation subsidiary enterprises is more advantageous than reorganization by spin-off according to transfer of rights and obligations.

2. The next common point is transfer the assets by restructured company to new firms in both methods [8].

A parent company is the unique founder of subsidiary firm and create its authorized capital by own property getting liability rights. In this case balance sheet assets and liabilities of the founder is permanent.

A parent company transfers a part of its assets to its subsidiary firm and account for it as financial investment in authorized capital [9]. In case of reorganization by spin-off the balance sheet account of the reorganized company are cut by transfer act and it can be negative for goodwill.

Summarizing the above, creation subsidiary enterprises is more advantageous than reorganization by spin-off according to investment potential and capitalization growth [10].

3. A subsidiary company is not liable for debts of the parent firm. The last one doesn't cut its debts and it impairs the financial sustainability of the company. In another method a reorganised company transfer as rights as liabilities and a part of receivables and payables to the new firm by transfer act.

There is no some requests and recommendations about liabilities value transferred to the new company. But the debts to the government budget and non-budgetary foundation of taxation and revenue are not transferred (item 8 section 50 of Tax Code of the Russian Federation).

According to allocation of receivables and payables reorganization by spin-off is more advantageous than creation subsidiary enterprises.

4. Companies created by spin-off are divorced from each other and don't come to help to each other [11]. A parent and subsidiary companies are a group of connected legal entities which help each other in different legal, economic and investment questions what lead to raising of stability of all companies included in the corporate group.

Summarizing the above, creation subsidiary enterprises is more advantageous than reorganization by spin-off.

5. The decision to reorganize the company by spin-off is made by its participants who has as common stocks as preference stocks. In company limited it is made by a general shareholder meeting where $\frac{3}{4}$ voters made such decision. In limited liability company this decision is made by all participants unanimously.

In reorganization process it is necessary to inform the Federal Tax Service, which make a note in the National Register of Legal Entities, and creditors, announce in mass media and the internet, put in the unified federal register of information on the facts of the activities of legal entities. It is not necessary in case of creation a subsidiary company [12].

Creation of subsidiary firm is unilateral contract and can be made by the decision of executive office or board of management. Except for the case when the deal is very large. There is no transfer act in the process. The parent company doesn't transfer any rights and liabilities to its subsidiary firm.

Summarizing the above, creation subsidiary enterprises is more simple and less expensive than reorganization by spin-off.

6. Shareholders who voted against the reorganization of public company or didn't vote at all can require the company to buy out their shares by real cost or be a shareholders of each

new firms [13]. In limited liability company decision about reorganization must be made on a unanimous basis.

Restructuring by spin-off is more simple as shareholders of the parent company can't require to buy out their stocks. Majoritarian participants keep their influence in subsidiary firm through the main company.

7. Shareholders of a subsidiary firm are participants of a parent company. And during net profit distribution dividends owners can be only participants of the parent company. Participants of the subsidiary firm can have dividends of the main company if it is. In case of spin-off participants of reorganized company can have shares in authorized capital of a new firm. That's why reorganization by spin-off is more advantageous than creation subsidiary enterprises especially for minority participants. But a parent company can sale its shares of authorized capital of the subsidiary firm to anyone or its participant which don't have right of preference.

8. Participants of organized by spin-off company can keep their rights to run new firms only if the company charter which is approved on epy shareholders general meeting of the reorganized company allows it. Participants of parent company can keep controlling the subsidiary firms through their administration being its members.

According to conflict resolution between business partners reorganization by spin-off is better than creation subsidiary enterprises. In corporation with parent and subsidiaries companies it is really difficult to solve some problems [14].

In general the way or restructuring depends on the case.

There are several types of reorganization, they are split up, spin-off, takeover, merger and reformation. Many specialists and we consider that the most complicated form is spin-off, especially forming the authorized capital, distribution of assets and liabilities between reorganized and new companies. There are some variants of forming authorized capital of new firm created by spin-off. The same can't be said for the other form of reorganization.

Let's consider forming the authorized capital for limited liability company created by spin-off. Limited liability company are beyond the 90% level of all commerce companies. The result of reorganization of limited liability company by spin-off is creation one or several new firms which got some rights and liabilities according the transfer act. And the reorganized company continues in operation (item 4 of section 58 of Civil Code of the Russian Federation, item 1 of section 55 of Federal Law about Limited Liability Company).

There are some legal restrictions about creation authorized capital. The value of it can't be less than 10 000 rubles, net assets of company must be more than its authorized capital.

Authorized capital of new company is paid by the founders. Asset holdings of the company created by spin-off is formed from the assets of the reorganized firm according to the transfer act [15]. There is no common between transfer the assets by way of succession and forming the authorized capital of company created by spin-off [16].

Active legislation forbids any pays for the shares in authorized capital in case of reorganization. It is incorrect to say about payment of authorized capital of the company created by spin-off by the participants of reorganized firm. The result of spin-off is creation a new independent firm without any assets of reorganized company [17]. If the founder decided to form authorized capital of subsidiary firm using property of reorganized company and this property is transferred as payment for this capital without any changes in the authorized capital of the reorganized company, this transfer of property is financial investment of reorganized company and share capital payment of a new firm (item 39 of Practice advisory

of formation the financial statements during reorganization (approved by the order of Ministry of Finance of Russian Federation No 44n of 20.05.2003)).

The main variants of forming the authorized capital of limited liability company created by spin-off are:

1. the authorized capital of the company created by spin-off is formed by cutting the capital of the reorganized firm. Value of participants shares in the capital of reorganized company is stay the same but its nominal cost is changed. In this case it is possible to convert the shares from the capital of reorganized company to the capital of new firm proportional or in a different way according to decision about reorganization.
2. Authorized capital of new company is created from the capital of reorganized firm as a part of one participant. The other part of the capital is divided up between other participants. It leads to the cutting the capital of reorganized company. This way is suitable for business separation between partners. For example when one participant of reorganized firm convert his share to the share of new company and stop being a participant of reorganized firm.
3. One part of capital of new company is assigned to reorganized firm and the others are shared between its participants. It is possible to assigned whole authorized capital to the reorganized company.
4. Authorized capital of new company is created by internal fund without capital of reorganized firm that is retained earnings and added capital. In such way participants of reorganized company become the participants of new firm. Reorganized company can take a stake in a new firm.

The process of forming the authorized capital in such way is below. Firstly the capital of reorganized company is expanded by retained earnings and/or added capital what leads to expansion of shares nominal cost of the reorganized firm by its own capital. After that the additional share of capital of reorganized firm is put on the capital of a new company and shared between participants of reorganized company. As a result they keep their shares in reorganized firm and got additional shares in new company. Participants of new firm don't make any contributions and get shares free of charge.

In case with limited liability company this process is more simple without advanced expansion of the capital. A part of the capital of reorganized company is turned over the new firm by transfer act and moved to its authorized capital. The results of these two variants are the same but the second way doesn't include time-taking and costly procedures of making decision about changing the authorized capital on general meeting, notarization, posting in mass media, making the changes in articles of association and Uniform State Register of Legal Entities etc.

Shares of reorganized by spin-off company which are subjected to convert to the shares of a new firm are not transferred to a new company and compensated at a time. It leads to capital reduction of the reorganized company at the moment of creation of a new firm. Equity capital of a company created by spin-off is forming by reduction of a capital of reorganized firm.

Often before the reorganization it is necessary the asset revaluation for making the additional capital [18].

Authorized capital of a company created by spin-off is defined not property costs got according to transfer act but a part of own assets of reorganized company which was transfer

to a new firm [19, 20]. For this reason if net asset value of a new company is more than its authorized capital this difference is retained earnings (accumulated losses) in opening balance.

It is recommended to form a transfer act in the end of financial reference period (year) or at the date of interim accounting reports (quarter, month) which is reason for estimation of transferring property and liabilities by reorganized company.

According to the work of The Ministry of Economic Development and Trade D28i-2105 21.07.2015 goodwill of state purchases is not transfer to a new company created by spin-off.

Making the decision about reorganization of limited liability company by spin-off its general meeting approves conditions of it, founding members of new firm which can be some or all participants of reorganized company, value authorized capital, share size of participants, authorized capital formation procedure, changes in reorganized company charter (its new edition), charter of a new company, its collegial and executive body, auditing committee, transfer act with participation of property, rights and liabilities between reorganized and new companies etc.

It is necessary to inform registration agency about reorganization, reduction of the capital, changes in the charter, make public in mass media about it etc.

Incorporation of legal entity created by spin-off is possible no sooner than expiry of a period of appeal of a decision about reorganization, it is 3 months later note about reorganization in the Uniform State Register of Legal Entities has been made (i.4 a.57, i.1 a.60 of Civil Code of the Russian Federation).

Reorganization by spin-off is considered done after the last new firm created by this reorganization is incorporated (i.4 a.16 of 129 Federal Law of 08.08.2001).

4. CONCLUSION

The paper studies the matters reorganization by spin-off the companies (mainly limited liability companies) and creation of subsidiary company according to last changes in legislation, differences between it. We defined and analyzed several criteria such as investment potential and capitalization growth, allocation of receivables and payables reorganization, transferring of rights and obligations, conflict resolution between business partners. In general the way or restructuring depends on the case.

Also the paper studies some variants of forming authorized capital, distribution of rights and liabilities between reorganized and new companies.

It can help entrepreneurs to understand all problems, make a right decision about the way of reorganization, to avoid some problems during forming the capital and distribution of rights and liabilities which can have an adverse effect on taxing and relationship with contra party and founders; taxman and auditors to understand what focus on during inspection of reorganized and new companies.

REFERENCES

1. Agapova D., Evdokimova A., Save the creditor: maintenance from unfair reorganization, *Economy and life*, 8, (2016).
2. Il'ina D.V., New reorganization, *Economy and Life*, 40, (2014).

3. Orgdulov M.V., Forming the capital during reorganization of limited liability company, *Economy and Life*, 7, (2010).
4. Vertakova Y.V., Tsukanova N.E., Harchenko E.V., Vendeleva M.A., Management of company strategic reorganization., Kursk State Technical University, Kursk, 2008, 209.
5. Anderson J. C., Gerbing D. W., Structural equation modeling in practice: a review and recommended two-step approach, *Psychological Bulletin*, 103(3), (1988), 411-423.
6. Mislavskaya N.A., Procedure of reorganization by spin-off, *Auditor*, 7, (2015).
7. Evseenko O.V., Compensation of shareholders and creditors interest in opening balance sheet of company reorganization, *Corporate finance*, no. 2(14), (2010), 62-67.
8. Ambos T. C., Andersson U., Birkinshaw J., What are the consequences of initiative-taking in multinational subsidiaries? *Journal of International Business Studies*, 41(7), (2010), 1099-1118.
9. Samburova Z.V., Forming of transfer act of reorganization by spin-off, *Economic News of Rostov State University*, 2, (2009), 104-107.
10. Samoilov I.A., System of owners interest during corporate restructuring, *Business and corporate law journal*, 1, (2016).
11. Nell P.C., Ambos B., Schlegelmilch B.B., The benefits of hierarchy? - exploring the effects of regional headquarters in multinational corporations, *Advances in International Management*, 24, (2011), 85-106.
12. Andersson U., Pahlberg C., Subsidiary influence on strategic behaviour in MNCs: An empirical study. *International Business Review*, 6(3), (1997), 319-334.
13. Chigrova N.V., Isaeva V.M., Assessment of reorganization by spin-off, *News of Orenburg State University*, 14(175), (2014), 372-378.
14. Kokoreva O.M., Official registration of legal entities after reorganization according to the legislation of Russian Federation, *News of Herzen State Pedagogical University of Russia*, 115, (2009), 253-259.
15. Carr E. H., 2012 analyze this, *Print Professional*, 50(3), (2012), 24-25.
16. A.A. Glusheckiy, Authorized capital: stereotypes and breaking it. Economic analysis of corporation right norm, Status, Moscow, 2017.
17. Gill S. L., Johnson R. L., Growing pains: Twelve lessons from corporate restructuring, *Health Progress (Saint Louis, Mo.)*, 69(4), (1988), 26-32.
18. Timofeeva S.N., Reorganization as a way of improvement of the effectiveness of company activity, *Community and individual: humanist trends of modern society development*, (2017), 456-463.
19. Saratovtcev Y.I., Tukova S.Y., Methods of reorganization management, *News of Saint-Petersburg State University of Economics*, 6, (2009), 136-142.
20. Cozinova A.A., Urgent problems and development prospects of reorganization management process in modern Russia, *News of Volgograd State Technical University*, 2(197), (2017), 64-66.



INNOVATIVE APPLICATION OF IOT AND CLOUD COMPUTING TO MANAGEMENT INFORMATION SYSTEMS

Vito Leggio¹, Lyudmila Zharova², Ivica Stankovic³, Radomir A. Mihajlovic¹

¹*New York Institute of Technology, USA;* ²*Faculty of organizational sciences, University of Belgrade, Serbia;* ³*Faculty of Business Studies and Law, Nikola Tesla - Union University, Belgrade, Serbia*

Abstract: Modern enterprises worldwide are faced with the imperative decision to embrace open computing infrastructure, to maximize wireless technology and connectivity in general, and rapidly migrate data centers to the cost effective Cloud systems. This paper analyzes problems that massive use of the IoT and BYOD technology brings, addressing specifically problems of migrating production data centers of large size into the Cloud. We look at one super sized use case (Port authority of New York and New Jersey) that employs 8170 people, and elaborate on the approach proposed. With the management witnessing rapidly changing technology that is almost impossible to track, data center redesign and migration is one of the highest risk efforts on the side of the top corporate decision makers. In this paper we present innovative strategic multi tiered approach to top management decision making, while elaborating on the technical issues which imply three axiomatic optimization goals of the new data center: undisturbed functionality, robust information security and improved performance (covering data throughput, latency and user friendliness). In particular, we address the use of the edge computing and micro data centers as key components that help reduce enterprise data center migration risks, while enhancing performance and security exposure to the massively used wired or wireless IoT and BYOD.

Keywords: Internet of Things (IoT), Cloud computing, Management Information Systems (MIS), security risk, security exposure, security policy, policy enforcement, data centre migration, Bring Your Own Device (BYOD), edge computing, micro data centres



IOT POWERED MODERN ENTERPRISE AND ZERO TRUST MANAGEMENT

Lyudmila Zharova¹, Vito Leggio², Jelena Mihajlovic³, Radomir A. Mihajlovic²

¹Faculty of organizational sciences, University of Belgrade, Serbia; ²New York Institute of Technology, USA; ³Faculty of Business Studies and Law, Nikola Tesla - Union University, Belgrade, Serbia

Abstract: In this paper we extend well established model of the "Zero Trust" information security and apply it to the overall enterprise management that covers: people, physical assets, like intelligent machines better known as IoT nodes, and computing resources such as software at run time. All of the considered entities, being inherently intelligent, besides serving production purpose pose a security threat that may translate into the disturbance of the business continuity and even disaster. In this paper, we propose a "General, Universal or Total Zero Trust" model and evaluate the justification of the practical implementation of such a model, taking into account attributes such as: infrastructure integration technical problems, quality of experience (QoX/QoE), capex, opex, user productivity, and ethical dimension of the "Zero Trust." Our model specifically addresses interactions that require application of "Zero Trust" solutions, which we summarize as: H2H, H2P, H2M, M2M, P2M and P2P interactions.

Keywords: Enterprise management, security, trust, virtual trust, zero trust, general zero trust, universal zero trust, total zero trust, security policy, internet of things (IoT)



RULES ON INTEGRATION OF ORGANIZATIONS USING AGRICULTURAL LAND – AN OBSTACLE FOR COMPETITION

Minko Georgiev, Aneta Roycheva

Agricultural University–Plovdiv, Faculty of Economics, Department of Economics, Bulgaria

Abstract: Do CAP rules on integration of organizations using agricultural land create problems with competition? The current article analyses the effects of the CAP that have been transposed into Bulgarian national legislation in the form of a procedure consolidating economic organizations in terms of agricultural land use. The problem originates from the fact that, due to the rules supporting integration, an issue with competition in agriculture arises. Market deformations lead to obstructions of the access to property rights for small-sized farms. The legal, economic and social inequalities reinforce a dominant position on local markets of larger-scale economic agents. The limited access to the primary production factor – land, could lead to polarization between separate agricultural subsectors.

Keywords: integration, competition, access to property rights, CAP, agricultural land

1. INTRODUCTION

The objective of the European Union (EU) is the stability of markets. Competition is among its absolute competences (Art. 3 (1) (b) of the Consolidated version of the Treaty on the Functioning of the European Union – TFEU²⁵). This means that economic equality is a priority. Such types of agricultural markets should be developed with the help of: (1) integration through association of farmers; (2) consolidation of production factors (Art. 39 (1) (a) TFEU). As a consequence, the effective distribution of economic goods and resources (Art. 119 and 120 TFEU) to the EU economy as a whole should occur.

To achieve these goals, EU secondary law²⁶ is also applied. The cited Regulation No 1308/2013 contributes to the integration of farmers' activities while maintaining the levels of competition. The implementation of this legislative act having an immediate effect, indicates the importance of cooperation for the development of competitive markets in the community.

The objectives of the EU's Common Agricultural Policy (CAP) have also been transposed into the national legislation of the Member States. For instance, in Bulgaria – through procedures²⁷ – agricultural producers are encouraged to carry out additional

²⁵ European Union, *Consolidated version of the Treaty on the Functioning of the European Union*, 13 December 2007, 2008/C 115/01, available at: <http://www.refworld.org/docid/4b17a07e2.html> [accessed 9 February 2018].

²⁶ Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007 (CMO Regulation).

²⁷ Art. 37 Agricultural Land Ownership and Use Act (ALOUA).

horizontal integration, based on the consolidation of the primary production factor – agricultural land. Incentives for land consolidation are a fact, but the procedure itself has a non-market nature. The question also comes down to whether such integration complements or damages economic equality. That is, whether integration with non-market rules helps or hinders competition. Additional questions also arise.

First. Do organizational forms, in this case: market, hybrids, hierarchical structures, determine the emergence of formations such as monopolies and cartels on a local level.

Second. Is it possible that this type of a governance structure in agriculture is the reason for the restricted access to a given resource for entire groups of participants.

The deepening concentration in EU agriculture is undoubtedly established²⁸. It should be examined whether locally, economic entities with non-market advantages have conquered agricultural land in the long-term. Kay (2016) [6] is of the opinion that it is a matter of “grabbing”. The legal environment, along with the way organizations interact in terms of agricultural land, is one of the reasons for the dominant position of certain entities in agriculture.

The question has another dimension. Against Bulgaria and three other EU Member States, an infringement procedure for failure to fulfil obligation has been initiated – because of restrictions in the national legislation in regard to the purchase of agricultural land by foreigners²⁹. Probably, the lack of such restrictions would enhance integration between large companies. They could quickly acquire plots of agricultural land. Competition at European level for the manufactured products would be greater. The question is also about who the competitors would be. However, small, locally operating economic actors may lose their access to farmland. For them, this resource is now quickly exhausted. This would also cast doubt on the fulfilment of the CAP objectives.

Finally, there is an imbalance between certain types of producers in Bulgaria in relation to the effect of European funds on the consolidation of agricultural land. Grain producers receive 70 – 80% of the subsidies for the entire agricultural sector. Integration supports intensive agriculture. As a result of this competition for resources, inequality between productions themselves may occur. This may cause sectoral opposition.

2. THEORETICAL FRAMEWORK OF INTEGRATION IN ORGANIZATIONS AND CONSOLIDATION OF RESOURCES IN AGRICULTURE

The theoretical dilemma can be presented as follows. Could cooperation be a cause for competition problems? Integration of organizations and the consolidation of production factors lead to economies of scale. However, the problem is that, in increasing the level of use of a factor, agreements between economic actors may be at the expense of others. This affects the long-term economic equality. Eventually, the overall return of such organizations and markets is low.

The theory of vertical integration considers organizations as a mix of market-related relationships, hybrid structures and hierarchical organizations serving the concept of high-

²⁸ See European Parliament Resolution of 27 April 2017 on the state of play of farmland concentration in the EU: how to facilitate the access to land for farmers (2016/2141(INI)).

²⁹ See the European Commission website for a “pending” procedure against Bulgaria in a section General Directorate Financial Stability, Financial Services and Union of Capital Markets for “Acquisition of Agricultural Land”.

scale exchange and low costs [15]. The theory of the organization recognizes that there is a case where competition can be put under threat. Integration based on double marginalization implies the existence of economic actors with high market power. Contractual unions between producers of the same homogeneous product may turn out to be “guilty” of hindering competition [5].

In the economic theory of property rights, contract-based integration in the context of market exchange is a way to effectively manage resources [3]. Dualism follows from the necessary balance between the objectives of the individual participants, the exchange groups and the arbitrators of the contractual process. The contractual integration of collective property rights management leads to a new theoretical dispute over the distribution of resources and the simultaneous maintenance of competitive markets [8].

The mix of market and non-market objectives of hybrids and hierarchical organizations should lead to consolidation of resources, but this may cause relocation of the “centre of representation” [7]. Incentives requiring cooperation may be at the root of non-market unions [13].

Integration is unconditionally necessary from an economic perspective. In relation to this, critically fragmented property rights in the agricultural sector of Italy, Hungary, the Netherlands have had to be consolidated, thereby increasing productivity [14]. In other countries, consolidation measures might have even helped save agriculture [1]. In Bulgaria, the association of producers, as well as the consolidation of land, should generate, apart from an increase in the number of market deals, a reduction of the losses in the processes. Consolidation-induced economic growth should have lowered transaction costs [4]. In parallel to this, negative social processes such as migration and depopulation of rural areas have been taking place. A possible reason for that can be the uneven distribution of economic opportunities.

The modern effects of integration have led to another issue. Concentration has become characteristic of the whole world, including the USA [10], the EU, etc. It has also appeared in Bulgaria [12]. Unfortunately, political convergence and integration through the CAP lead to this kind of deformation. Because of the interconnectivity of markets, there is already a sustainable tendency for some actors to retain their dominant position over certain resources in the long-term perspective.

The current research acknowledges the significance of legal theory. Equality is a legal principle. It is especially important to the regulation of market relations, in particular competition. Contemporary positive law “blurs” the boundaries of subjective rights, which guarantee an equal economic start [9]. Therefore, the notion of competition is ambiguous – Bulgarian legislation does not currently provide for a legal definition for this economic category. The situation becomes even more complicated when another category – integration – is combined with competition.

3. HISTORICAL ASPECTS OF THE NEED FOR CONSOLIDATION

In the 1950s, agricultural lands became part of large, centralized farms typical of the process of “collectivisation”³⁰. Private companies were missing. Organizational structures for agricultural production were highly integrated. In the period up to 1991, agricultural land was

³⁰ A process of forced uniting of agricultural farms and lands, which took place in Bulgaria from 1953 to 1958, leading to the utilization of 92% of agricultural land by large centralized labor-cooperative farms.

granted only in their power, and since they did not trade with it, the market was, in practice, reduced to sporadic deals by small landowners with private property.

The 1991 Constitution made possible the restitution of “private property” in the country. In the period following 1991, an attempt was made to restore agricultural land to the previous real estate boundaries. This led to the formation of more than 2,000,000 small, fragmented plots. Because of the classic inheritance³¹, property co-ownership has become almost obligatory. Problems with the fragmentation of property rights have become a prerequisite for a low-scale market exchange. These processes have led to: devaluation and increase of the amount of uncultivated agricultural land; reduction of the number of transactions with land; and as a secondary consequence – problems for farmers in accessing capital. The price of labor in the sector also fell. The problem of illegal conquest emerged as a precursor of land grabbing. In parallel with the processes described, the previous organizational structures were liquidated. Forms of integration with certain exceptions (cooperatives) were missing. With the sale of agricultural assets, the capacity of newly established agricultural organizations declined. Private property did not automatically introduce effective market relations. As a logical consequence, the size of the country’s total agricultural production was also reduced.

It can be argued that the changes which began after 1989, led to a low level of utilization of agricultural production factors and small, low-capacity organizations. After 2000, the need for new integration processes appeared.

There were also positive instances. In the northern part of the country, the Dobrudja region, agriculture gained momentum because of the successful consolidation of the production factor, based on the “use” of agricultural land. Rental relations have become an example of successful horizontal integration. In other cases, food industry (grape and wine sector) companies, in order to consolidate their production, apart from vertical integration, purchased arrays of their needed agricultural land. An important aspect was the creation of investment companies. These companies were given the right to sell and manage agricultural land, and accelerated its consolidation after 2007 – 2008. Integration in agriculture has developed further due to the country’s accession to the EU in 2007 as well. A major incentive have been the payments to farmers – the subsidies per unit area. According to data from own sources, the consolidation in figures can be presented in the following way:

³¹ The Inheritance Act determines orders of heirs by law and by will. Legislative amendments after 1991 affecting agricultural land were adopted. The most important aspect is that inheritance by law in almost all cases is related to more than one heir. I.e. one object of inheritance with more than one co-owners leads to an increased number of property rights. This process always obstructs organizational economies of scale.

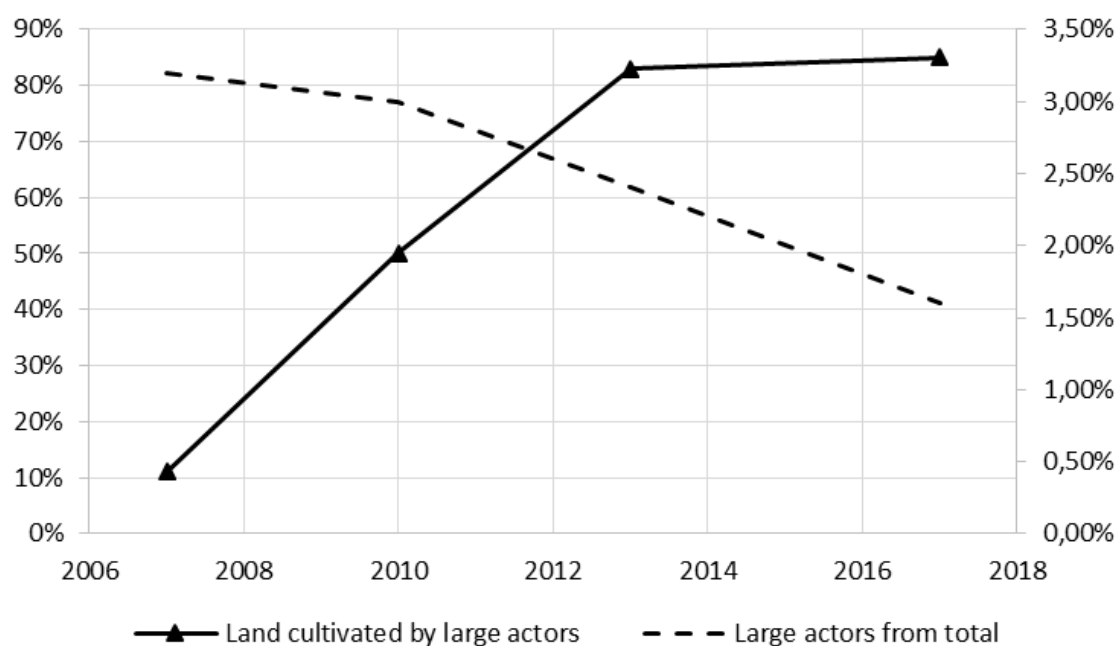


Figure 1. Consolidation of agricultural land in Bulgaria 2007 – 2017

Source: own research

Over the previous ten years, not only the size of cultivated agricultural land in the country, but also its share managed by large actors, have increased. Simultaneously, the relative share of large actors has declined. This means that large investment companies and large producers integrate despite the fact that the total number of farmers decreases.

4. LEGAL OPPORTUNITIES FOR INTEGRATION OR CONDITIONS FOR ECONOMIC INEQUALITY

EU legislation in regard to integration and competition

Primary EU law (TFEU) explicitly provides for the possibility of associating of agricultural productions with the aim of achieving economies of scale and efficient use of production resources – Art. 39. Competition in the agricultural sector is subject to further regulation. In the case of agriculture, neutrality as a principle is not applied.

Regulation 1308/2013 directly provides opportunities for the association of agricultural producers. They can negotiate both vertically and horizontally. This legal act imposes restrictions in order to preserve the role of competition. The commodity agricultural markets do not allow:

- co-determination of the prices of agricultural products;
- agreements restricting access to membership in production associations.

The procedure against Bulgaria. Freedom of the markets is also ensured by respecting equal opportunities for entities from different countries. Pursuant to Art. 258 TFEU, the

Commission has initiated proceedings to establish infringement of EU law, in relation to restrictions on Union citizens in the process of acquisition of agricultural land (the limitations are included in Art. 3 (c) ALOUA).

National legislation of Bulgaria

Normative acts to limit unfair competition – 1 act

The Law on Protection of Competition. In Art. 20 of the Act a legitimate definition of the concept of “dominant position” is provided. However, the main problem is the lack of restrictions on dominance in the acquisition of resources – such as farmland. There is a lack of a definition of a dominant position on a local level / market.

Legislation regarding the consolidation of land resources, including: 3 legislative acts; 1 state regulation; 1 decision of the Constitutional Court; 1 decision of the Supreme Court of Cassation.

Farm Lease Act (FLA, 1996). After its entry into force in 1997, the opportunities for consolidation of agricultural land in the country have been “loosened”. The provisions allowed producers to invest in the long-term because of the benefits they had in their favor: (1) opportunity to conclude contracts corresponding to the repurchase period of the investments; (2) cancellation / cessation methods – only for providing a better protection of producers – after harvesting the yield, fruits, production; (3) protection against risks associated with non-compliance caused by force majeure factors – the rental price can be negotiated as an element proportionate to yield. I.e., if the producer does not gain yield, they will not pay anything.

Despite the legal possibilities, with the described exceptions, horizontal integration took place slowly (2007 – 2008), with cultivated crops being mostly intensive. Because of this, the law helped mainly grain producers to accumulate capacity in the sector. They were also those who successfully integrated, creating the largest agricultural association in the country.

Special Purpose Investment Companies Act (SPICA). In 2006, financial-investment companies with an object of activity: acquisition and management of agricultural land, also known as the “land funds”, began to operate on the agricultural land market.

The procedure under Art. 37 of the ALOUA, Art. 69-77 of the Code for Application of the ALOUA.

- *Preclusive deadlines for manifestation of subjective rights.* Disputes concerning the exercise of the right of ownership, both between owners and users, and between the users of agricultural land involved in the procedure, are not uncommon. Process integration is based on a non-market distribution of property rights. Even in terms of the law, it is questionable whether entities “temporarily losing the right of access (for a year)” to their own land, are on equal grounds.

- *Limited access to information.* Despite the availability of the Farm Information System – “Farm – Use of Agricultural Lands”, the timely notification of all interested parties is not possible. Notification, only at the “local” level, almost always excludes those owners of agricultural land who live outside the settlement of the land array (or outside the country). The latter is capitalized as an economic advantage by economic actors participating in the procedure of distribution of agricultural land under Art. 37 of the ALOUA. An important

result is the system of information channels which ensures local advantages – dominance of big actors, members of associations.

A complex procedure involving a total of 12 administrative hierarchical structures. In such an environment, large producers are always more adaptable. Their economic advantage stems from the ability to carry out “organizational calculations” and organizational-process economies of scale. An important consequence is the capitalization of the property rights by the hierarchical structures which are transferred to large economic actors – “rent seeking” [2].

Complicated compensation system. In practice, it can lead to a loss of compensation even due to time limitation under Art. 77 (b) of the Code for Application of the ALOUA, in relation to § 2 (e) ALOUA. An important result is the opportunity for certain actors to use procedural mechanisms in order to circumvent material rights and thus to gain advantage at the expense of others.

Decision of the Supreme Court of Cassation. Over the last two years, due to the increase in both land prices and the rent allowance in certain regions, there has been a further activation of farmers aimed at an additional consolidation of plots. In this respect, in July 2017, some “minor obstacles” for large farmers to impose their “market power” were removed. This, however, was performed by the judiciary system authorities. By Decision № 2/2015 of 20.07.2017 of the GACTC at the SCC³², by the interpretative method, the possibility was created for the land lease to be a subject to conversion³³ into rent. This act enabled traders to save from “the form of the deal”. The negative effects appeared. The contracts could only be concluded with one of the co-owners. This increased the market power of traders, but transferred the costs to the small co-owners of land (not involved in the contract).

Payments per unit area. Ordinance № 3 of 17.02.2015 on the terms and procedure for the implementation of the direct payment schemes. An important result is the incentives for conquering the economic resource, using intensive productions as a mechanism – in order to limit the access of other actors.

When owners cannot choose how to use agricultural land or gain benefits from it, they cease to regard it as an economic asset. In fact, they deny their property rights [11]. These are prerequisites for an exit from the market. The reduction of the number of actors is an indicator for distancing from perfect competition.

³² The Supreme Court of Cassation (General Assembly of the Civil and Trade Colleges), which, according to Bulgarian legislation, have the right to interpret law by unifying the practice of the judicial acts of the judiciary bodies. They are obligatory for the judiciary system, and even though they are not a legal source, they serve as a basis for resolving legal disputes.

³³ Conversion (jur.) is envisaged here. It represents the transition of one type of transaction into another, in this case – land lease into rent, and subsidiary application of the provisions of the Obligations and Contracts Act (OCA) in the contracts thus obtained.

5. COORDINATION STRUCTURE OF A MIXED TYPE – ORGANIZATIONS WITH RELOCATED CENTRE OF REPRESENTATION

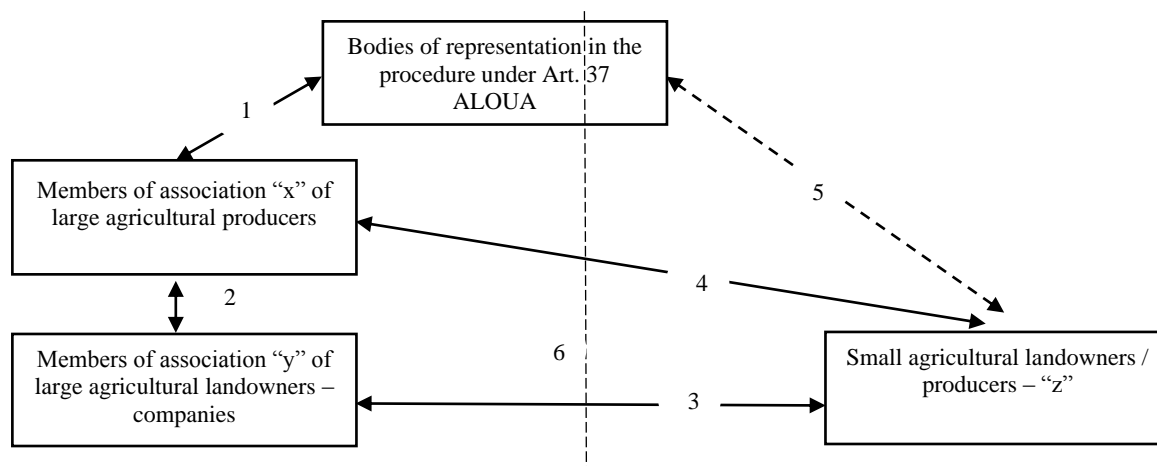


Figure 2. Actors related to agricultural lands

Source: own research

In line 5 of actors, the hierarchical structures retain a part of the property rights, which subsequently are granted to the actors in lines 1 and 2. The procedural mechanism is used as a means of allocation of material rights from "z" to "x" and "y".

Lines 3 and 4 show entirely market relations. The actors on the left side "x" and "y" are members of the associations. They are more powerful. This horizontal integration serves to transfer a significant part of the transaction costs, becoming a burden to "z".

There is an unequal distribution of rights, where the centre of representation of the hybrid and hierarchical economic actors is shifted to the left – line 6. The latter guarantees long-term inequality in regard to rights in the distribution of the economic factor – agricultural land.

6. EMPIRICAL EVIDENCE ON PROBLEMS WITH COMPETITION, ORIGINATING FROM INTEGRATION ON A LOCAL LEVEL

Table "a" shows the number of those producers who have owned (managed) at least 10% of the actually cultivated agricultural land within a given land array, following the procedure under Art. 37 of the ALOUA. I. e., the land near the land array, which is easily consolidated and has a higher economic rating, in one form or another, has served 0 – 4 producers. We believe that the reduction in some places is a result of internal restructuring – a larger producer has failed to collect 10% of the land after the distribution under Art. 37 of the ALOUA.

Table "b" shows what percentage of the total area of the land actually cultivated in the land array is occupied by the producers described under the previous paragraph. An increase in the percentage is due to the cases in which one of the farmers has consolidated land through large plots. This is possible with the help of the state or municipal land fund. There is a reduction only where small farmers have succeeded in reclaiming their land for their own management. In cases where the reduction is estimated at over 5%, the state has managed to

“stop the usage” of a given land plot. It has transferred it to animal grazing or another utilization purpose.

(A) Consolidation of agricultural land

Tab. a Number of producers

year area	2013	2014	2015	2016	2017	2018
a	1	1	1	2	3	2
b	1	1	2	2	3	2
c	1	1	2	2	4	3
d	1	1	2	2	3	3
e	1	2	2	3	2	2
f	0	1	2	2	3	2
g	0	1	2	2	3	1
h	0	0	1	2	1	3
i	0	0	0	0	2	4
j	0	1	0	0	1	1
k	0	1	1	1	2	1
l	0	0	1	1	1	1
m	0	0	2	2	1	1
n	0	1	1	1	1	1
o	1	2	2	3	3	3

Tab. b Percentage of agricultural land

year area	2013	2014	2015	2016	2017	2018
a	12,0	14,0	15,0	25,0	33,3	31,0
b	15,0	17,0	28,0	32,0	33,0	32,0
c	10,0	15,0	26,0	26,0	48,5	46,5
d	12,5	18,0	29,0	31,0	53,0	59,0
e	11,0	16,0	28,0	40,0	39,0	41,0
f	8,0	16,0	27,0	28,0	43,0	55,0
g	7,0	11,5	25,5	28,5	40,5	33,0
h	2,0	3,0	10,0	24,0	18,0	27,0
i	4,0	9,0	9,0	7,0	15,0	28,0
j	3,5	12,0	13,0	84,0	73,0	79,0
k	5,0	16,0	20,0	22,0	26,0	28,0
l	8,0	4,0	10,0	52,0	56,0	45,0
m	8,0	9,0	23,0	23,0	19,0	26,0
n	7,0	12,5	13,0	14,0	18,0	19,0
o	11,0	28,0	37,0	42,0	47,0	68,0

Source: own research

Although the legislation does not define it as so – for us, these are data that unequivocally show a “dominant position” within local markets.

(B) Distribution of costs in contracts with agricultural land

The economic distribution of costs should be analyzed through comparison between groups.

On the one hand, there are the members of the producers’ and other associations. On the other hand, there are small producers, most often owners of agricultural land.

Because of economies of scale – at the same prices of agricultural land, members of associations have lower transaction costs per ha by 27,5 – 30% – for deals with properties up to 0,5 ha, in comparison to the participants who are small producers and owners of agricultural land. Under the same conditions, the same actors, respectively by 20% per ha for deals with properties up to 2 ha, and 10 – 12% for deals with properties up to 5 ha. For properties over 5 ha no comparison is made. The second group does not deal with such properties.

This process is assisted by the “affiliated” land plots through the distribution under Art. 37 of the ALOUA. In practice, the second group does not participate in the procedure. The distribution of the burden of these costs institutionally determines priority for the first group.

(C) Others

In each of the 15 studied land arrays there are cases of missed deadlines for filing the declaration under Art. 69 – 70 of the Code for Application of the ALOUA. In two of the land

arrays, the cases increase by an average of 5% per year (since 2010). Immediately after the decision of the “distribution body”, the farmer in whose favor the decision is, takes control over the agricultural land. Usually this takes place through “real actions” (ploughing the land). This not only generates the claimed subsidies, but also eliminates competition on the part of landowners who are producers. Such “incidents” lead to the denial of small producers to engage in farming.

There is an increase in the number of persons who are not aware of the fact that there is a compensation in their favor under Art. 77 (b) of the Code for Application of the ALOUA, in relation to § 2 (e) of the ALOUA. There were 7 such cases in 2016, while in 2017 the number of these cases rose to 19. The researched period is short, but it proves the existence of information asymmetries regarding compensation. An issue for future research is how many times the state becomes the owner of these sums after the expiration of the time limitation period.

7. CONCLUSIONS

This article presents empirical evidence on the statement that the rules of integration do not increase the levels of competition (perfect competition is envisaged). Current regulations do not provide a viable solution to the problem. In this context, the following proposals can be made:

Theoretical solutions

- Imposing restrictions on the “duration” of use, similar to the introduced quotas for the utilization of exhaustible resources/goods – public good theory;
- Legal re-defining of competition, including in terms of resources.

Economic solutions

- Limiting the forms of decoupled support per unit area;
- Removal of the non-market (administrative) distribution of property rights in the procedure under Art. 37 of the ALOUA;
- Incentives for producers using agricultural land “extensively”.

Organizational solutions

- Feedback in the system aiming at providing equality – mandatory notification of local small producers and owners of agricultural land in all phases of the procedure under Art. 37 of the AOULA;
- Reformatting of organizational structures through the integration of the agricultural information system – without asymmetries – reconciliation with the property register, cadastre, trade register.

Positive law solutions (de lege ferenda)

Regarding Regulation 1308/2013:

In paragraph 173 of the preamble referring to cases of dominant position in connection with Art. 101 TFEU, after the words “apply to the production of, and the trade in, agricultural

products”, the following should be added: “and the resources agricultural land and water, on which the entire food chain depends”.

In paragraph 174 of the preamble referring to the special approach to farmers’ organizations and producers in relation to the objectives of Art. 39 TFEU, the words “or the use of joint facilities” should be followed by “or the use of facilities which cannot be separated from agricultural land”.

- The concept of these texts is to limit concentration and dominance across the EU.

Regarding the ALOUA: para. 5 should be added to Art. 37b, according to which:

“Owners and/or users of agricultural land cannot participate in the agreement under Art. 37 (c) of the ALOUA on a given local land area, when these persons own, use or manage more than 25% [5] of the arable land in the same local land area before 30 July of the corresponding year.”

- The concept of this text is to limit the possibilities for concentration and dominance in the Bulgarian legislative system, when these deformations are a result of the use of agricultural land.

Regarding the LPC: to Art. 20 of the LPC, after the end of the paragraph, the following should be added: “Dominant position is also when two or more persons, on the basis of a different form of association, acquire the ownership of or use a given resource, thereby restricting the competition on the market of that resource or on the functionally associated markets.”.

REFERENCES

1. Boliari, N., Does Land Fragmentation Affect Land Productivity? Empirical Evidence from Bulgaria. *Review of Agricultural and Environmental Studies*, 94-3, 273 – 302, 2013.
2. Czyzewski, B., Matuszczak, A., Towards Measuring Political Rents in Agriculture: Case Studies of Different Agrarian Structures in the EU. *Agric. Econ. – Czech*, 63, 2017 (0): 00–, 2017.
3. Eggertson, T., *Economic Behavior and Institutions*. New York: Cambridge University Press, 1990.
4. Georgiev, M., Penov, I., Vliyanie na razhodite po prehv’rlyane na zemedelska zemya v’rhu konsolidatsiyata na pozemlenata sobstvenost [The Costs of Transferring Land Ownership and their Impact on Land Consolidation]. *Ikonomika i upravlenie na selskoto stopanstvo*, 51(3), 19 – 26, 2006.
5. Hovenkamp, H., Harvard, Chicago, and Transaction Cost Economics in Antitrust Analysis, *The antitrust bulletin*: Vol. 55, No. 3/Fall, 2010.
6. Kay, S., Land Grabbing and Land Concentration in Europe. A Research Brief. Transnational Institute for HOTL, Amsterdam, 2016.
7. Ménard, C., The Economics of Hybrid Organizations, *Journal of Institutional and Theoretical Economics*, 160 (3), 345 – 376, 2004.
8. Posner, R., The Chicago School of Antitrust Analysis, 127 U. PA. L. rev. 925, 1979.

9. Posner, R., Values and Consequences: An Introduction to Economic Analysis of Law, Coase-Sandor Institute for Law & Economics Working Paper No. 53, 1998.
10. Roberts, M. J., Key, N., Agricultural Payments and Land Concentration: A Semiparametric Spatial Regression Analysis. *American Journal of Agricultural Economics*, Vol. 90, Issue 3, 627 – 643, 2008.
11. Sikor, T., He, J., Lestrelin, G., Property Rights Regimes and Natural Resources: A Conceptual Analysis Revisited, *World Development*, Vol. 93, 337 – 349, <https://doi.org/10.1016/j.worlddev.2016.12.032>, 2017.
12. Swinnen, J., Vranken, L., Review of the Transitional Restrictions Maintained by Bulgaria and Romania with regard to the Acquisition of Agricultural Real Estate. Centre for European Policy Studies (CEPS), 2010.
13. Tullock, G., The Welfare Costs of Tariffs, Monopolies and Theft. *Western Economic Journal* 5: 224 – 232, 1967.
14. Van Dijk, T., Scenarios of Central European Land Fragmentation. *Land Use Policy*, Vol. 20, Issue 2, 149 – 158, 2003.
15. Williamson, O., Markets and Hierarchies: Analysis and Antitrust Implications, 1975.



SCIENTIFIC INTELLIGENCE AND ROBOTICS OF WELDING IN TECHNICAL SYSTEMS IN PRODUCTION PROCESSES OF MINING

Slobodan Radosavljević¹, Nikola Ille², Milan Radosavljević³,
Jovana Radosavljević³

¹RB "Kolubara" d.o.o., Lazarevac, Serbia; ²The Wolrd Bank, Belgrade, Serbia, Washington, USA; ³GO Lazarevac, Serbia

Abstract: It is very transparent that welding processes consisting of many repeatable jobs on similar or different parts are suitable for partial or complete automation. Basically the number of parts of any kind to be welded determines whether the welding process will be specifically automated or not. If the spare parts need to be specially adjusted in order to be buried in the originally configured welding format, or if the spaces to be welded are extremely wide, and the possible need to be in different geometrical positions each time, the automation of the welding process of such units i would be very difficult or almost impossible and financially extremely demanding. Mining operations just perpetuate the aforementioned suppositions and situations, and in this context, one can raise the question of the possibility of applying automation of welding in such an environment, as well as the potential risks arising from this or the overall economic cost-effectiveness of possible application. The undeniable fact is that robots are suitable for repeat jobs or similar parts that require more than one axis to weld or where access to parts is difficult. It is time to make a turning point in research primarily in the context of artificial intelligence of customizing robotics and directing it to welding in all types of jobs, on all component units to the level of individual and unrepeatable business activities on components of technical systems among other industries and in mining, production process in the environment of micro location attributes to extremely unfavorable working conditions. The paper analyzes some of the issues in the subject context for welding work in the mining industry's production practice, taking into account the format of respectability of potential risks and the ultimate economic effects of similar endeavors.

Keywords: Welding, production, system, mining, risk

1. INTRODUCTION

The most important advantages of automated welding compared to manual are precision and productivity. Robotic welding improves wet repeatability. When the robot is programmed with a high-quality program code and a coded program card, it will perform precise, completely identical welds each time on parts of the same dimensions and specifications regardless of the number of times the repetition of the activity. Automated pistol movements reduce the potential error, which means reducing waste and rewinding. With robotic welding, it is possible to achieve and significantly increase the productivity of work in relation to conventional welding by a man. The robot not only works faster than a man, but can work 24 hours a day, 365 days a year without interruption, which is much more

efficient than manual welding, provided that it is fully equipped and all attributes are set in the optimum format. Another very important benefit of automated welding is lower labor costs. Robotic welding undoubtedly eliminates the risk of injury, shifting the operator away from harmful vapors and molten metals near the safe harbor. The question of potential risk thresholds in the subject context can also be raised here (and is this the path towards zero risk or the path towards maximizing the minimization of all potential risks)?

Most manufacturing welding processes can be used in automated applications. The most popular GMAW process is a full wire (80% of applications). This process is best for most large-scale production companies because it does not require welding after welding. So everywhere is talked about when the work of the robot is in question, as well as on welding jobs on big production, and it is not questioned what to do with small production whether it is going to develop application formats for the work of robots, how to permeate the volume of potential risks and how such jobs to make it economically rational, efficient and cost-effective? And precisely this type of work is occurring in mining, primarily in the maintenance system. A very clear problem framework is posed as a hypothetical question. Whether this idea can be applied in the next step in the development of artificial intelligence of robotics or a future for welding jobs, especially in the presented circumstances and conditions, both in the construction of a new steel structure and in the maintenance process, when it comes to technical systems for surface exploitation of coal in mining? [1], [2].

2. SPECIFIC ASPECTS OF ROBOT WELDING

Robotic equipment performs and controls the robotic welding process. Automatic arc welding equipment is designed differently from hand-held equipment. Automatic arc welding consists of heavy high-repetitive cycles and welding equipment that must be able to operate under such conditions. In addition, the equipment must have characteristics and controls for the interface with the main control system. In order to perform arc welding, a special type of electricity is required. The welding machine, known as the "power source", is the source of this special energy. All welding processes use an arc welding gun to transfer the welding current from the welding cable to the electrode. The gun also protects the air from the atmosphere. The tip of the pistol is close to the weld and is particularly prone to welding. The pistol cleaner is usually used in the arc welding system to remove the precipitate. All continuous wired arc processes require a wire feeder to add an electrode-wire to the arch. The positioners and manipulators of the parts hold and position the parts to ensure precise robotic welding. The robot cell's productivity can be increased by means of an automatic rotary positioner, so that the operator can place the parts while the robot welds. In order to be able to guarantee that the tip of the electrode and the coordinate system of the tools are precise in interaction, it is important to calibrate the TCP process (Tool Center Point). The automatic TCP calibration device performs this task that is time consuming for a long time. The arms and arms of the first robots worked pneumatically (using air) or hydraulically (using fluid pressure). Flexible tubes transported substances under pressure to the axis. Now, electric motors located in the axes allow the robot to be more precise and controlled, but also to slow down the movements. Most robots are equipped with one hand and one hand with a few articulated joints or axles. Some of the axes rotate so that their arches imitate movements of the human shoulder, wrist, and elbow. Other robots move in a straight line, similar to a crane. Robots are grouped into groups according to the combination of axes used in construction. There are five different types of robotic arms used today. [1], [3], [4]. The degrees of freedom are the axes around which the robot moves freely. The space the robot can handle is the

robot's work space. Quarterly hands are sometimes referred to as "Cartesian" because the axes of the robot can be described by using X, Y, and Z of the coronary system. It is believed that such a design will produce the most precise movements. The cylinder arm also has three degrees of freedom, but moves only linearly along the Y and Z axis. The third degree of freedom is the rotation of the base about two axes. The working space is in the shape of a cylinder. The spherical arm, also known as the polar coordinate robotic arm, has one sliding motion and two rotations (around the vertical pillar and around the shoulder axis). The working space of the spherical arm is a half sphere with different radii. SCARA (Selection Compliance Assembly Robo Arm) is also known as horizontal articulated robot arm. Some SCARA robots rotate around all three axes, and some also have sliding movements along one axis in combination with rotation around the other. The last and most used robot is designed as a fused arm, known as the articulated arm. The arm has a body, shoulder, upper arm, forearm and ankle. [1], [5], [6], [7]. All parts in the hand can rotate, creating six degrees of freedom. Three degrees are X, Y and Z axes. The other three are throwing, turning and turning. Throwing is when the wrist moves up and down. Bending when the arm moves left and right. Turning is rotating the entire forearm.

During a short time for which industrial welding robots used, the robot arm is far more polarized. For welding, robotic arm has replaced almost all other types besides gantry robots, which are used for a lot large and very small robots. The main reason for the popularity of the robotic arm is therefore which allows the manipulation of the welding gun in the same way as it would The man did it. The welding angle and the angle of the road can be changed to be provided quality welding in all positions. The robotic arm allows arcane welding in places that are inaccessible or difficult to reach. Although the robot does not can perform identical manipulative movements like a man, the robot arm is very much close to it. In addition, the robot arm is the most compact and has the largest working environment relative to its size. Usually, robots have five or six axes for free programming. [7] to [13]

A robot can successively move a gun to any location and position against the welding seam. It can also repeat programmed schedules welding. The manually welding operator is not able to secure good as a robot because of the weight of the pistol and the monotony of the job. Spot welding robots should have six or more axes and should they would be able to get points in a random field from every angle. That allows the flexibility of the gun position to perform welding. Some positions that are strange to operators, such as welding upside down (bottom), are easy tasks for a robot.



Figure 1. Electro-welding of various components in which the robot is run, [3], [18] to [19]

Figure 1 gives an overview of arc welding performed by the robot in the ideal conditions of the workshop space and the environment in it on the components of mining equipment.

3. CONDITIONS FOR ROBOT ELECTRICAL WELDING

An important condition is the power source and it must deliver controlled voltage at the voltage to the demands of the welding process. Normally, the current is between 10 and 35 volts and between 5 and 500 amps. Different welds and procedures have specific arc characteristics that require specific outputs of welding machines. An automatic arc welding machine may require a more complex power source than that used for semi-automatic welding. An automatic welding machine usually electronically communicates with power to control the welding program and achieve the best results. The power supply for the arc welding is designed to provide an electrical current of appropriate values and characteristics to provide a stable arch for welding. There are three different types of power supplies for arc welding, which differ from the static characteristics of the output curve. "Power Constant" is a conventional type of power source that has been used for many years for manual welding with electrodes. It can also be used for welding under the protective layer and for tungsten welding. The "Constant voltage" supply source is usually used for welding with a gas and a wire with a small diameter filled with powder. The power supply "Current Constants" is usually used for the arcade tungsten gas or plasma rejection. In the automatic welding system, the gun is used to direct the electrode to the arch, to conduct the current to the electrode and to be a shield for the arch area. There are many types of welding guns and the choice of a gun depends on the welding process, changes during welding, the welding current, the size of the electrode and the means protection. Pistols can be classified into categories by cooling mode. Pistols can be cooled by circulating water or air from the environment. The gun can be used for welding with an electrode such as welding with gas or a powder filled bar, and a gas for protection can and can not be used. Pistols vary and depend on whether they are real or under angle. Pistols at an angle are usually used for robotic welding, so that they can access the welding. The main function of the pistol is to carry the welding current to the electrode. This means that for the welding process with a soluble electrode, the pistol communicates the current to the electrode until the electrodes move through the gun. The second main function of the pistol is to protect the gas if it is used. Welding gas shielding uses a gas that can be active (usually carbon dioxide or inert gas, argon with CO₂ or oxygen). The welding gun is usually placed at the end of the robot with the appropriate one stand. It is preferable to use collision protection to prevent damage to expensive equipment in the event of electrode bonding, collision during installation or startup. To successfully assemble parts in robotic applications, the parts must be stacked precisely and tightly in one place during welding. This means that special attention should be paid to designing stitches and tools that will keep the parts straight. Tools must provide fast and easy setting, and they must firmly hold parts in place until parts are welded. Additionally, the restraint tools must provide a welding gun with access to each welding point. Although special positioners offer more options and improve robot system capabilities, the starting point for positioning parts in robotic welding can be a stitch used for manual welding. A useful working environment for robots is limited because the way the welding gun is set does not allow the gun to come in place as it should. Special positioners eliminate some of these limitations by making workplaces more accessible to the welding gun. Positioners used with robots must be more precise than those used for manual or semi-automatic welding. In addition, the robot controller must be able to control the positioner and the positioner

controls must be compatible with those of the robot. This allows simultaneous, coordinated movement of several axes at the same time during welding. Installing and removing the fixed clamps or positioners can require a lot of time and is not practical. It is often much more efficient to use two or more fixed stitches on a rotating positioner, although the starting price is more expensive. For example, an operator can place parts on a rotating table while the robot secures at the same time. Obviously, this speeds up the process and forces the robot to it insures as much as possible. [9] to [14], [15]

4. POSSIBILITY OF ROBOTIZATION OF WELDING IN MAINTENANCE ON TECHNICAL SYSTEMS IN MINING

For mining, the total working time of technical systems in surface exploitation of coal is very important. The time of non-cancellation of all engaged systems is imposed as an imperative considering the given strategic positions and parameters of the system in the total electricity balance of the Republic of Serbia. The user of each technical system requires a non-cancellation condition of the same. From the aspect of maintenance, this is a too rigorous request. The holders of such systems must at any time have answers to any possible delays that occur during the operation of the system. The goal is to minimize the time of the standstill, ie to relieve the reliability of the system in operation to the highest possible level. Despite all the efforts of technical system maintainers, the conditions in which the technical systems in mining work operate are such that very often despite regular maintenance and maintenance works, there are various destructions caused by varying voltage conditions, due to the very complex conditions in the operation of the system during coal excavation or tailings mass. This is manifested through the failure of individual components of the system to breaks, cracking, bending of screwing, wear, and more. In such circumstances, it is necessary to react quickly and adequately to the faults as soon as possible. The great significance and share of the team's activities has arc welding. Given the complexity and complexity of the conditions in which it is performed, it is necessary that the quality of the welded joint is almost perfectly realized in order to satisfy all the stress condition criteria arising from the welding activity and in order to normalize and disperse the aggregate unit itself on which the procedure is performed. These are extremely difficult tasks in the production of welded joints, especially in non-accessible or hard-to-reach places. There is a need for the use of smaller robots that can, at the location of the technical system, perform arc welding, quality, quick and as much as possible when the economic parameters are in question. At today's level of development, automation, artificial intelligence and robotics, this is quite possible, and it is the opinion of the scientific and professional public that it will not take too long to implement such ideas in the production practice of not only mining, but also other industries, both outside the industrial poles and others activities. The idea is particularly interesting to maintainers predictive maintenance whether we can propose the expected part of the life cycle of complex technical systems in mining in their maintenance phase or not. The answer to this question is checking through software systems working to simulate real parameters including data reliability of their components. All components of the technical systems in mining are degraded according to the external conditions of various influences and the environment, as well as the boundary conditions. Therefore, we can conclude that the reaction of the system differs with the time variant parameters, although they are slowly changing. We can assume that parameters such as (generally stiffness) degrade into 3 types (linear, exponential, inverse power). They are the main types of samples with accelerated reliability. It is interesting to specifically analyze what happens to different types of degraded

stiffness values in formatted units of technical systems. Although it is difficult to predict the exact duration of the complete life cycle of complex technical systems, it is possible to guarantee the expected reliability of the system with the given rate of degradation risk. Figure 2 gives an overview of arc welding performed by the robot in conditions of production practice at the site of the technical mining system and in ideal conditions of the workshop space and the environment in it on the components of mining equipment. [9] to [16], [17]

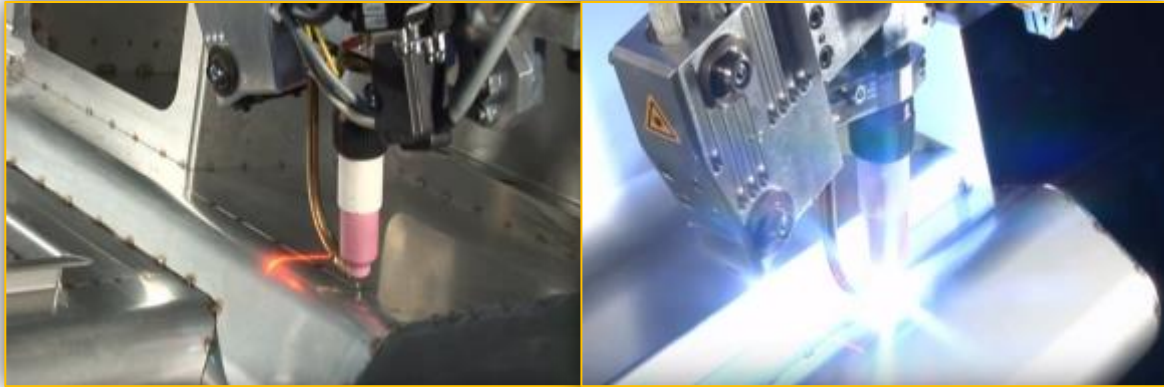


Figure 2. An example of arc welding performed by a robot in conditions of production practice at the location of the technical system and in ideal conditions of the workshop space and the environment in it, [3], [18] to [19]



Figure 3. Display of a welded profile profile on components in mining carried out by a robot in a mobile mobile workshop at the site of the technical system, [3], [18] to [19]

Figure 3 shows an arc welding of a welded profile profile on a component in mining which was executed by a robot in a mobile mobile workshop at the site of the technical system.

Risk analysis in the context of cascading would be carried overly in the direction of a more complex examination of characteristic cases of direct interaction on the human-robot realm, and then the consideration of all other macro and quiet details in the process of the mere execution of the activity of arc worming:

1. The robot works independently without the direct involvement of a man;
2. A robot works next to a man, without sharing a job and a work assignment;

3. The robot and the man are team-working.

In the risk analysis, the first step is to make a parallel of all intra-human-robot lines when it comes to arc welding. It is then necessary to make a comparison of all the activities in this process with an assessment of the risk index of each co-position/activity, which is possibly possible or which will eventually occur with high probability. It is very important to note that it is rare to find an analysis of technical risks when it comes to electro-arc welding. It is generally perceived risk analysis for the aspect of human health and safety at the workplace. Here we come to the whole new situation where this kind of risk is less necessary, but the emphasis is on the consideration of all parameters of technical risk types, which must be quality, professional, comprehensive and positioned precisely on contemporary approaches and methods, modern tools, which scientists are at their disposal. Table 1 shows the representation of interactions on the human-robot line in the execution of electric arc welding from the aspect of the assessment of risk thresholds. [17] to [18]

Table 1. Demonstration of a human-robot robotic relationship in arc welding from the aspect of the assessment of threshold levels of risk level. [1], [18], [19], [21] to [22]

Man	Robot
<ul style="list-style-type: none"> The only one is capable of performing the tasks for which it is sought (thinking, planning, creativity, imagination ..) 	<ul style="list-style-type: none"> Work faster and more precisely
	<ul style="list-style-type: none"> Not sensitive to unsuitable and hazardous conditions (high and low temperature, radiation, poisons...)
	<ul style="list-style-type: none"> They do not get tired of heavy or monotonous jobs, but they work as long as they get energy

Basic Laws of Robotics	Risk +		Risk -		A partial risk	Total risk threshold					
	Yes	Yes	Yes	Yes							
The robot works independently without the direct involvement of a man	Yes	Yes	Yes	Yes	Risk probability 78% high risk	101	116	120	134	166	188
						201	234	256	282	312	399
						510	538	587	594	611	936
A robot works next to a man, without sharing a job and a work assignment	Yes	Yes	Yes	Yes	Risk probability 87% high risk	141	148	155	162	171	193
						206	238	257	284	3210	399
						521	544	596	618	683	992
The robot and the man are working team	Yes	Yes	Yes	Yes	Risk probability 96% high risk	146	152	158	171	178	198
						211	241	266	290	345	398
						551	594	676	834	951	1411

Diagram 1. Presentation of the risk analysis of all interactions in the human-robot relationship when performing arc welding in some mining sequences, [1], [17] to [19]

In diagram 1, an analytical approach to the risk analysis of all interactions in human-robot relations in the execution of arc welding in some mining sequences. [1] to [17], [18] to [19]



Figure 4. Investiciona popravka tehničkih sistema u RB „Kolubara“, (2018), [1]

Na slici 4 dat je prikaz remonta-investicione popravke bagera glodar u EPS,RB „Kolubara“, Republika Srbija.

5. CONCLUSION

Welding is a multidisciplinary technology that is based on a set of formal theories in the field of metallurgy, electrical engineering, mechanical engineering and related scientific disciplines. In order to fully understand the welding process, research is very important in areas that interpret the reason for which a rule has been created and related to the welding area. It can be concluded that welding today is one of the key technologies and has a continuous expansion of development. Progress in the field of welding can be seen primarily in the intensive development of welding equipment, and less in the detection of new and better procedures. According to all analyzes, MAG/MIG procedures will be dominated in the future (great flexibility, possibility of automation, development of quality additional matrices, etc.). In today's welding development, the inevitability is the automation and robotization of welding, especially in the maintenance of the system, among others, the technical systems in mining. In addition, the risk potentials that can be seen in all phases of arc welding with rather high thresholds must be neglected, which should be defined by adequate responses that are ready to be used at all times, and in the context of major changes and inclusion of robots in the execution of the subject matter. It remains for the scientific and professional public to continue developing the process of welding to automation, artificial intelligence and robotics for all business segments, as well as for business activities that are of a single character and in principle not typical. As the development of robotics is inconceivable, it is expected that in the near future, all the elements and ideas stated in the paper will be practically implemented in the mining industry's production practices for the maintenance and development of technical systems used in this industry of the Republic of Serbia.

REFERENCES

- [1] Internal documentation of the EPS, „Kolubara“ Mining Basin, Lazarevac, Republic of Serbia (2017/2018).
- [2] www.designsafe.com, design safety engineering, inc. Risk Assessment Software, Ann Arbor, MI USA. (Internet References 9.5.2018).
- [3] <https://www.logismarket.es/fanuc-robotics/robot-de-soldadura/1043880242-814666359-p.html>, (Internet References 9.5.2018).
- [4] <https://www.nopromat.si/robotizacija.html>, (Internet References), (2018)
- [5] J. N. Pires, Robot-by-voice: Experiments on commanding an industrial robot using the human voice, *Industrial Robot, An International Journal*, Vol. 32, 2005.
- [6] www.designsafe.com, (Author of software: Bruce W. Mein, Design Safe Engineering, Michigan, USA). (Internet References 9.5.2018).
- [7] Main, W. B.; Cloutier, R.D.; Manuele, A.F. and Blowski, S.D.: Risk assessment for maintenance work. Working Paper. Arbor (Michigan – USA): Design Safety Engineering Inc., 2005. Page. 81.
- [8] R Main, W. B.; Risk Assessment challenges and oportunities, Working Paper. Arbor (Michigan – USA): (2015), pp. 178.

- [9] [https:// industrial robot.com/](https://industrialrobot.com/), (Internet References 9.5.2018).
- [10] D. Rambabu, R. Nagaraju, B. Venkatesh, Speech Recognition of Industrial Robot, International journal of computational mathematical ideas, Vol. 3, 2011.
- [11] D. Mišković, M. Bojanic, N. Jakovljevic, V. Delić, Estimation of Reliability in Speech Recognition, TELFOR - 19. Telecommunications Forum, 2011, (9.5.2018).
- [12] J. N. Pires, G. Veiga, R. Araujo, Programing-bydemonstration in the coworker scenario for SMEs, An International Journal, Vol. 36, 2009
- [13] ABB Rapid reference manual, ABB Automation Technologies AB, Robotics, 2005.
- [14] www.alatisthermn.co.rs., (Internet References 9.5.2018).
- [15] Radosavljević, S.; Lilić, N.; Ćurčić, S. and Radosavljević, M.: Risk assessment and managing technical systems in case of mining industry. Strojniški vestnik – Journal of Mechanical Engineering, Vol. 55, No. 2 (2009), pp. 119-130. ISSN 0039–2480.
- [16] Radosavljević, S. and Radosavljević, M.: Risk assessment in mining industry – Apply management. Serbian Journal of Management, Vol. 4, No. 1 (2009), pp. 91-104. ISSN 1452-4864.
- [17] Long-term development of Kolubara the 2020th year, EPS, 2000th.
- [18] [ISO 31000:2009](http://www.iso.org/iso/31000) *Risk management -- Principles and guidelines*. Geneve (Switzerland): International Organization for Standardizations (ISO), 2009. – 24.
- [19] Radosavljević S., Radosavljević M., Risk technical systems: model and sotware Designsafe 6.0., International Journal of Software Systems and Tools, (IJSST), Volume 1., Number 1., pp. 45-53., (2011).



THE ECOLOGICAL SCOPE OF DESTRUCTION OF LAND DAMAGES IN PRODUCTION PROCESSES OF THE REPUBLIC OF SERBIA

Slobodan Radosavljević¹, Nikola Ille², Milan Radosavljević³,
Jovana Radosavljević³

¹RB "Kolubara" d.o.o., Lazarevac, Serbia; ²The World Bank, Belgrade, Serbia, Washington, USA; ³GO Lazarevac, Serbia

Abstract: The pollution of the land in the Republic of Serbia by volume and types is gradually increasing and the consequences that may arise from this are numerous, very complex, viewed in a broadly environmental aspect of the environment. The stopping of newly emerging destructive trends of this type becomes methodologically more and more difficult and financially more demanding. Bearing in mind that the unpolluted land now and in the future will be one of the very important factors for the eco credibility of each country in world relations, it is necessary as soon as possible to make fundamental advances in preserving the environment and land as one of its media, to destroy all barriers that are in this context, they generate and gradually create predispositions of eco-thresholds to the permissible limit. Clearly, this is a required venture in voracious business processes, but it is necessarily important and extremely important for the ecological future of the Republic of Serbia, resulting in all the benefits that position it as a country with strong ecological credibility in world relations. The pollution of the soil by products of different processes is multiplied and in the overall synergy are stacked to the limits that are difficult not only to anticipate, but ultimately almost impossible to effectively reduce to the thresholds of acceptability or, where possible, complete elimination. Research in this area indicates the continuation of negative pollution trends that are increasingly larger and more extensive each day.

This paper provides monitoring of this area in a broadly contextual context through the analysis of a production process in mining. At the same time, the problem is considered through the analysis of the potential of the risk and the need for their minimization.

Keywords: Land, pollution, production process, mining, risk

1. INTRODUCTION

In the Republic of Serbia, pollution of the land becomes more and more serious and, above all, more serious. The reasons for this state of affairs are rallied and everyone is trying to find a certain line of connotation of their own ecological integrity in the context that he is not the one who pollutes on any basis from any technological or non-technological process. It is difficult to give explicit certificates of total land contamination, and assessments are based on a case-by-case basis, ie from a research to a lump-sum assessment that certainly can not be relevant and is in total discontinuity with extensive scientific and expert research and analysis.

So far, of course, as estimated, there are still about 100,000 tons of hazardous waste, which is not adequately taken care of, which requires the state to continue its safe removal as soon as possible and to sanitize the land so that pollution does not spread. However, in scientific circles, there are opinions that this amount of hazardous waste ranges over 250,000 thousand tons, which, together with other types of pollution, generate a synergy of mulching. It is difficult to evaluate and practically returns us to the very beginning when it comes to the overall observation of soil quality analysis. Among others, there are hazardous chemicals that have been standing for years, often in inadequate conditions, most often in halls of companies that are no longer in function, which should be included in the already long-lasting contaminated land, and the negative synergy which certainly arises from this. So the attitude is that this problem should be dealt with very seriously and responsibly using the circular economy institutes in the management of all types of waste. It is indisputable that the state has already established the existence of old, historical pollution at 88 sites in the Republic of Serbia (it is estimated that there are at least one more). Of 88 locations, mainly in failed social enterprises, the state has taken away hazardous waste from nine locations since 1988, but land remediation has not been done here, the Great Flood of 2014 may be a permanent threat to land, which is partly through research and proven. To the extent that only companies or companies in the Republic of Serbia used floods, they eliminated all types of hazardous waste by simple discharge, which left a lasting impact which requires a long road and a period of time to at least partial or complete eco-calitative normalization. Unfair operation of certain laws of registered operators for the disposal of hazardous waste and personally those who without any licenses perform this activity led us partly in this situation in which we are currently located (recently uncovered facts in the vicinity of Sabac as well as other locations of the Republic of Serbia, as well as those which will only be identified and discovered). At the time of the flooding in 2014, only one place in the industrial zone of Sabac threatened that hazardous waste was poured into the Sava River, it was made up of about 3.5 tons of polychlorinated biphenyl (PCB), a dangerous, carcinogenic compound used in transformers. It is necessary to publish the names of all the sites where hazardous waste has already been identified and that for each location, a solution is sought individually with the help of local self-governments. It is estimated that between 300 and 1,000 tonnes of hazardous waste is located at each of these locations, and the government should invest about one billion dinars next year for the rehabilitation of sites with historical pollution. Otherwise, it is estimated that the Republic of Serbia needs more than EUR 12-14 billion to deal with all accumulated environmental problems, which is indeed a big financial obligation, but also the burden that the country has to endure, if it prefers and posits changes in this area in accordance with the applicable standards, EU directives. Otherwise hazardous waste is mainly exported to Austrian incinerators, part of it went to Switzerland and Romania, and for those services it takes between half a million and a million euros annually, "only one authorized operator. These are mostly hazardous chemicals because Serbia does not have a facility for physico-chemical treatment, and rarely which substances can be reused. If we want to promote agriculture, as an important branch for healthy food, then we have to cleanse the country from chemicals, because only foreign investors will come to Serbia. This is demonstrated by the example of the company Prahovo, whose new owner pre-sale asked for pollution remediation, which was done with money from the bankruptcy estate, before the lenders were satisfied. The percentage of pollution in Serbia with depleted uranium, which NATO bombed Serbia in 1999, is highly debatable. And the consequences are at every step, but the professional public dares to think that he is now less polluted with chemicals? Viscose

from Loznica and pit mines in RTB Bor stand out as the most critical locations in Serbia contaminated with hazardous waste, [1], [2].

2. THE ROLE OF STATIONS AND TRANSFORMERS IN MINING, OWN CAME AND RISK OF RISK OF LAND

In mining for the supply and operation of technical systems for surface exploitation of coal, electricity is used and power is supplied through transformer stations and power transformers. In mining, there are different types of transformers and transformers of electricity, from 10-20 kW, 35 kW, 110 kW and more. Every year, a detailed overview of each substation and transformer is carried out, as well as at monthly levels to the daily control check, eliminating possible deficiencies and bringing the system into optimal technical conditions with parameters for safe, reliable and safe operation. The group of contaminants also includes various types of synthetic oil, among which the most famous transformer oil, the commercial name of pyralene. Transformer oils are used for the cooling of electric transformers, but they are also used as lubricants in some specific cases of closed systems. These oils are non-degradable and belong to extremely dangerous pollutants in the environment. By penetrating the soil permanently pollute the soil and groundwater. Cooling of large transformers, which are part of the electric power systems, is necessary for their safe and proper operation, [1], [2]. [3], [4].



Figure 1. Pitch of 10-20 kW and 35 kW transformers operating in mining, [1], [8] to [10]

Figure 1 shows the 10-20 kW and 35 kW transformers operating in mining.

For cooling, transformer oils (transformer oils) are used - natural and synthetic oils. Natural transformer oil or usually transformer oil is linseed, to which additives - dielectric stabilizers, toxic and genotoxic substances are added. These transformer oils are not permanent and must be processed every year, that is, they dry, because they are very hygroscopic and absorb moisture from the air. Their periodic processing is necessary, but expensive and carried out in special installations of the electro-maintenance service.

Therefore, the use of these oils in electricity companies is increasingly avoided. Synthetic or permanent cooling oils are pumped into transformers when they are formed and last as much as the transformer itself, so the cost of their maintenance is negligible. Synthetic transformers have more titles (chlorinated biphenyls, polychlorinated diphenyls, polyphenylated polyphenyls, arochlorine 1254, acacryl, solvotol) of which the most common and most certainly pyral or polychlorinated biphenyl (PHB) are most commonly known. Synthetic oils are permanent, they do not have to be processed periodically, which is a great advantage over natural oils. However, synthetic transformers, pyrolysis, are very dangerous environmental pollutants and therefore permanently eliminated from the use in the European Union. Due to good skin resorption, working with this oil is risky without protective equipment, even for specified MDK concentrations. Piralene belongs to cumulative poisons and has systemic effects of poisoning, which are expressed in the near or future future. The leakage of such oils poses a major problem for soil contamination in the location of the same sites as the permanent pollution of groundwater.

In order to solve the previous problem, oil pits with a function of collecting oil leak or washed from the transformer at precipitation located on the surface of the earth are produced. From these caves the oil is permanently disposed of by authorized operators for further treatment, usually processing or combustion in specific and closed systems. Figure 2 shows a 110 kw transformer station that is operational in mining. [1], [2]. [5] to [8].

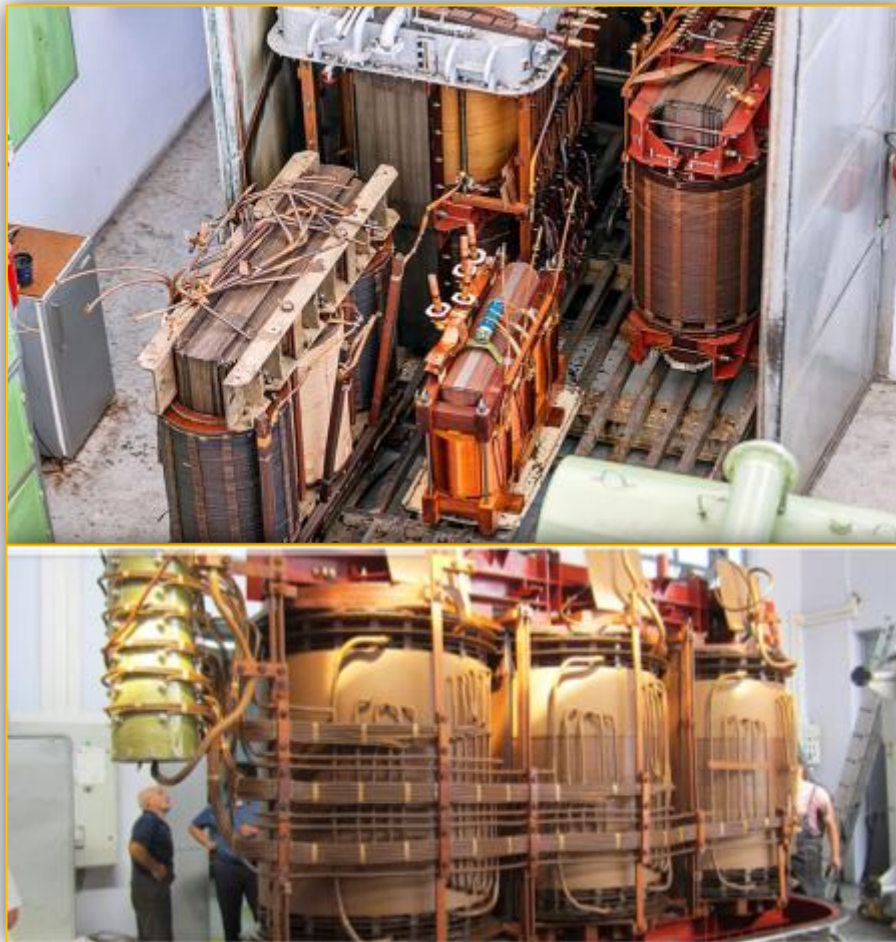


Figure 2. 110 kW power station pumps that are operational in mining, [1], [8] to [10]

3. EQUIPMENT WITH OIL MARKERS AND WHEELERS FOR COLLECTION OF ISCURRENT QUANTITIES OF PCB OIL FROM TRANSFORMATORS AND TRAFOSTATIONS

In the scope of inspection, repair and overhaul of transformer substations, the following works are mainly performed:

- Inspection and, if necessary, installation of NN. and VN windings;
- Review if necessary. rectification of the voltage and current characteristics of the transformer;
- Installation of other equipment according to the assessors of the maintenance, (voltage regulator, clamping rings ...);
- Designing and installing a conservator, as well as replacing all spare parts;
- Filtration, drying and vacuuming of existing transformer oil to dielectric breakdown over 220 kV/cm;
- Filling a new, filtered transformer oil in the required quantity;
- Obtaining the appropriate attestation, transformer and all installed parts including transformer oil;
- On-site leakage repair at all sealing positions for transformers of all power and voltage levels;
- The collected transformer oil is transferred to further treatment (usually filtering);
- Remediation of contaminated soil is carried out on the surface exposed to leakage of oil.

A special problem is the oil of pits and baths that were built at a time when water was unavailable for water, and now there is a problem of mixing water and pyralene as the water penetrates the pits. In case of higher precipitation, there is an uncontrolled outburst of the mixture in question, with significant pollution of the soil in the near and further surrounding as well as underground waters. These circumstances require a constant monitoring of oil wells and caves at the location of transformer stations and transformers, with the aim of undertaking the necessary preventive measures and activities for solving the problem and, if necessary, complete reconstruction until the production of new and high quality waterproofing materials. At the same time, in the context of preventive measures, it is possible to install smaller separators for separating oil from water and thus permanently solve the problem on one observed unit.

The research done in the subject context indicates the following results. [1], [7] to [10].



Figure 3. Satellite recording of microlocation sampling in the vicinity of oil baths and pit within one of the TS in mining, [1], [8] to [10]



Figure 4. Motor drill "HYCON" in position for taking samples of contaminated soil, [1], [8] to [10]



Figure 5. Image of micro location of drilling and drilling TSJ-2, [1], [8] to [10]

In Figure 3, 4 and 5, a demonstration of the microlocation of soil sampling, sampling machine, and drilling sites were taken and samples taken for laboratory analysis of the soil. In the analysis of samples, the following methods of determination were used:

- pH value in soil samples is determined potentiometrically.
- The content of organic matter in soil samples is determined by oxide-reduction titration with ferro-ammonium sulphate.
- The content of calcium carbonate in soil samples was determined titrimetrically.

- The content of light-chain phosphorus in soil samples was determined after extraction with sodium bicarbonate spectrophotometrically with ammonium molybdate.
- The content of potassium in soil samples was determined after extraction with ammonium acetate by atomic absorption spectrophotometry.
- The content of total nitrogen in soil samples is determined volumetrically.
- The content of metals (Cr, Ni, Pb, Cu, Zn, Mn, Cd, Co, As and Fe) in soil and lead samples (Pb) in groundwater samples was determined after acid digestion with nitric acid, hydrogen peroxide and hydrochloric acid acids, atomic absorption spectrophotometry.
- The content of living in soil samples was determined after digestion by atomic absorption spectrophotometry, using cold steam.
- The content of polycyclic aromatic hydrocarbons (PAHs) in soil and groundwater samples was determined after extraction with methylene chloride and solvent change with high efficiency liquid chromatography (HPLC).
- The content of aromatic hydrocarbons (benzene, toluene, ethylbenzene and xylene) in samples of soil and groundwater were determined after extraction by pentane gas chromatography with the FID detector.
- The content of mineral oils C10-C40 in soil and groundwater samples was determined after extraction with methylene chloride by gas chromatography with FID detector.
- The content of polychlorinated biphenyls (PCBs) in soil samples was determined after hexane extraction by gas chromatography with the ECD detector.

Table 1 shows the results of the analysis of soil samples taken near the Trafo Station with the analysis of the risk exposure and critical peaks for individual elements.

Table 1. Results of physical and chemical tests of soil sample TSJ-1 (composite sample made from individual samples sampled from depths of 0.1, 0.2, 0.5, 1.0, 2.5 and 5.0 m), l.b. 1102, with risk and critical exposure analysis peaks for individual examined elements, [1], [8] to [10]

Parameter	Method	Measuring unit	Test result	Limit value (1)		Remediation Value (1)		Risk threshold
				Tablet	Corrected	Tablet	Corrected	
Moisture	SRPS EN 12880:2007	%	16.40					-
The content of organic matter, (humus)	Internal method	%	0,45					-
Content of	Internal	%	64					-

clay	method							
pH	EPA M 9045 D 2004		7.26					-
Content of CaCO ₂	Internal method	%	1					-
Easy Accessible P	Internal method	Mg 100 g	0.03					-
Lakopristu pačni K	Internal method	Mg 100 g	7.8					-
Total nitrogen	Internal method	%	0.03					-
Chromium- Cr	WM 037	mg/kg	22.56	100	180	380	684	-
Nikl-Ni	WM 033	mg/kg	31.52	35	75	210	450	+
450Olovo- Pb	WM 041	mg/kg	14.58	85	114.45	530	719.86	-
Copper-Cu	WM 032	mg/kg	18.96	36	54.27	190	286.43	-
Zinc-Zn	WM 035	mg/kg	48.22	140	254.68	720	1263.5	-
Mangan- Ma	WM 036	mg/kg	422.36					-
Cadmium- Cd	WM 042	mg/kg	0.04	0.8	0.88	12	13.21	-
Live-Hg	WM 051	mg/kg	<0.13	0.3	0.42	10	13.97	+
Cobalt-Co	WM 046	mg/kg	7.22	9	20.20	240	538.67	+
Arsen-As	WM 043	mg/kg	5.66	29	48.18	55	78.10	-
Iron-Fe	WM 038	%	1.82					-
Parameter	Method	Measuri ng unit	Test result	Limit value (1)		Remediation Value (1)		

				Tablet	Corrected	Tablet	Corrected	
Mineral oils C10 C40	VM 056	mg/kg	<0.01	50	2.25	5000	225	-
Polychlorinated biphenyls OCB as Arochlor 1260	VM 052	mg/kg	<0.01	0.02	0.0009	1	0.05	+
Polycyclic aromatic hydrocarbons (PAHs)								+
PAH total	VM 009	mg/kg	<0.01	1		40		+
Naftalen	VM 009	mg/kg	<0.01					+
Pyrénées	VM 009	mg/kg	<0.01					+
Fluorine	VM 009	mg/kg	<0.01					+
Fenantren	VM 009	mg/kg	<0.01					+
Fluorant	VM 009	mg/kg	<0.01					+
Benzo (a) pyrene	VM 009	mg/kg	<0.01					+
Anthracene	VM 009	mg/kg	<0.01					+
Benzol (a) anthracene	VM 009	mg/kg	<0.01					+
Automatski ugljovodonici								+
Benzene	VM 055	mg/kg	<0.01	0.01	0.0005	1	0.05	+
Xylene	VM 055	mg/kg	<0.01	0.1	0.005	25	1.13	+
Toluene	VM 055	mg/kg	<0.01	0.01	0.0005	130	5.85	+
Entilbenzene	VM 055	mg/kg	<0.01	0.03	0.001	50	2.28	+



Figure 6. Display of one type of separator with which it is possible to successfully purify water from pollutants with transformer oils, [1], [8] to [10]

According to the results of physical and chemical studies it can be concluded that the soil around the oil bath system and pit at the locations of Transformer Stations and groundwater at the Transformer Station site are not significantly contaminated (but are values for concatenated monitoring) by arsenic and metals with chromium, nickel, lead, copper, zinc, cadmium, mercury and cobalt, as well as organic pollutants - mineral oils C10-C40, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and aromatic hydrocarbons (benzene, xylene, toluene and ethylbenzene). In the TSVR-3 well, the concentration of nickel is higher than the limit value, but it is significantly lower than the remediation value prescribed by the said Regulation. Figure 6 shows a type of separator to separate the oil from the water. [1], [2]. [8] to [10].

4. CONCLUSION

The paper analyzes soil pollution with reference to only one of the methods of pollution and its analysis of both samples and thresholds of risk exposure with interesting pollution peaks that are higher. At the same time, a review of the transformer oil is given. Transformer oils are used for the cooling of electric transformers, they are non-degradable and they belong to extremely dangerous pollutants of the human environment. Pyralene, a mixture of chlorinated biphenyls with different chlorine content, most often 54%, is a synthetic product, extremely stable and non-degradable. Spilled pyralene must be quickly and effectively mechanically removed from the soil surface so as not to penetrate the ground and reach groundwater. By landing it permanently contaminates soil and groundwater. The only effective way of removing this oil is by thermal decomposition, ie precisely guided combustion process, so that no dangerous product of combustion would be released into the outside environment. Burning of pyralene in the open air frees a large number of toxic and carcinogenic products. Pyralene belongs to genotoxic and carcinogenic substances with an extended duration of action, so its use is permanently banned in EU countries. The solution of the problem of pollutants contaminated by leaching was given in the previous part, and it is possible to set up an integrative separator for collecting oil and its separation from water. Great efforts are needed to make qualitative steps in cleaning the soil by remediation methods of polluting elements such as transformer oils. Some of them are very difficult to remove, almost impossible. The Republic of Serbia, for the safety and health of its citizens, must

permanently solve the problem of cleaning the land from dangerous substances, and the scientific and professional public to make a full contribution in that context.

REFERENCES

- [1] Internal documentation of the EPS, „Kolubara“ Mining Basin, Lazarevac, Republic of Serbia (2017/2018).
- [2] Sovrlić, M.; Stevanović-Čarapina, H.: Commercial use of polychlorinated biphenyls and possible pollution of the environment, *Elektroprivreda*, No.2, Belgrade, 2002, 63.71.
- [3] www.designsafe.com, design safety engineering, inc. Risk Assessment Software, Ann Arbor, MI USA. (Internet References 9.5.2018).
- [4] www.designsafe.com, (Author of software: Bruce W. Mein, Design Safe Engineering, Michigan, USA). (Internet References 9.5.2018).
- [5] Main, W. B.; Cloutier, R.D.; Manuele, A.F. and Bloswick, S.D.: Risk assessment for maintenance work. Working Paper. Arbor (Michigan – USA): Design Safety Engineering Inc., 2005. Page. 81.
- [6] R Main, W. B.; Risk Assessment challenges and opportunities, Working Paper. Arbor (Michigan – USA): (2015), pp. 178.
- [7] Radosavljević, S.; Lilić, N.; Ćurčić, S. and Radosavljević, M.: Risk assessment and managing technical systems in case of mining industry. *Strojniški vestnik – Journal of Mechanical Engineering*, Vol. 55, No. 2 (2009), pp. 119-130. ISSN 0039–2480.
- [8] Radosavljević, S. and Radosavljević, M.: Risk assessment in mining industry – Apply management. *Serbian Journal of Management*, Vol. 4, No. 1 (2009), pp. 91-104. ISSN 1452-4864.
- [9] Long-term development of Kolubara the 2020th year, EPS, 2000th.
- [10] Radosavljević S., Radosavljević M., Risk technical systems: model and software Designsafe 6.0., *International Journal of Software Systems and Tools*, (IJSST), Volume 1., Number 1., pp. 45-53., (2011).



PECULIAR PROPERTIES OF URBAN PLANNING ON ALLUVIAL FANS LOCATED IN THE STEPPE ZONE (ON THE EXAMPLE OF ASTANA – THE CAPITAL OF KAZAKHSTAN)

Marat Ishankulov, Aktlek Nurgazinov

L. Gumilyov Eurasian National University, Astana, Kazakhstan

Abstract: In many ways the spatial development of urban areas determines by long-term interests of society. The rationing and management of economic activity in the CIS countries is carried out according to the sectoral principle. This means that the territory, as a single natural-functional structural unit, "disappears", ceases to exist.

There are opportunities for urban development experiments "from scratch" in the 20-year-old Astana, which is impossible in the conditions of the established capitals of the world. The city is located in a steppe zone on a high plain with absolute heights of 300-360 m. The digital model of a relief has allowed to take a new look at the nature of the city's location.

The area of urban development occupies 4 natural and territorial integrity. The right bank of the city is represented by an ancient fragment of the Kon river alluvial fans. Its catchments are located in the Kazakh upland. The left bank is formed by two more alluvial fans of the Nura river. The fourth landscape formation - the channel and the Ishim floodplain - occupies a transit position in relation to these two dominant formations and lies with them in a close landscape-geochemical and ecological connection.

The lack of knowledge among the planning organizations about the state of the city on the alluvial fans of removal has led to and continues to lead to adverse natural phenomena such as water-logging, flooding and a barrage effect. The processes of compacting, salinization and alkalinizing of soils, the complexity of the soil cover; frequent changes in contrasting unpredictable climatic situations, characteristic of the steppes define specific requirements for amenity planting.

Knowledge of the "fans nature" of the location of Astana gives the key to the management of the territory. The dam and drain reservoir, created before the deployment of the drain at the top of the cones of removal, characteristic of the left-bank part of the city, could serve as a regulator of underground runoff in the entire flow-subordinate space.

Each of the four natural formations possesses features of an individual, optionally closed uniqueness. Together they form the basis of the city's landscape carcass. Its purpose is to prevent the emergence of environmental problems and preserve the ability of the territorial system to self-organize and develop.

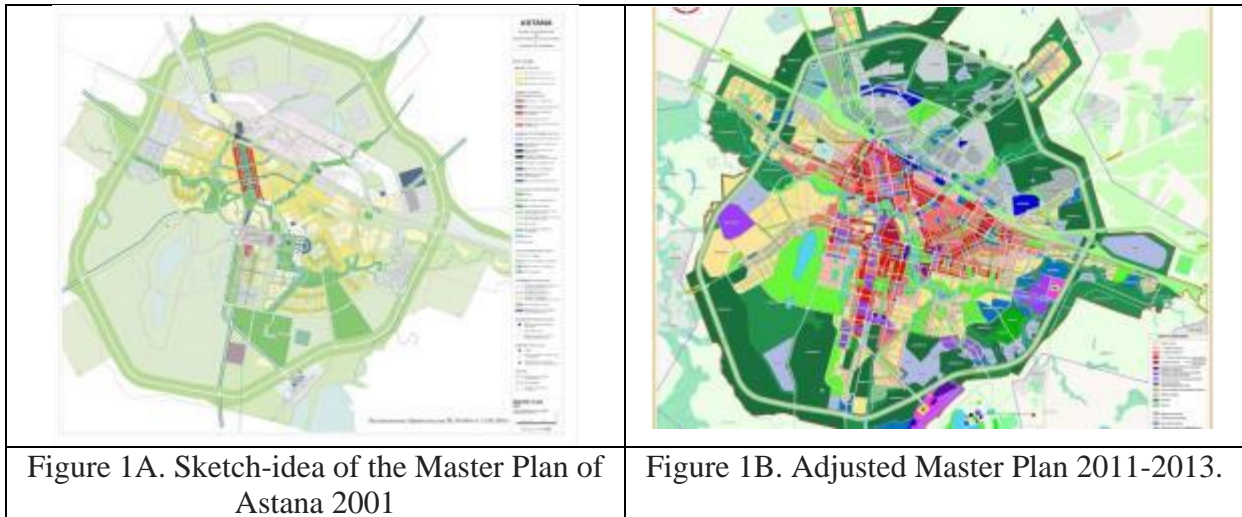
Without legal status, the environmental carcass of the urban area or its basic provisions can be included in the city general urban plan. The mutual understanding of the developers of the environmental carcass and the general urban plan can contribute to this. But the general urban plan can effectively "work" if there are legal mechanisms of its implementation. Therefore, the creation of a local environmental regulatory framework becomes extremely important.

Keywords: Environmental management, Environmental carcass, Urban planning, Alluvial fans, Steppe zone

1. INTRODUCTION

The first project for building Astana was approved by the Government of the Republic of Kazakhstan on August 15, 2001 (Figure 1A). It was developed by a project team of Japanese specialists led by architect Kiyoo Kurokawa - one of the founders of the world movement of architectural metabolism, the creator of the philosophical concept of symbiosis. However, the original General Plan did not justify itself in full due to the unpredictably rapid pace of Astana's development and the scale of its growth.

Later, in 2011 and 2013, the General Plan of Astana was adjusted. In the future development of the city until 2030, the boundaries of the city remained within the existing limits (Fig. 1B) [1], and the idea of Kiyoo Kurokawa is still recognized and, unfortunately, has become even farther from the real incarnation. The landscape approach to solving Astana's urban development problems would have been friendly to Kurokawa's architectural views.



Existing notions on the nature of the location of Astana. Background data of the scientific research institute of the General Plan of Astana (NIPI Astanagenplan) represent the new left-bank part of the city as a part of the interfluvium - a flat alluvial plain, within which bifurcations of the Nura and Ysil rivers (formerly Ishim) occur. Due to the general bias of the area to the Ysil River observed periodic discharges of Nura water into the Ysil basin.

The surface of the interfluvium is streaked with the channels of temporary watercourses and numerous enclosed depressions. Some of which are represented by shallow lake-shaped lakes. Each of the lakes has its own catchment area.

The confluence of Nura and Ysil occurs along three stream channels - Sarkrama, Kozgosh and Mukhor, merging into one channel at the confluence of Ysil. Only the Sarkrama has a well-developed stream channel. The other two stream channels are an alternation of boschazhinas (deep pit with water) and the gently sloping faults that connect them.

The water-bearing horizon on the interfluvium space is confined to alluvial sediments of the Lower Quaternary-modern age (alQ_{I-IV}). Water-bearing sands, gravel and pebbles lie in the depth interval from 3 to 12 meters. The aquifers from the surface are covered with loamy clayey deposits with a thickness of 3-5 meters. Alluvial deposits are underlain by waterproof clays of the Neogene to a depth of 20-25 meters or lie directly on rocks of the Paleozoic basement. The discharge of well opening alluvial deposits varies over a wide range from 0.5 to

4-5 l/s with a decrease from 0.5 to 4-5 meters. Static groundwater levels are set at a depth of 0.5 to 5-6 meters. The mineralization of water within the boundaries of Astana varies from 0.5-0.6 g/l to 13-20.0 g/l.

There are streams of groundwater in the alluvial deposits directed both along the Esil stream from east to west and from the south from Nura river. The difference in pressure between the two rivers is 14 meters at a distance of 20 km. Slope is 0.0007.

The level regime of groundwater is influenced by Yesil and Nura, Maybalyk lake, Nura-Ysil canal, Taldykol waste water storage, Small Taldykol, ash disposal area at fuel-burning power plant-1 and 2, water losses from sewerage and water pipes, modern construction. These objects have a multidirectional impact on the level and chemical regime of groundwater. On the one hand, drainage of the Taldykol sewage tank takes place, on the other hand, the Nura-Ysil canal is increased, watering of greenery, vegetable garden, streets, reducing natural evaporation from built-up areas (street asphaltting).

2. RESEARCH RESULTS

2.1 A NEW VIEW AT THE NATURAL-HISTORICAL ORIGIN OF THE ASTANA LOCATION AREA

Astana is located on an elevated plain with absolute heights of 300-360 m (Figure 2). The digital terrain model allows a new look at the nature of the location of the city. Two age generations of the alluvial fans of removal have been revealed: the ancient alluvial fan of the Kon river (the right bank) [2] and two alluvial fans of the Nura river (the left bank).

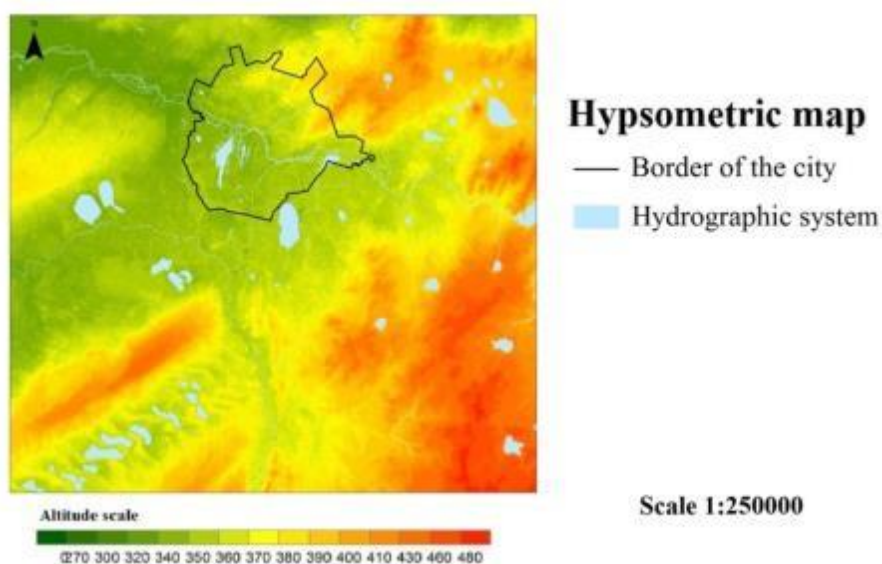


Figure 2 – Hypsometric map of Astana.

The map was created by processing ASTGDEM2_0N51E071 a radar satellite image (17.10.2011).

Nura is subject to furcation (fragmentation of the consolidated channel into sleeves - multi-arm) on the longitude of Astana. Fuser vertex is possible on any segment of Nura river

where a breakthrough occurs. Furcations are facilitated by hanging dam phenomena, the formation of ice, maximum runoff, areas of dumping the river. The consequence of furcation is the emergence of alluvial fans and internal deltas. Due to inequality flow strength, the main and minor directions of surface runoff are separated.

A series of fan-shaped channels of the northern orientation separates from the main riverbed of the Nura river at the Kabanbaybatyr village (formerly) forming a Rozhdestvenka alluvial fans. Point of embranchment coordinates is $50^{\circ}52'10''$ N and $71^{\circ}20'31''$ W. Sarkrama and Taldykol are the two active lobes of which it consists. The unfolding of the Rozhdestvenka alluvial is not limited to the left bank of Ysil. It continues on the right bank of Astana not in the town boundaries, but to the west of it. The alluvial fans arcuate bending along the northern boundaries of the city of the outlet closes with the sources of the river. Siley. Consequently, there is a probability of feeding Siley river by the underground waters of Nura, and the reason to believe that Seley is the continuation of Nura. This fact testifies to the younger age of Ysil in comparison with Nura, and also about the finding of the alluvial fans in the active stage.

The Rozhdestvenka alluvial fan is bordered by the Maybalik alluvial fan from the east (Figure 3). Its stream channel gullies are not clearly expressed. It presents the difficulty of clearly establishing the beginning of its branching, since at the present time the alluvial fans is weakly active and is in the stage of withering away. The branch node is located between the villages of Nura and Akhmetaul with approximate coordinates $50^{\circ}45$ N and $71^{\circ}25$ W.

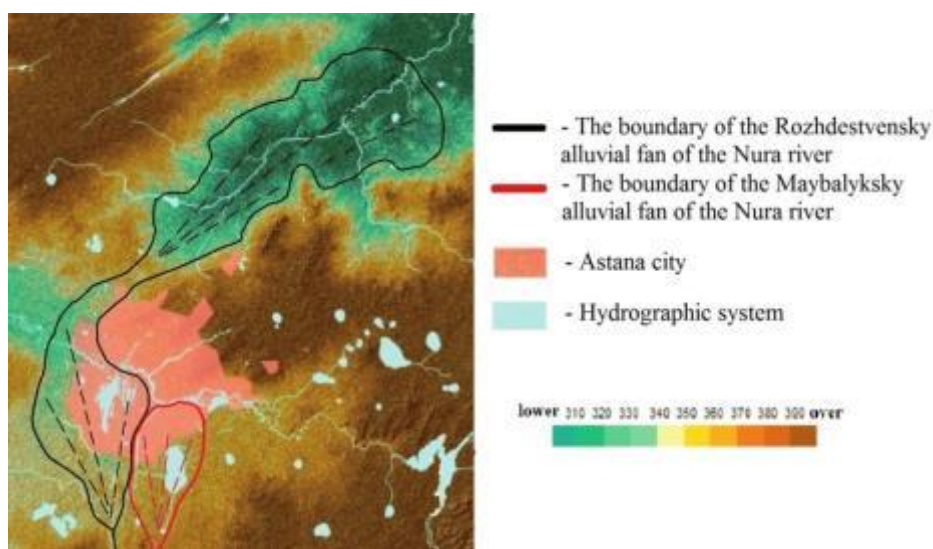


Figure 3 - The boundaries of the alluvial fans of the Nura river. The boundaries are set according to the digital relief model. (The radar satellite image ASTGDENV2_0N51E071, 17.10.2011).

The alluvial fans of the Nura river are different on hydraulicity and in the place of its manifestation in the expansion space of the expanding flow. This depends on the current volume of incoming surface and interflow, and the relationship between the potency of the lobe body and the bed plastic (Figure 4).

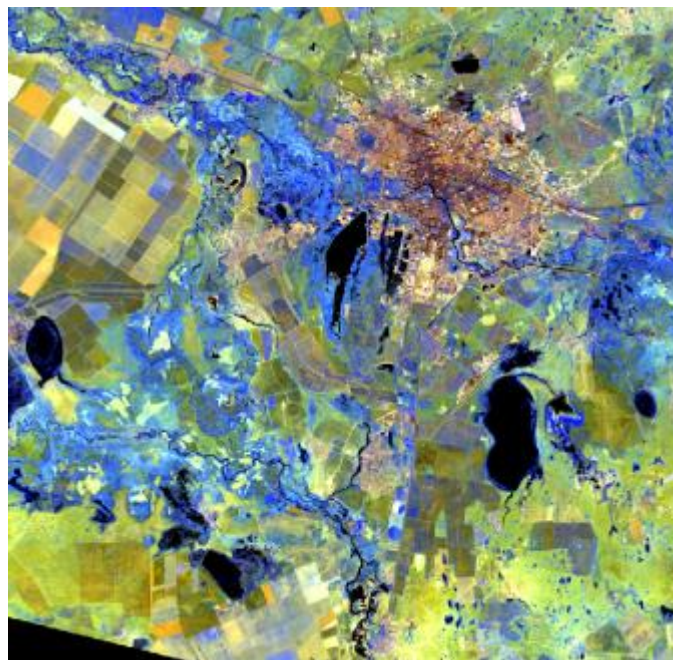


Figure 4. Position of the Astana city of in the system of channels of the Rozhdestvenka and Maybalyk alluvial fans of the Nura river.

The image was obtained by processing the combination of channels 7-6-5 of the satellite image Landsat 8 during the intergeneration period on August 24, 2016.

2.2 MESO-RELIEF OF THE CITY

The right and left-bank parts of Astana differ sharply in terms of terrain.

The terrain of right-bank of Astana. The Kon River alluvial fan is located in the city by its middle segment. It manifests itself morphologically as ridges with flat apical surfaces. The ridges are oriented in the south-west north-east direction.

The ridges are the residual ancient (ages Q_{1-2}) surfaces of the once uniform giant alluvial fan (megafan) of Kon river with a common slope to the north of the Kazakh Low Upland. The apex of the Kon alluvial fan was located in the Nura district of the Karaganda region went outside the Akmola region, ending in the North-Kazakhstan region. It consisted from alluvial fans 2, 3 and even higher orders. The primary surface was dismembered subsequent erosion processes. Only the axial parts of high-order alluvial fans with the greatest flow energy, denser and coarse proluvium deposits survived in the process of erosion as observed in the territory of the right bank of Astana.

It is noteworthy that irrespective of the altitude, the surviving ancient fragments of the surface of the alluvial fans inherit the acquired primary clawed fan-shaped form, which clearly witness to their proluvium origin. The highest elevations (430-460 m) occupy better surviving surface remains. The ridges are located depending on the degree of denudation at heights of 355-430 m. High altitude marks of the initial primary surface of the megafan are retained fragmentarily on some of them. The ridges are divided by the right tributaries of Ysil-Sarybulak and Akbulak and their numerous streams of temporary watercourses within the city limits. This creates an exclusive mosaic pattern of local watersheds and a hydrographic network. The relative heights of the ridges range within a dozen meters. Hence,

the clearly visible exposition differences of the meso-forms of the terrain are the north-western and south-eastern meso-exposure (Figure 5). The ridges form consist of sediments are loamy and clayey composition with lenses from sand, gravel and pebbles, and fragments of rocks. Groundwater is located at depths of 4 to 15 or more meters.

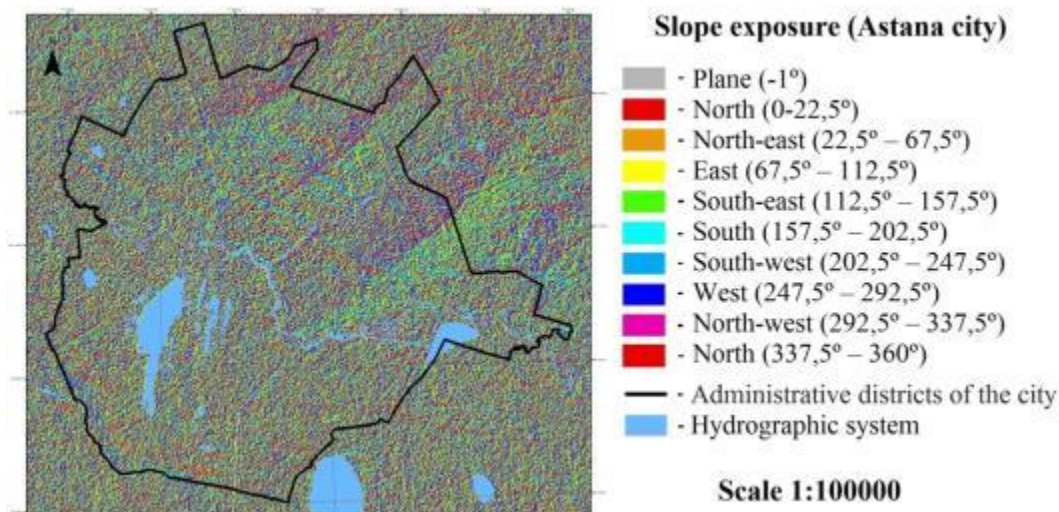


Figure 5. Map of the exposure of the slopes of the territory of Astana.

Conditions for the formation of numerous closed depressions are created in the northern part of the city in the absence of a developed erosion network. This leads to stagnation in them of surface runoff and excessive moistening of buildings and structures in practical terms.

The terrain of left-bank of Astana. The relief of the left bank is flat, calm, almost flat, without sharp fluctuations in altitude. He draws attention to the fact that the exposure differences at the level of the meso-forms of the relief and, especially, the microforms of the relief are hardly distinguishable or practically not manifest. The formation of alluvial fans in this territory took place under conditions of a slight difference in altitudes and a covering character of the distribution of sediments.

The proluvium nature of the alluvial fans of the left-bank of the Nura confirms the facies composition of the deposits – the change from the top of the cone of removal to its periphery of coarse gravel and gravel-pebbly deposits by sands and, then, by loam (Figure 6). The level of groundwater table fits into the well-known patterns of their behavior on alluvial fans (Figure 7).

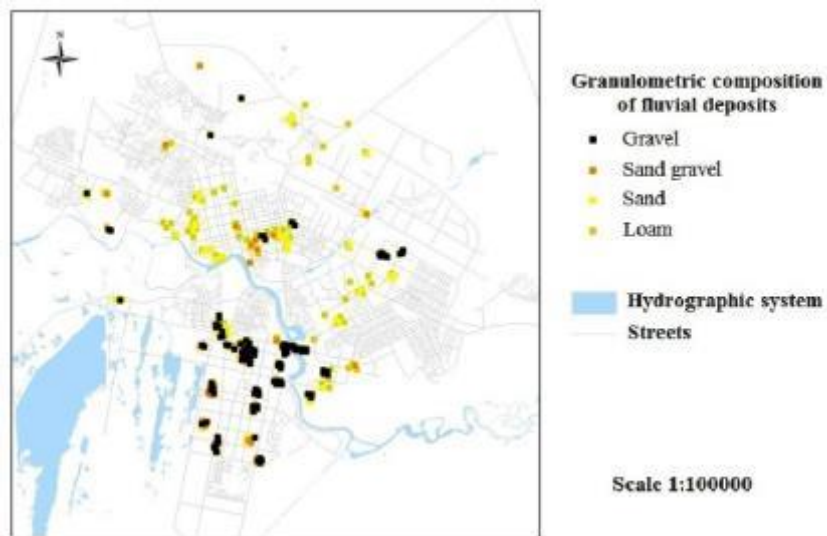


Figure 6. **Particle-size distribution** of fluvial deposits of the Astana area.

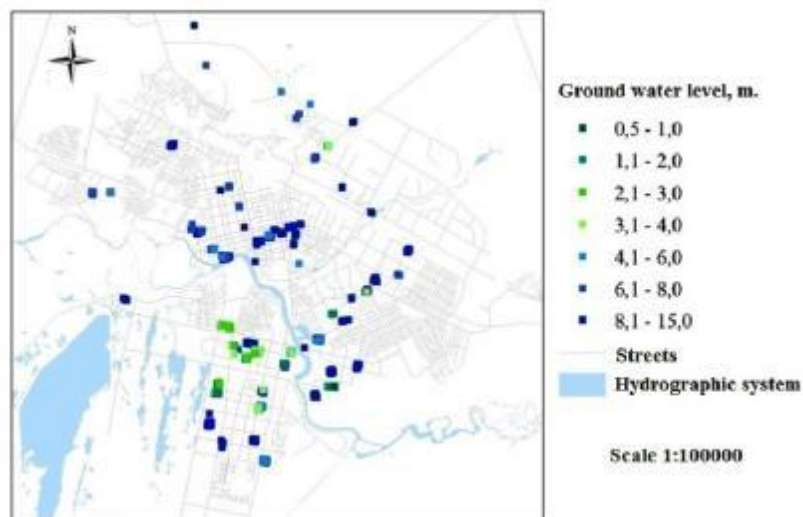


Figure 7. Groundwater table in Astana. Situation for the period before the construction of buildings and structures (preparation of project documentation).

The zone of accumulation of potential pollutants is practically absent as they are unloaded in Ysil or taken out of the city limits.

2.3 LANDSCAPE CARCASS OF THE ASTANA CITY

The materials of the conducted research allowed us to reconsider existing ideas on the nature of the urban development area. They testify to the formation of four natural and territorial integrity on the Astana area. The right bank of the city is represented by an ancient fragment of the Kon river alluvial fans. Its catchments are located in the Kazakh upland. The left bank is formed by Rozhdestvenka and Maybalyk alluvial fans of the Nura river. The channel and the Ishim floodplain the fourth landscape formation occupies a transit position in

relation to these two dominant formations and lies with them in a close landscape-geochemical and ecological connection. These natural objects form the basis of the city's landscape carcass. The landscape carcass gives the key to understanding the ecological problems of the city [7].

2.4 ENVIRONMENTAL ASPECTS OF ASTANA CITY PLANNING

The position of the city on such peculiar natural objects, such as alluvial fans should be taken into account when urban planning. A number of unfavorable natural phenomena, such as flooding and flooding (Figure 8), the barrage effect (Figure 9), the processes of slippage, salinization and solonetization of soils are associated with the alluvial fans.

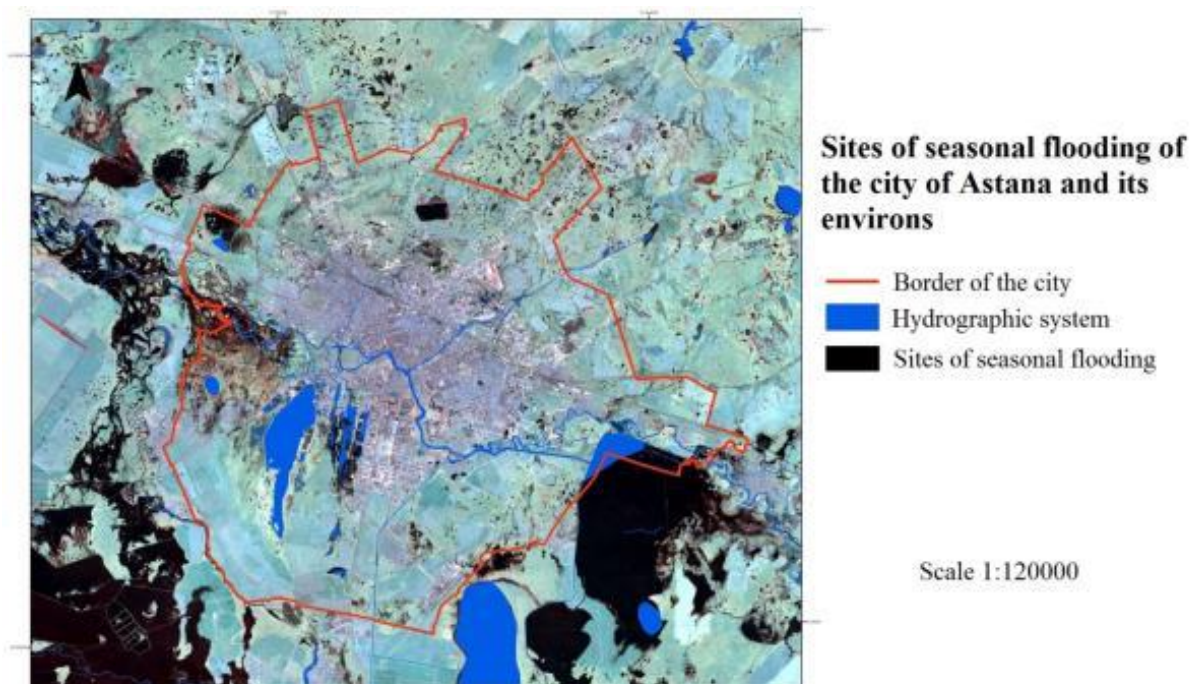


Figure 8. Areas of seasonal water logging and flooding of Astana and its environs are black. *A picture was received on April 21, 2017 from the satellite Landsat 8).*



Figure 9. Areas of high soil moisture in Astana and its surrounding (orange color).
The picture was received on August 24, 2016 by processing a combination of channels 5-6-4 of the satellite image Landsat 8. The barrage effect of urban buildings and structures in front of buildings across the direction of the underground flow movement (red color) is viewed.

The landscapes of the alluvial fans of eruption possess a powerful environment-forming potential and structural and transformative changes (town-planning) carried out on them have far-reaching negative ecological consequences if they do not correspond to the laws of their formation, structure and development [3]. Thus, the landscape carcass can be interpreted as landscape-environmental. Its purpose is to prevent the emergence of environmental problems and preserve the ability of the territorial system to self-organize and develop.

3. METHODOLOGY

The article does not pretend to fully develop the landscape-environmental carcass of Astana. It can only be considered as the initial stage of its creation. The identification and justification of the environmental carcass of the urban area is complicated procedure and represents a separate research topic. The formation of the environmental carcass of urban area is carried out on a larger scale, and as a result, requires more detailed studies. The urban area has a number of features. The main ones are: a fairly high level of urban development, which, as a rule, leads to the emergence of environmental problems; increased demand for land and their respective costs; specificity of historical and cultural development; strict boundaries of land users, both in the urban area and in the suburban area, etc.

Experiments in creating an environmental carcass are not numerous. The search for ways based on scientific ideas that can ensure sustainable development of the territory are considered fundamental tasks of politics and management. One of them is the landscape-environmental aspect of spatial organization of the territory [4-6].

A long-term interest of society in largely determines the spatial development of urban areas. The standardization and management of economic activity in the CIS countries is carried out according to the sectorial approach. This means that the territory as a single natural-functional structural unit "disappears", ceases to exist. To "preserve" it is necessary to change the principles of economic and environmental regulation.

Most of the work in solving environmental problems is focused on differentiating the state of individual natural components (soil, air, surface and groundwater, etc.) and finding ways to improve the quality of each., The elements that make up the environmental carcass on the territory of one administrative subordination have different subordination as they are managed not as territorial but as sectoral systems. The environmental carcass includes natural monuments of the republican level and specially protected natural areas of local importance, but each of these groups has its own subordination. The administration of roads and external improvement of the city administration is responsible for the state of green plantations not all of the city, but only for a small roadside part of it. The ecological framework of the territory may include objects in private ownership or long-term lease. The environmental carcass in general does not have unified management, and where it does not exist, there is no organization (system).

Environmental and landscape carcass of the territory is formed from elements of the natural block and connects three blocks (natural, anthropogenically-natural and social) into a uniform system.

Depending on the level of consideration of the environmental carcass of the territory, its composition as elements may include:

- basic parts (protected area);
- key elements (valuable wetlands);
- transit elements – environmental corridors (large and small rivers, performing ecological and biological functions of conservation, movement, multiplying the gene pool of biological diversity);
- Natural sanctuary (the core of the historical and cultural framework are key elements);
- Already existing or specially created natural-anthropogenic complexes (gardens and parks, boulevards, green plantations along large and small rivers, etc.), sections of typical landscapes, etc.
- Watershed providing interrelation of basic and key elements;
- Urban watercourses connecting all the fragmented natural and artificial structural landscape complexes of various ranks and form environmental corridors should become one of the main elements of the urban city's environmental carcasses.

Each of these objects is a certain system that can function to some extent independently, but as part of an environmental carcasses. Under the environmental carcass of the urban territory is understood [6] the aggregate of the medium-sized and natural-

anthropogenic complexes of the free space of the city, ranked according to the modes of use, that are purposefully formed to create a comfortable environment for human habitation and ensure sustainable development of the urban area.

Thus, the environmental carcass of urban territory appears as an aggregate that performs a completely different function in other territorial boundaries. The main purpose of the environmental carcass of the territory is the development of the system (territory) through the preservation of its functional integrity.

The primary territorial basis on which ecological balance when forming the environmental carcass of a large city, which is Astana, can be ensured is the meso-territorial level, i.e. a large city and its suburbs.

4. CONCLUSION

There should be a sufficient amount of open (free) space in the city to form an environmental carcass of the urban area which is one of the indicators of the quality of the city's environment and should be used as a potential reserve for ecological purposes. In the current situation, it is necessary to identify and preserve (reserve) areas with high environmental potential.

Element of the construction of the environmental carcass of Astana is suburban territory. It is considered by us from the positions of the "donor" (source) of the most important environmental factors. This is not only the already created Green Belt around Astana with a green plantation area of 73,000 hectares. Recreation zones on the more humid distal segments of the Rozhdestvenka alluvial fan of Nura carryover during the cultural measures are most suitable for these purposes.

A new view at the fan nature of the location of Astana city gives the key to managing the interflow of the territory. The dam and Nura drain reservoir created before the unfolding of the runoff at the top of the alluvial fan could serve as a regulator of underground flow over the entire flow-subordinate space.

Having no legal status the environmental carcass of the city territory or its main provisions in our opinion can be included in the general plan of the city. The mutual understanding of the developers of the environmental carcass and the master plan of the city can contribute to this. But the general plan can effectively "work" if there are legal mechanisms of its implementation. Therefore the creation of a local environmental regulatory framework becomes extremely important.

REFERENCES

1. URL: astanagenplan.kz/genplan/index.html
2. Ishankulov M.Sh. Landscapes of alluvial fans in a changing climate, Kazakhstan. In: Desertification of Central Asia: assessment, forecast, management. Astana: Nazarbayev University, 2014, 274-283.
3. Ishankulov M.Sh. Landscapes of the alluvial fans of dry lands. Astana: LLP "KzHi-Tech", 2010, 301 p.

4. Narbut N.A. On the issue of environmental planning of urban areas. Bulletin of the Peoples' Friendship University of Russia. Series "Ecology and life safety", 4, 2008, 29-35.
5. Voronina A.V. Eko-reurbanization of cities in the structure of urban planning. Privolzhsky scientific journal, 1, (2011), 88-92.
6. Mirzekhanova ZG, Narbut N.A., Ecological foundations of the organization of urban areas (on the example of Khabarovsk). Pacific Geology, Volume 32, 4, (2013), 111-120.
7. Ishankulov M.Sh., Nurgazinov A.B, Alibekova N.T., Meiramkulova K.S. Landscape-environmental aspects of urban planning in Astana - the capital of Kazakhstan, due to the city's location on the alluvial fans of rivers. Materials of the XII International Landscape Conference: Landscape science – theory, methods, landscape-ecological support of nature management and sustainable development. Tyumen, August 21-26, 2017, 50-54.
8. URL: <http://zelenstroi.kz>



A LEAN MANAGEMENT APPROACH IN LIGHTING TECHNOLOGY

Luminita Parv

Transilvania University of Brasov, Romania

Abstract: Lean management holds a substantial promise for dealing with a wide range of economical demands which includes improving the quality of product by reducing costs, high levels of process and also reducing the lead time. Efforts are being recognized with in the automotive sector to implement lean manufacturing by eliminating waste and adding value to the product there by satisfying the customers.

This paper critically reviews the concept, principles of lean and their implementation in electronics sector captivating ideas from automobile industry. The aim of the work is to investigate how leading companies are trying to implement the principles of lean manufacturing into their production operations by reducing costs and adding value to the product.

Keywords: Lean management, process improvement

1. LEAN MANAGEMENT – AN INTRODUCTION

Lean Manufacturing holds a substantial promise for dealing with a wide range of economical demands which includes improving the quality of product by reducing costs, high levels of process and reducing the lead time [1, 2].

Lean manufacturing is totally different from the older manufacturing as in the products are rather pulled rather than pushed to the customers. This is one of the few characteristics of lean production. Lean production has not only defied the mass production in case of an automotive industry but also directed it towards an extensive array of industrialization [2].

The other characteristics of lean production are as follows:

- Rather than detection in quality, the main importance is given on prevention.
- Production line is integrated throughout.
- The supply chain is integrated right from the consumer to the raw material.
- Work is prearranged in teams in order to eradicate all the non – value added waste.

There are basically five principles of implementing lean manufacturing in any organization such as automotive industry or an aerospace industry. The fundamental principles of JIT or Lean Production were developed by Toyoda when he was working on an automated power loom in the year 1890's. The five principles are as follows [1]:

- Identifying the value stream: Production of raw materials into finished goods has to be identified and action has to be taken.
- Create a value flow: The processes and the products have to flow continuously by eliminating needless steps in manufacturing process.
- Pull the value: The product has to be pulled towards the customer rather than pushing it. Thereby preventing the production of needless products.
- Elimination of waste: Removing the waste which doesn't add value to the product.
- Pursue for perfection: The processes have to be improved continuously.

Efforts are being recognized with in the electronics sector to implement lean manufacturing by eliminating waste and adding value to the product there by satisfying the customers. In order to sustain an overall strategy, the various tools and techniques for implementing lean manufacturing are identified [1,2,3].

The major tents of Lean manufacturing or the Lean manufacturing tools and techniques with their strategic initiatives are as follows:

- Pull – Kanban systems.
- Quick changeover – setup reduction.
- Value stream analysis or Value stream mapping.
- Cellular Manufacturing.
- Total Productive Maintenance (TPM) and Total Quality Management (TQM).
- Work Place Organizations 5s systems and Visual Management.
- Employee Involvement.
- Standard operations.
- Takt time.

To achieve this goal, the analysed factors are information flow, delivery time, personnel, inventory, material flow, as these impact each other during the production process.

The impact that these factors generate is difficult to define without analysis throughout the value stream.

2. CASE STUDY

2.1. RESEARCH METHODOLOGY

In order to consider the users' requirements for the methodology, an empirical-analytic study has been carried out. Representatives from production have been interviewed to evaluate the needs for process improvement.

The main steps for organizing a one-piece flow line in a flexible (lean) line are as follows [2.3]:

- Record to set cycle time, takt time, optimum number of operators, number of workstations.
- Record time measurement - this step is important because it provides us with the input data needed to make the line change.
- Current flow analysis - one-piece flow line.
- The current situation allows the production of a single piece at the workstation, it immediately passes from one process to another without stopping.

The family product is a sensor-switched outdoor light l 810 led iHF Z-wave (figure 1). This type of product can be integrated into the smart friends' system or any other z-wave network, with invisible high-frequency sensor, ideal for building entrances and fronts of buildings, 12,5 w Steinel led lighting system, 612 lm, 160° coverage angle, reach from 1 - 5 m, for stylish up and down lighting, includes soft light start.



Figure 1. The sensor-switched outdoor light

2.1. PROCESS ANALYSIS AND PROCESS IMPROVEMENT

In order to implement Lean technique in lighting technology, our proposed methodology consists in five steps.

First step consists of:

- Capture the manufacturing process activities. Quantify the amount of created product: The technique has to capture and represent the amount of product (physical units or percentages).
- Quantify the amount of created product: The technique has to capture and represent the amount of product (physical units or percentages).
- Capture the created scrap and waste material: the technique has to capture and represent the flow of scrap and waste material created after every step of the process and where is it sent.
- Quantify the amount of scrap and waste material created: the technique has to capture and represent the amount of scrap and waste material created after every step of the process and where is it sent.

The technique has to be able to show all the steps of the process in order to identify where the scrap and waste material is created. The table generate with Adaptive Excel sheet is presented in figure 2.

Measure	Enter your data here									
	jan.17	feb.17	mar.17	apr.17	mai.17	iun.17	iul.17	aug.17	01.17.2017	oct.17
Number of defective units produced	60	90	28	10	5	2	1	3	4	1
Total number of units supplied	3456	1456	3453	3452	3410	5456	2456	3456	4400	3634
Number of planned deliveries	3456	3456	3456	3456	3456	3456	3456	3456	3456	3456
Number deliveries not on time	56	40	39	28	40	11	15	5	2	2
Number of incorrect deliveries	0	0	1	0	0	0	0	0	0	0
Number of good units produced	3453	2505	2505	2505	2200	2505	2505	2505	2505	2505
Direct operator hours used	2345	1723	1723	1723	1723	1723	1723	1700	1723	1723
Sales turnover of product	5345000	5345000	5345000	5345000	5345000	5345000	5345000	5345000	5345000	5345000
Value of raw material	120300	110031	120300	120300	120300	120300	120300	120300	120300	120300
Value of Work in Progress	23410	23410	23001	22410	21410	33410	23410	23410	23410	24410
Value of finished goods stock now	2345000	2345000	2345000	2345000	2345000	2345000	2345000	2345000	2345000	2345000
Equipment Availability (%)	98,00%	98,00%	98,00%	98,00%	92,00%	98,00%	98,00%	98,00%	98,00%	98,00%
Equipment Performance (%)	99,00%	99,00%	99,00%	99,00%	89,00%	99,00%	99,00%	99,00%	99,00%	99,00%
O/P Quality (%)	99,50%	99,50%	99,50%	99,50%	99,50%	99,50%	99,50%	99,50%	99,50%	99,50%
Process Output value	\$2.345.600	\$2.345.600	\$2.345.600	\$2.345.600	\$2.345.600	\$2.345.600	\$2.345.600	\$2.345.600	\$2.345.600	\$2.345.600
Process input value	\$345.300	\$345.300	\$345.300	\$345.300	\$345.300	\$345.300	\$345.300	\$345.300	\$345.300	\$345.300
Number of employees	12	11	11	11	10	11	11	11	11	11
Sales Turnover of area	\$5.345.000	\$5.345.000	\$5.345.000	\$5.345.000	\$5.345.000	\$4.980.012	\$4.980.012	\$4.980.012	\$4.980.012	\$4.980.012
Square meters of area	10345	10345	10345	10345	10345	8030	8030	8030	8030	8030

Figure 2. Adaptive sheet with the process measure

The second step is to represent the product manufacturing flow: The technique has to capture and represent the flow of resources required to create the product (Figure 3, 4 and 5).

Process Data									
Process Step/Station:		#1	#2	#3	#4	#5	#6	#7	#8
Cycle Time (mean)	mins	2,50	1,69	3,40	1,01	2,21	2,66	1,37	2,29
Stdev (Cycle Time)	mins	0,02	0,01	0,03	0,02	0,01	0,05	0,04	0,02
Stdev (Cycle Time)x3		0,05	0,04	0,10	0,06	0,02	0,15	0,13	0,05
Optimum Cycle Time		2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
VA	%	60	40	0	60	40	80	80	80
NVA	%	30	50	0	10	20	20	0	50
Waste	%	10	10	100	30	30	20	10	10
Scrap (%)		2	2	0	10	0	2	2	3
Rework (%)		1	1	0	20	1	20	2	5
Yield (Quality)		97%	97%	100%	70%	99%	78%	96%	92%
Actual Volume per day		220	220	220	220	220	220	220	220
Operating Time per day	mins	1800	1800	1800	1800	1800	1800	1800	1800
Optimum volume		721,154	1065,09	529,1005	1782,18	814,48	676,183	1310,04	787,402
Performance		30,51%	20,66%	41,58%	12,34%	27,01%	32,54%	16,79%	27,94%
OEE		29,591%	20,036%	41,580%	8,641%	26,741%	25,378%	16,122%	25,705%

Figure 3. Process data

Cycle Time Calculator (use to calculate mean cycle time and standard deviation)									
Process Step/Station:		#1	#2	#3	#4	#5	#6	#7	#8
Cycle Time (Sample #1)	mins	2,50	1,70	3,40	1,00	2,20	2,70	1,40	2,30
Cycle Time (Sample #2)	mins	2,47	1,69	3,42	1,00	2,21	2,69	1,39	2,29
Cycle Time (Sample #3)	mins	2,49	1,70	3,44	1,02	2,22	2,70	1,40	2,30
Cycle Time (Sample #4)	mins	2,50	1,67	3,40	1,04	2,21	2,59	1,38	2,27
Cycle Time (Sample #5)	mins	2,52	1,69	3,35	0,99	2,21	2,63	1,30	2,27
Cycle Time Mean	mins	2,496	1,69	3,402	1,01	2,21	2,662	1,374	2,286
Stdev	mins	0,01817	0,01225	0,033466	0,02	0,00707	0,0497	0,04219	0,01517

Figure 4. Cycle time calculator

Process Parameters		
Total (Cycle Time)	17,13	mins
Stdev (Cycle Time) Bar	0,02	mins
Max Cycle Time	3,402	mins
Optimum Cycle time	2,14	mins
Total VA	55	%
Total NVA	22,5	%
Total Waste	27,5	%
Mean Scrap	2,625	%
Mean Rework	6,25	%
Rolled Throughput Yield	0,44919	%
Optimum overall Volume:	529,101	

Figure 5. Process parameters

The third step consists of the results representation in an intuitive way: results presented in a way that is easy to understand for people unfamiliar with the technique. It detail the process' steps: the details within every single step of the process (Figure 6, 7, 8).

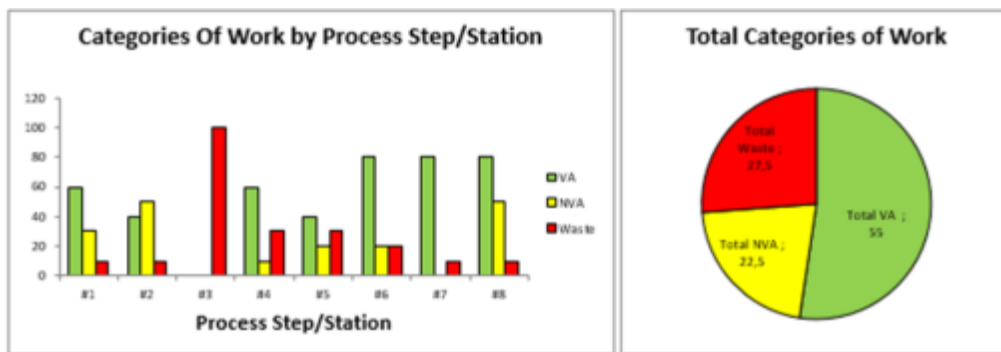


Figure 6. Process Step/Station Chart

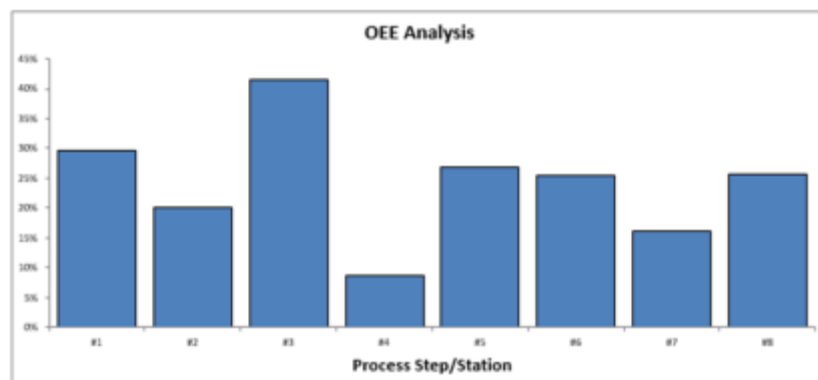


Figure 7. OEE analysis (step/station)

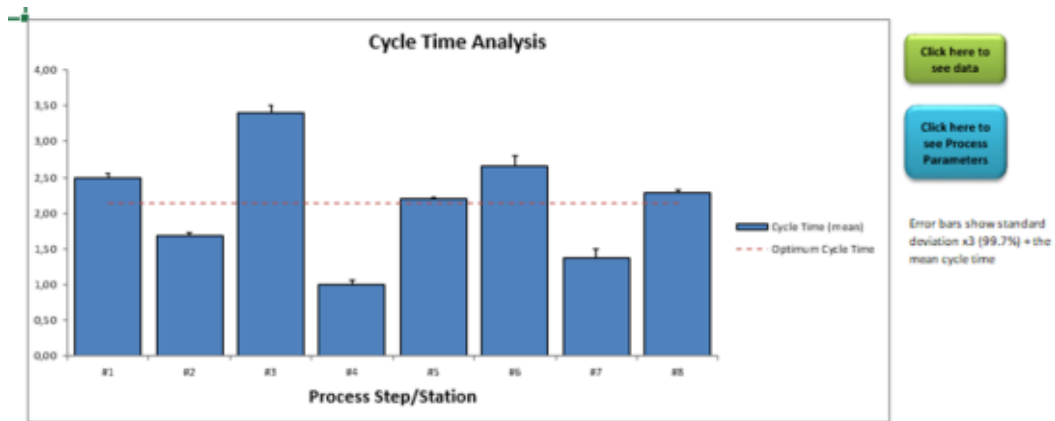


Figure 8. Cycle time chart

The fourth step consist of an agent-based simulation, using Anylogic platform [4,5,6]. The resources and activities are represented as agents. The result of this simulation is the identification of unnecessary waste and the process bottle necks (Figures 9 and 10).

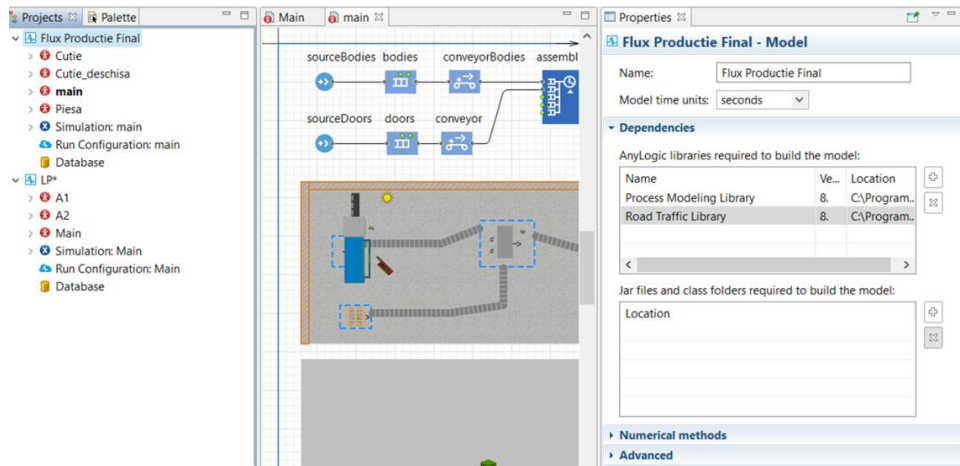


Figure 9. Anylogic capture

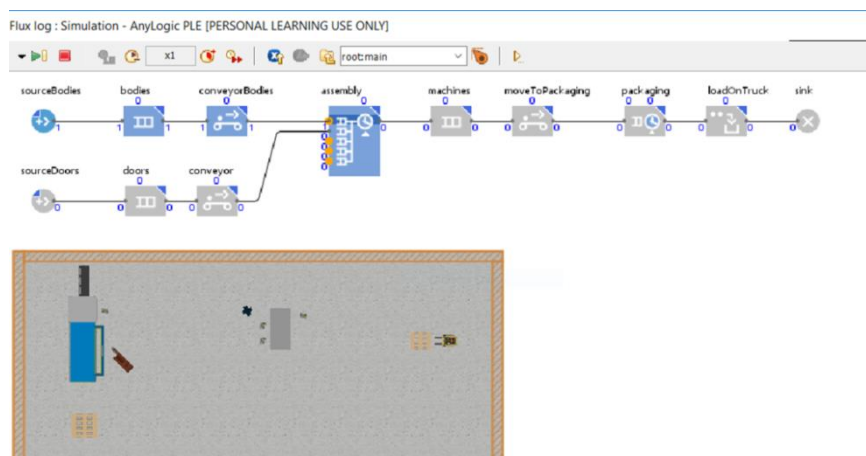


Figure 10. Anylogic simulation

The last step is represented by the process improvement evaluation [6].

	Results							
Not Right First Time (PPM)	17361	20604	8109	2897	1466	367	407	868
Delivery Schedule Achievement	98,38%	98,84%	98,84%	99,19%	98,84%	99,68%	99,57%	99,86%
People Productivity (Units per hour)	1,47	1,45	1,45	1,45	1,28	1,45	1,45	1,47
Stock Turns	2,15	2,16	2,15	2,15	2,15	2,14	2,15	2,15
Overall Equipment Effectiveness (OEE)	96,53%	96,53%	96,53%	96,53%	81,47%	96,53%	96,53%	96,53%
Value Added Per Person	\$166.692	\$181.845	\$181.845	\$181.845	\$200.030	\$181.845	\$181.845	\$181.845
Floor Space Utilization	\$517	\$517	\$517	\$517	\$517	\$620	\$620	\$620

Figure 11. The main KPI of the future state of process



Figure 12. Key performance indicators

3. CONCLUSION

The present study showed the use of process mapping in applying concepts of lean production, combined with simulation as a complementary tool.

Using the simulation, it was possible to predict the production line under study according to the process mapping the data generated by the software, the current state of production line was analysed and weaknesses in the production process were identified. According to that, a plan of action was suggested.

The main problems in the production line were exaggerated stocks and the bottleneck in a production process.

The company has no effective control over raw materials necessary for production, thus maintaining surpluses of some parts and no inventory for others, which increases the cost of production, whether due to increased production time or cost of unnecessary stocks.

REFERENCES

1. Womack JP, Jones D.T, A Mentalidade Enxuta nas empresas: elimine o desperdício e crie riqueza 9th ed. Campus, Rio de Janeiro, 2003
2. Shank JK., Govindarajan V., Strategic cost management: the new tool for competitive advantage. The Free Press, New York 1993
3. Belokar R.M., Kumar V., Kharb S., An application of value stream mapping in automotive industry: a case study. International Journal of Innovative Technology and Exploring Engineering (IJITEE) Vol 1 No 2, 2012
4. Rajakumar S., Arunachalan V.P., Selladurai V., Simulation of workflow balancing in assembly shopfloor operations. J Manuf Technol Manag 2005, 16(3):265–281
5. Anand G., Kodali R., Simulation model for the design of lean manufacturing systems—a case study. Int J Product and Qual Manag 2009, 4(5–6):691–714
6. Mönch L., Simulation-based benchmarking of production control schemes for complex manufacturing systems. Control Eng Pract 2007, 15(11):1381–1393



DOES GENDER MAKE A DIFFERENCE IN THE LEADERSHIP PREFERENCES IN THE CONSTRUCTION INDUSTRY

Teodora Klincharova, Makedonka Dimitrova, Marjan Bojadjiev

UAKS Institute for Entrepreneurship and Leadership Development, Macedonia

Abstract: Leadership is a complex concept open to individual interpretation. The main aim of this research was to investigate the application of McGregor's XY Theory of leadership in the Macedonian construction industry with a special focus on the position of women within the industry. Also, the focus was on the gender perspective of leadership and managerial style in the construction industry in Macedonian companies. We have used construction sector findings from Hong Kong as a yardstick for the analysis. The traditional view that construction is considered a masculine profession as well as the changing patterns of gender preferences represented another challenge. The methodology of the research is based on a previously tested instrument that measures the XY orientation, intrinsic motivation, turnover intention, trust and satisfaction among the employees. The data was collected in Spring 2016 in one big size company in Macedonia from the construction sector. The received 100 responses were analyzed in the SPSS statistical software using cross tabulations and the related statistical analyses. The results show that the chosen company is untypical for construction industry because most of the respondents were females however men are holding most of the managerial positions.

Keywords: leadership, motivation, McGregor XY Theory, gender, construction industry



ATTENTION ON SOCIAL MEDIA: EVIDENCE FROM THE MACEDONIAN START UPS

Makedonka Dimitrova, Dimce Micevski, Ilijana Petrovska

UAKS Institute for Entrepreneurship and Leadership Development, Macedonia

Abstract: In the current technological era, the social media today present a necessary tool among most of the businesses in their communication with the consumers. Smaller businesses with limited resources look at them as a cost effective communication channel but also big companies take advantage of them. To explore the practices, the paper focuses on the awareness and benefits of social media as a communication channel between the participants in the Macedonian startup community. A structured questionnaire was distributed to all registered start ups in the Republic of Macedonia. The survey found that 60% of the respondents fully agree that by using social media as a communication channel with consumers is improving the image of the company itself, which coincides with the opinion of Taneja and Toombs (2014) describing the positive aspects of the use of social media. While, contrary to the findings of Bakeman and Hanson (2012) concluding that only big companies are aware of the social media utilization, the survey found that all 25 startups or 100% of respondents use social media in running their business.

Keywords: social media, communication, customers, start ups, Macedonia

1. INTRODUCTION

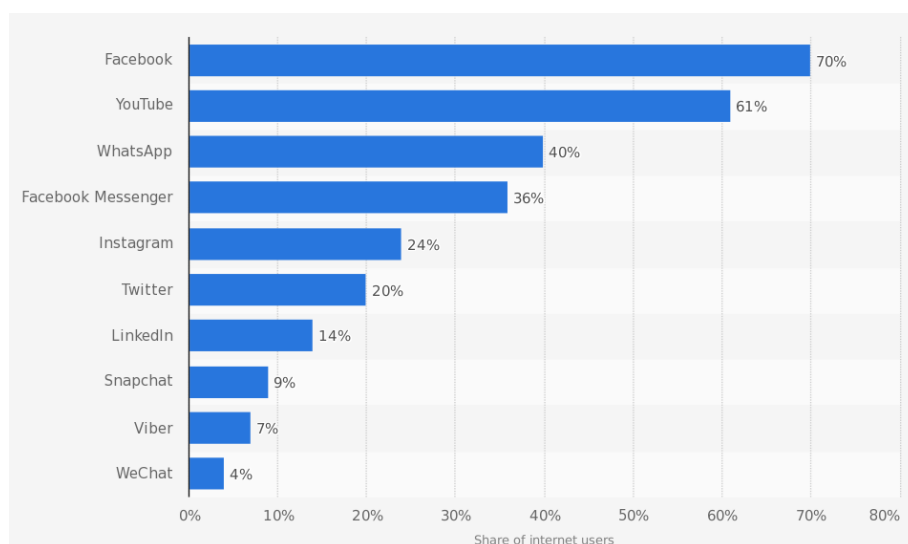
21st Century is a one of information and new technologies enabling social media (SM) to interact with the living and working style of the world population. SM represents a quite intriguing concept of today's world. It is almost impossible to imagine a daily routine without the use of social media. Many influential business leaders use SM to secure their personal development as well as to increase the exposure of their businesses and receive customer feedback. According to Kadam and Ayarekar (2014) social media represent a phenomenon that enables and supports interaction and communication among individuals around the globe. SM popularity increased with high penetration of the mobile phones, internet usage rates and the mobile software applications that makes them accessible at all times.

2. LITERATURE REVIEW

2.1. SOCIAL MEDIA

Organizational perspective wise, SM is the communication channel through which a business could communicate directly with its consumers. Over the years, their applicative use

in companies has been increasing to a level that today we refer to this type of communications channel as digital media as well. According to Cooper (2015) Facebook's social network is the best example to acknowledge the explosive growth of SM over the past decade as well its importance on the market. Developing from social networking services for students in 2004, Facebook is today's the world leader in the area of SM with a monthly base of 1.2 billion users as of March 2015. People around the world use Facebook, not just social networking, but also for tracking news, current events, communities and businesses. For the market, this means that Facebook and other SM platforms are also used as main channels for doing business, followed by Twitter with 316 million users, Instagram with 300 million, etc. Cooper (2015) predicted that, over the next few years, the use of social media will be represented among the all age groups equally and the existing gap related to the use of technology will disappear, given the increasing fatigue of people aged 65+ about healthy life and care. Graph 1 below indicates that Facebook enjoys greatest usage penetration rate of 70%, followed by YouTube with 61%, Instagram 24% and Twitter with low 20%, but also other closed circle communication platforms indicate high penetration rates such as Facebook Messenger with highest popularity of 36%, followed by WhatsApp by 40%, LinkedIn with 14% and Viber of only 7%.



Graph 1. Global Active usage penetration of leading social networks as of February 2017

Source: Digital News Report 2017(2017), Reuters Institute for the Study of Journalism

In an era of digitization, given the quality and uniqueness of the digital marketing, one must perform market research and recognize the consumer needs and then adapt the content and channels of promotion accordingly to the nature of the business (Patrutiu-Baltes, 2015). According to Taneja & Toombs (2014) every business needs to identify its positioning on the market including building its reputation regardless the channel, traditional or social media. The traditional media gives the business an equal approach to the broad mass while the social media is more demanding. The emergence of SM directly affects the overall use of traditional media and the cost of marketing in general because SM are a much cheaper channel of advertising and promotion compared to the traditional one.

Narayanan et al. (2012) explain that the new world is shaped by SM where everyone can express their opinion, influence the others in real time with distance reduced to zero

allowing increased rates and intensity of communication. Given that the online market is very harsh, full of information and presence of many businesses, it's difficult to identify a competitive approach even in the cases of product or service innovation and unique business models. On the other hand, differentiation through the SM can be a successful tool for business promotion but also a challenge for new ventures that have not established certain point of brand equity yet. Moreover, SM requires human capital to deliver the messages to the customers personally i.e. to start and maintain communication with each consumer directly as well as to communicate the message in a rapidly fast and flexible timeframe (Taneja and Toombs, 2014). SM is characterized with the quick timespans and the "word of mouth" effect because the consumers are interconnected through online platforms. According to Lee and Bernoff (2008), the massive use of technologies in the form of blogs such as YouTube, Facebook, Twitter or other forums with high potential for interaction in the format of online recommendations and discussion enables consumers to share experiences related to the availability and use of products and services at any time anywhere in the world.

Also, consumer behavior is also an important factor being explored as a separate field and this is associated with purchasing habits that can affect the value of the brand. Hajli (2014) explains that customers interact in a continuous process and often their intention of buying becomes influenced by online market turning them into loyal customers prepared to share experiences, interact with the online community, often buy online and make recommendations for products on social networks. On the parallel, the market along with some brands adapts to these consumers and stimulates the interaction they are looking for.

In the past the market was oriented towards the products, whereas today businesses adapt to the customer needs and then they market the products. So, it is of crucial importance to understand the customer's needs, establish communication with them and then create environment that add value to the loyal customers to become. Said that, businesses create databases of customers' preferences and design their marketing strategy according to the preferences, involving SM as a cheap tool of the implementation stage (Taneja and Toombs, 2014).

The main role of marketing content is to inform and educate the public in order to develop a privileged relationship with it, and to determine the brand's loyalty to it. To be relevant to the audience and create a powerful brand, it is crucial to create effective content that will result in a privileged relationship via the visual connectivity (Patrutiu-Baltes, 2015; Manic, 2015). Oser (2006) concludes that many target markets could be also reached via the viral marketing tools as well such as the viral videos or video clips that could be part of an electronic email. The author explains that even though, the viral messages are not considered commercials, startup companies could take advantage of them and create a buzz for a successful story overnight over the traditional companies. To conclude, SM may play an important role in companies brand establishment and growth but there are also online security concerns that they need to be aware not to reflect negatively on the brand (Taneja and Toombs, 2014).

2.2 STARTUP BUSINESSES

Republic of Macedonia is still country in transition and its economy is efficiency driven according to the Global Entrepreneurship Monitor survey (2008). In the last five years the startup community started growing but there is no organized system in place to track the establishment and growth of startup. As a reaction, the startup community itself maintains its

network with informal meetings and informal mutual co-operation. This fact is also evident from the Start up Index research (2016), where Macedonia has low start up index value of 26, comparing it to Serbia 33.94, Slovenia 87.50 and another set of Northern European countries such as Latvia with 123.68, Iceland 216.67 and Estonia with highest index value of 256.15. Franck Nouyrigat (2016) provided a clear picture of the establishment of startup ecosystem in Macedonia claiming that it has potential to increase by three times given its current span compared to other countries that have similar references, but that there were certain factors that are not negligible and affect the further development. He identified several key factors that may influence the startup community in Macedonia such as talent, human capital, regulation and access to finance.

Startups also experience that same product/service promotion cycle as any other businesses, in particular the three phases of introducing the product/service to the customer and brand creation; capacity for product sustainability as well as trends follow up. According to Taneja and Toombs (2014), the startup companies in the first phase communicate their target clients in a personalized manner via inexpensive marketing tools such as SM and telemarketing. Also, branded startups hold their own identity and as such secure presence on the market to further on increase the brand awareness among the customers which in turn contributes to the developing of the 'word of mouth' effect. The second phase, based on the types of the clients, the managers develop a corresponding approach with selected SM tools. And, finally in the third phase, the managers try to minimize the risk from aggressive promotion and develop a unique brand story line that has strict goals and directives. In the last phase, only 26% of the startups succeed in the implementation of the promotional strategy while the rest rely on aggressive communication that somewhat leads to negative effects among customers.

Jones and Jayawarna (2010) explain that awareness of SM and their use can solve the problem of new businesses in terms of insufficient resources and finance needed for their growth and sustainability. In their study, SM is categorized as "bootstrapping" activity and is a tool used to compensate for limited funds and resources. On the other hand, Bakeman and Hanson (2012) conclude that large corporations are aware of the need to use social media, in contrast to small startups lagging behind with this trend and their employers are insufficiently acquainted and knowledgeable about the availability of new technologies and new media. So, dedicated knowledge about SM is a key for startups to take advantage of the opportunity to increase the entrepreneurial performance via improved communication with the consumers (Kadam and Ayarekar, 2014). Therefore, employers in employee profiles and job descriptions need to meet the criteria for knowledge of social media.

The impact of SM has a major role in the development of small startup businesses despite the non-sufficient human resources for marketing and promotion as concluded from the research conducted in Nairobi, Kenya on 246 startup businesses (Jagongo & Kinyua, 2013). SM in the Republic of Macedonia as Kiselicki (2013) explains has positive effect on small startups unlike the print media and other types of traditional media. Moreover, the study found that paid SM campaigns have a greater positive effect than unpaid ones especially for building and maintaining brand awareness among consumers.

However, it is important to emphasize that communication through social media would have a positive effect on the value of the brand; only if the involvement of consumers in the communication itself is high involving more personalized marketing (Zailskaite-Jakste & Kuvykaite, 2013). Moreover, Nory et al. (2015) emphasized that the combination of websites and SM may increase the awareness of the brand, inquiries, enhance relationships with customers, attract new customers, enhanced ability to reach customers on a global scale,

and ease the co-promotion of local businesses that enhance the image of small businesses in the region. Also, they conclude that web site interactions coupled with sustained SM promotion could give positive impact on businesses in terms of increased interaction, brand awareness and revenues.

The startups versus the traditional business have limited resources to use the SM for marketing purposes therefore one of the biggest obstacles for small businesses in using social media is the transition process from communicating with consumers to interacting with them on hourly basis (Taneja and Toombs, 2014). However, in the process of increasing the frequency of social networking small business owners should distinguish between their personal SM profiles and the business ones not to reflect on the image of company. According to Li & Bernoff (2008) many small business owners use SM for marketing and distribution purposes as traditional companies used to do in the past but there are a significant number of companies that if SM is not implemented in their operational strategy they could suffer losses.

On the other hand, entrepreneur could get closer to their customers not only via virtual networks but also in a more direct way, so to create the 'buzz' using the word of mouth potential by giving away free samples of the products they offer (Copeland & Malik, 2006).

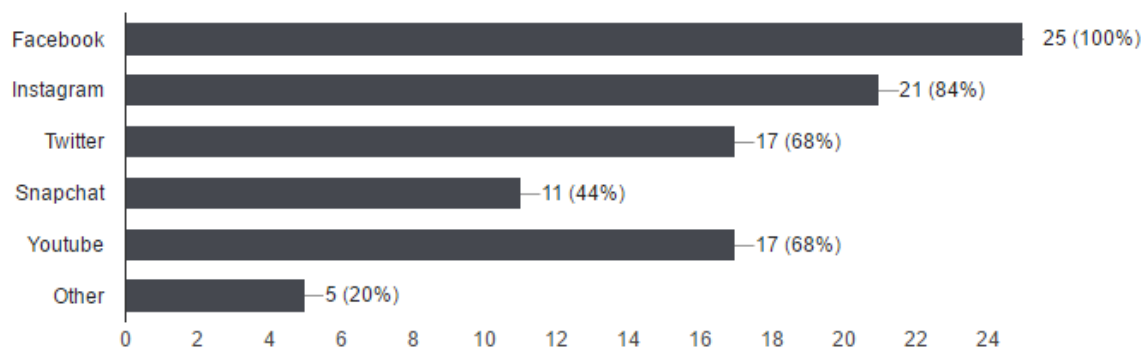
Hence, the value of using SM could be high for every company especially for small business. These include reduced marketing costs by replacing the print, TV and radio commercials with online tools in our case social networks that in some cases are nearly free of charges. Another value, that might be also benefit for small businesses is building relationships with potential buyers and turning them into loyal consumers. Except for everyday entertainment activities, SM plays a major role in communicating with companies with their consumers, and increasingly represents a substitute for the traditional way of communication between consumers and the brands themselves. At the same time, SM allows consumers to negatively and positively influence the value of the brand itself according to the authors Zailskaite-Jakste & Kuvykaite (2013).

3. METHODOLOGICAL APPROACH AND RESEARCH INSTRUMENT

This paper's main research question is to explore the awareness and the benefits of using social media among the startup businesses in the Republic of Macedonia. We have used a previously validated research instrument of Kadam and Ajarekar (2014) that was applied on a hundred startup businesses from Bombay, India. The questionnaire was modified and adapted to suits the characteristics of Macedonian startup businesses. In order to have a representative we have conducted the survey of 25 startups of businesses in Macedonia which is 50% of the entire startup community according to Nouyrigat (2016) who has identified total of 52 startups. The survey was conducted in the period from 25 September to 25 November 2017. An online questionnaire of 15 previously structured questions was emailed to the owners of startup businesses, not including the demographic questions. The answers to the questions was measured on a Likert-type of scale ranging from 1 to 5 where: 1 - I completely disagree, 2- partially disagree, 3 - neutral, 4- partially agree, 5- completely agree. The sample included businesses not older than 5 years regardless the industry and manner of operation. The respondents were dominantly based in Skopje, the capital of Republic of Macedonia.

4. RESULTS AND DISCUSSION

Our research indicated that the use of social media in the small startup businesses in Macedonia is a crucial tool for communicating with consumers. As a result, businesses on daily basis acknowledge and implement new trends in the online communication. Graph 2 below indicates the penetration of usage of SM by type and preference among the Macedonian startup community. Facebook, Instagram, Twitter and YouTube dominate from the SM as channels to communicate with the customers. This is in line with other research in the areas (Patrutiu-Baltes, 2015; Manic, 2015; Oser, 2006).



Graph 2. Which social media does your startup use in daily operations

Source: Authors own reserach

Furtheron, we have compared our research results with the similar research conducted in India with 100 startups from the city of Bombay as already mentioned in this paper. Majority of the startups 72% (N=17) were led by men and only 28% (N=7) were led by women. High 68% were 26 to 35 years old; of those 56% hold bachelor degree and 32% master's degree. All 25 startups or 100% use social media for their business operation, which is contrary to the findings of Bakemon and Hanson study (2012) that only large companies are aware of the use of social media. The startups knowledge of social media is high as 60% of Macedonian startups said that they independently study and monitor social media trends on the Internet where 52% of the respondents from the Indian startups found to have basic or introductory knowledge of social media as identified in the previous research on the topic (Zailskaite-Jakste & Kuvykaite, 2013; Kiselicki, 2013). Then, the awareness of startups about the use of social media in Macedonia is 60%, and in India 70% and on the parallel Bombay startups shows 18% awareness of blogs to become future marketing tool.

However, it should be noted that the awareness of the Macedonian startup community is significant because 44% of startups account for up to 10% of the social media budget, and even 16% of the total number of startups allocate over 75% of its social media budget. The most used social network by Macedonian startups is Facebook with 100%, followed by Instagram 84%, YouTube and Twitter with 68% and the other LinkedIn and Pinterest with 20% participation. At the same time, 51% of startups in Bombay, India believe that SM is partly a gain in business growth, while only 28% consider it crucial for the growth of their business. This percentage of Macedonian startups is reversed, 54% of them believe that the use of social media is crucial for business growth, while the remaining 24% think that social media is only partial gain in the growth of their business. In addition, 60% fully agree that the use of social media as a channel for communicating with consumers improves the image of the company itself also concluded previously by Taneja and Toombs (2014) by describing the

positive aspects of the use of SM. According to the survey, 40% of the respondents partially agree that through the use of SM, startups in Macedonia can operate as good as the big corporations on the market, while the Indian startups expressed slightly higher (57%) readiness equal competition, meaning that Indian startups are more competitive in their markets compared to the big players.

According to the survey, one of the main benefits that startups gain through the use of SM in Macedonia is 'improving the image' (88%) which was almost mirrored in India by 89%. Then the interactive relationship with consumers follows with 84% consent, where in the case of India 74% of the respondents agree. In order to encourage and increase sales as a benefit from the use of SM, 76% of the Macedonian startups agree, while in India this benefit is represented by lower 58% of the respondents. High 60% of the respondents in Macedonia think that the 'creation of loyal consumers' is another benefit from the use of SM, while 44% of the startups in India claimed the same benefit. Both Macedonian and Indian start ups claim that profit (over 60%) is a benefit while using SM in the daily operations. The Indian startups in terms of benefits are determined to have two other two advantages, in particular competitiveness of the market (57%) and impact of the consumer buying decision (55%).

We could conclude that the Indian startup community compared to the Macedonian one is more advanced but the second one is striving to catch up moving into the same direction.

5. CONCLUSION

We could conclude that the startup community in Macedonia is young but flexible to the globalization pressures and needed adaptation to secure survival. Despite the socialist legacy, the entrepreneurs are committed to success and all that it requires given the Nouyrigat's (2016) conclusion that Macedonian startup businesses kick off with capital up to USD 5000. Therefore, the use of social media in the startup businesses in Macedonia is a crucial tool for communicating with consumers as this has been also concluded from the research. On the opposite, Bakemon and Hanson (2012), found that only large companies are aware of the advantages of the use of SM. Moreover, we conclude that the big companies in Macedonia can learn a lot from small startups, especially in the segment of market positioning by targeting a niche audience with loyal consumers.

From the aspect of social media as a communication channel, Macedonian startups agree that they represent the cheapest and most effective way to communicate with their potential consumers, which later turns them into loyal base. They also follow up on the other trends such the 'word of mouth' as a marketing effect, viral marketing, email marketing and others. It can be concluded from the research that the young Macedonian Startup community is both aware of the use of SM and its benefits especially in respect of the company brand equity.

With this study, we intended to contribute to the awareness of the value of the SM to start ups and stimulate its further application as a rather cheap alternative to the traditional media. We also hope to help small business in their wellbeing and as such contribute to the quality of life in the society in general.

We also find this paper original as it is among few that report on startup community and their use of SM however there are some limitations. In the case of startups a qualitative research is also appreciated as it looks into depth of the specific topics and also we suggest further research to be able to compare results in future and recommend possible actions to help young companies endure on the globalized market regardless their geographical point of

origin. SM, we believe to further shape the ways business operate, to they would need to stay alert and follow up on the developments in an organized manner.

REFERENCES

- Bakeman, M., & Hanson, L. (2012). *'Bringing Social Media to Small Business: A Role for Employees and Students in Technology Diffusion'*, Business Education Innovation Journal, 4, 2, pp. 106-111.
- Cooper, J. (2015) *'The New Year's Social Stratosphere'*. Adweek.
- Copeland, M., and Malik, O. (2006). "How to Build a Bulletproof start up", Business2.0 pp.76-92.
- Dimitrova, M., Vadjnal, J., Petrovska, I. and Bojadziev, M. (2014). *'Should I become an entrepreneur or an employee: Dilemmas of students in Macedonia and Slovenia'*. Acta Oeconomica Universitatis Selye, pp. 35-44.
- Eucher, J. (2013). *'What Large Companies Can Learn From Start-ups'*, Research Technology Management, 56, 4, pp. 12-16.
- Freeman, D. and Siegfried, R. (2015). *'Entrepreneurial Leadership in the Context of Company Start-Up and Growth'*, Journal of Leadership Studies, 8, 4, pp. 35-39.
- Global Entrepreneurship Monitor (2008) Executive Report*. Babson, MA: BabsonCollege.
- Hajli, M.N. (2014). *'A study of the impact of social media on consumers'*, International Journal Of Market Research, 56, 3, pp. 387-404.
- Hisrich, R. and Brush, B. C. (1985) *'The Woman Entrepreneur: Starting Financing, and Managing a Successful New Business'*.Lexington, MA: Lexington Books.
- <http://swtalumnimk.com/2015/12/14/start-up-academy/>
- <https://westernbalkanstartups.com/%D1%80%D0%B5%D1%81%D1%83%D1%80%D1%81%D0%B8/>
- Jagongo, A. and Kinyua, C. (2013). *'The Social Media and Entrepreneurship Growth(A New Business Communication Paradigm among SMEs in Nairobi)'*, International Journal of Humanities and Social Science, Vol. 3/10.
- Jones, N., Borgman, R. & Ulusoy, E. (2015). *Impact of social media on small businesses*. Journal of Small Business and Enterprise Development, Vol. 22, pp.611-632.
- Jones, O., & Jayawarna, D. (2010). *'Resourcing new businesses: social networks, bootstrapping and firm performance'*, Venture Capital, 12/2, pp. 127-152.
- Kadam, A., and Ayarekar, S. (2014). *'Impact of Social Media on Entrepreneurship and Entrepreneurial Performance: Special Reference to Small and Medium Scale Enterprises'*, SIES Journal Of Management, 10/1, pp. 3-11.
- Kiselicki, M. (2013). *'Analyzing the effectiveness of social media in the promotion of entrepreneurial businesses in the Republic of Macedonia'*, Journal Of Sustainable Development (1857-8519), 4, 7, pp. 84-98.

- Leppäniemi, M. and Karjaluoto, H. (2005). *'Factors influencing consumers' willingness to accept mobile advertising: A conceptual model'*, International Journal of Mobile Communications, Vol. 3, No. 3, pp.197–213.
- Li, C., & Bernoff, J. (2008). *'Groundswell winning in a world transformed by social technologies'*, Canadian Manager, 33, 2, pp. 28.
- Manic, M. (2015). *'Marketing engagement through visual content'*, Bulletin Of The Transilvania, University Of Brasov, Series V: Economic Sciences, 8, 2, pp. 89-94.
- McMullen, J.S. and Shepherd, D.A. (2006). *'Toward a Theory of Entrepreneurial Action: Detecting and Evaluating Opportunities'*, Academy of Management Review, 31, pp. 52-132.
- Narayanan, M., Asur, S., Nair, A., Rao, S., Kaushik, A., Mehta, D., Athalye, S., Malhotra, A., Almeida, A. and Lalwani, R. (2012). *'Social Media and Business'*, Vikalpa: The Journal For Decision Makers, 37, 4, pp. 69-111.
- Nouyrigat, F. (2016). *'Actionable Start Up Ecosystem Report'*. Swiss Contact.
- Oser, K. (2006). *"VH1, Bravo Get Content, rating from Web Virals,"* Advertising Age.
- Patrutiu Baltes, L. (2015). *'Content marketing - the fundamental tool of digital marketing'*, Bulletin Of The Transilvania, University Of Brasov, Series V: Economic Sciences, 8, 2, pp. 111-118.
- Schaupp, L., & Bélanger, F. (2014). *'The Value of Social Media for Small Businesses'*, Journal Of Information Systems, 28, 1, pp. 187-207.
- Stevenson, H. H., Roberts, J. M. and Grousbeck, I. (1985). *"New Business Ventures and the Entrepreneur"*, Burr Ridge, Il., pp. 16-23.
- Taneja, S., and Toombs, L. (2014). *'Putting a face on small businesses: Visibility, Viability and Sustainability, the impact of social media on small business marketing'*, Academy Of Marketing Studies Journal, 18, 1, pp. 249-260.
- Zailskaite-Jakste, L. and Kuvykaite, R. (2013). *'Communication in social media for brand equity building'*, Economics & Management, 18, 1, pp. 142-153.



STRATEGIC CORPORATE SOCIAL RESPONSIBILITY AS A FACTOR OF ATTRACTING CUSTOMERS

**Isidora Milošević, Sanela Arsić, Anđelka Stojanović, Danijela Voza,
Ivan Mihajlović**

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Focusing Corporate Social Responsibility (CSR) and company activities in a way that is sensitive to social and political strengths of the environment is a key goal in the decision-making process for the CSR strategy. Corporate strategy can be difficult to build without taking into account CSR elements that are sources of competitive advantage, and a relatively lasting competitive advantage can be achieved through relationships with customers, suppliers of products and services, giving importance to brands and creating a new business model. The target population in the conducted survey was final consumers. A survey questionnaire was used as a data collection tool. The aim of this research is to examine the opinions and attitudes of consumers in relation to the knowledge of the concept of corporate social responsibility and how this concept can affect their decision to buy the CSR company's products. Data collected in this survey were processed with adequate statistical methods, based on which appropriate conclusions were made.

Keywords: Dimensions CSR, Consumers, Companies, Strategy



QUALITY OF SERVICES IN BANKING IN EASTERN SERBIA

Sanela Arsić, Isidora Milošević, Anđelka Stojanović

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: In modern business on the market banks are increasingly difficult to achieve a competitive advantage based on new services, pricing, distribution channels and promotion. Many studies about competitiveness of the banking sector showed that banks turn to improve the quality of services as a source for better positioning in the market. A survey questionnaire was used as a data collection tool. Data collected in this questionnaires was processed with adequate statistical methods used of software packages SPSS v.18 based on which we appropriate conclusions were made. Factor analysis was used to obtain and analyze the results. The obtained results show that on the quality of banking services are effects: the respect and understanding of clients, professionalism, and image of the bank.

Keywords: quality, employees, banking services

1. INTRODUCTION

In modern business on the market banks increasingly gain a competitive advantage based on new services, pricing, distribution channels and promotion. Most studies about competitiveness in the banking sector shows that banks should turn to improving the quality of services as a source for the best positioning in the market.

The banking sector is a significant part of the service economy. The modern way of life imposed this because the necessity of using banking services use almost everyone, both citizens, businesses and state institutions. However, banks are currently facing with major challenges in their business environment, the sources of which are the result of the global economic and financial crisis, and a steady increase in the expectations of users of banking services. These factors influence the increase in demand towards banks and the strengthening of competition in the banking sector. The bank provides feedback to its potential customers, communicating on that way. However, in this relationship, there are often numerous problems between the bank and the users, such as vague communication in call centers and branches or communications via e-mail or the Internet. In order to ensure the competitiveness of banks, they need to achieve differentiation of their services from the competition and to be able to retain existing and attract new clients. Currently, banks mainly offer similar services, in business with the population and economy. Most of the new services have already been offered to the market over the past ten years of transition in the Serbian banking sector, so the opportunities for developing new services are reduced to a minimum (Radojević & Marjanović, 2011).

Banking staff has become a critical factor for the growing competition and the fact that the success of the business of the most often depends on the ability of the staff to successfully complete its tasks, retain customers and manage relations with clients. Because

of the bank in the developed economies are trying „to move branches of one step further from the culture of the sale” according to the marketing management that all employees in the branches include of the development of the marketing strategy for branches (Angur et al., 1999). Bank employees actively participate in the services sector. With the services in their branches of the banking staff becomes a holder of the entire process and the key influential group which can be realized, i.e. to improve the sale and the positive impact on the quality and satisfaction with the customers.

Banking staff should conduct the transfer of information relevant to the service which is the subject of the concrete meeting, but also to offer a new service and promotes the bank, with his personal behavior and target the activities that are brought new customers.

This paper, based on a literature analysis and research in practice conducted through a questionnaire, has the aim to show the most important factors that influence the quality of banking services.

2. LITERATURE REVIEW

The quality of the services is one of the most “triggers” of loyalty by customers and generate an important volume of interest among researchers and practitioners. As a term, quality is often used in everyday life, and everyone has a good idea of what is good and what is the poor quality.

Despite such widespread use, researchers still have not been able to find a unique definition of quality, primarily because of the quality, as well as the concept, bound for a large number of interpretation (Garvin, 1984). What one person perceives as a quality other person can see as an average or below-average. Namely, elements that include habits, attitudes, experiences, a set of values or the social class of an individual are just some factors that determine the way in which the person can perceive quality. This clearly suggests that the measurement of the quality is the complex and challenging task (Gronroos, 1984). The complexity of quality measurement is further enhanced by some service characteristics, including intangibility, but also by the fact that customers are often involved in the service process and therefore directly effect on the quality of the service. The complexity of the measuring quality of services is best illustrated Seth, Deshmukh & Vrat (2005) who presented 19 different models in their study, that are used for measuring the quality of services.

In the increasingly competitive business environment the construction of the close relations with the consumer is of essential importance for the development and maintenance of business. In that sense, a service profit chain (Heskett et al., 1994) emphasizes that the growth in the operations of service organizations, which include banks, is stimulated primarily by the loyalty of the users of their services.

This loyalty is a direct result of the satisfaction of users of the services and it has no without relying on the quality as well as the primary determinant in the process of serving. Therefore, the ability to provide a high quality service that will satisfy or surpass the needs and expectations of customers both in banking and in the rest of the service economy is the basis for building a competitive advantage (Ennew & Waite, 2007). The quality of the services is not the only factor which determines the decision of the users to use a banking service, there is still a lot of factors especially in the markets of less developed countries.

Another important element in the banking business is the loyalty of users who appears as a result of the good ways of providing services. Customer loyalty represents the interest of the users according to the given enterprise during a long period of time, while recommending the company and its products or services that it provides to other users. Some researchers

believe that the loyalty is still an underdeveloped area (Lewis & Soureli, 2006) because it did not get the significance.

However, very quickly it became evident that the loyalty is paramount importance for the service oriented companies such as the bank, and that loyalty should be seen as the most valuable assets for all service providers (Silver & Vegholm, 2009). While for researchers, measuring customer loyalty is a real challenge (Berg, 2008). The complexity of customer loyalty stems from the fact that the concept of loyalty consists of two dimensions: dimensions of behavior and dimensions of attitude. The behavior dimension occurs if users continuously use the services of the same company. As such, loyalty based on the behavior is intended to re-buy services or products (including the frequency and amount) (Lewis & Soureli, 2006). While, loyalty based on attitude implies user's nature, preferences, trust or emotional ties to the services or products and oral propaganda (Marinković & Senić, 2012).

3. METHODOLOGICAL FRAMEWORK

The research carried out in this paper refers to the examination of business factors that contribute to the quality of banking services. The survey questionnaire method was used for data collection. The structure of the respondents in the sample is heterogeneous - in survey participated the clients who work in state-owned enterprises (in education, health, police, municipal administrations, as well as in the private enterprises) on the territory of the Eastern Serbia, who use the services of the different banks.

The survey was conducted from May 2017 to January 2018 on the territory of Eastern Serbia. The survey involved 345 respondents, of whom 320 (or 92,75%) correctly fill their questionnaire. A standardized questionnaire consisting of two groups of issues (total 30 issues). The first part of the questionnaire which were collected primary data included the demographic characteristics of the sample, respectively, the issues related to the demographic data of the respondents such as gender, age, professional qualification and working status. The second part of the questionnaire was related to the examination of the level of customer satisfaction with the different elements of the quality of services in banking.

The survey (provided the anonymity of the respondents, and Likert's five-point scale was used for the grading of the offered modalities of the response (statement), ie the degree of agreement with unconfined observations. What it meant 1 - absolutely disagree with the claim, and 5 - absolutely agree with the claim.

The examined claims were selected on the basis of the review of the relevant scientific literature from the field of marketing services (Parasuraman et al., 1985; Jamal & Anastasiadou, 2009). In that way it is created the basis for the analysis of the kindness, professionalism and competence of the employed worker based on the perception of the clients. In addition to the above, the image of the bank and its affiliates, as well as the level of compassion of bank worker with the problems customers have, were analyzed.

4. DISCUSSION OF RESULTS

4.1. DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

In Table 1 are presented data that enable the acquisition of the image on the structure of the sample. The sample is represented by (62.5%) men and (32.5%) women. The youngest respondents under the age of 25 years were the least in the sample (3.8%). The largest

number of the respondents from 36 to 45 years (35%). There are slightly less respondents between 46 and 55 years (25.6%) and 26-35 in total (22.5%). As far as the professional qualifications more than half of the respondents have completed secondary school (63.7%), then have higher school (20%) and university degree (11.9%), while the smallest percentage of respondents with primary school (2.5%).

Table 1. The demographic characteristics

Demographic variables	The composition of the sample	
	Categories	Percentage(%)
<i>Gender</i>	Male	62.5
	Female	37.5
<i>Age</i>	from 18-25 years	3.8
	from 26-35 years	22.5
	from 36-45 years	35.0
	from 46-55 years	25.6
	over 56 years	13.1
<i>Education</i>	Elementary School	2.5
	Secondary School	63.7
	School of higher education	11.9
	Faculty	20
	Master/ doctor of science	1.9
<i>The length of use of the banking services</i>	less than 5 years	6.3
	from 6-10 years	25.0
	from 11-15 years	33.8
	from 16-20 years	24.4
	over 20 years	10.6
<i>Do you use only one bank?</i>	Yes	53.8
	No	46.3
<i>Which characteristic is most important for you in communication with the bank?</i>	The quality of the product	13.1
	Kind staff	13.1
	The expertise and competence of the staff	19.4
	The speed of the services	15.6
	Working time	1.9
	Commission fee	21.3
	Proximity to the bank	15.0
	I cant decide	0.6
<i>How do you usually use banking services?</i>	Personal going to the bank	87.2
	Via e-mail	10.6
	By phone	2.2
<i>How are you informed about the services of the bank?</i>	Going to the bank	8.1
	Through TV advertising and newspapers	36.3
	Via the Internet and the website	18.1
	Through the call center of the bank	6.9
	Through the flyers	1.9
	Through a friend	26.9
	Other	1.9
<i>What are the reasons for your dissatisfaction with the Bank's operations?</i>	A bad service	10.6
	Unkind staff	29.4
	Crowd at counters	32.5
	The website is not update	4.4
	Too much paperwork	22.5
	Other	0.6

Most clients use banking services between 11-15 years old (34.8%), slightly lower percentage (25%) than 6-10 years old and (24.4%) of 16-20 years. Over 20 years (10.6%) of clients use banking services, while in the tested sample only (6.3%) clients who use banking services for less than 5 years.

4.2. FACTOR ANALYSIS

Factor analysis represents a mathematical technique for reducing the amount of data. It receives a large set of variables and looks for a way to compile this data with a small number of factors or components (Manasijević, 2011).

A lot of related variables can be reduced by factor analysis to a smaller number that is suitable for other analyzes. There are three basic steps in the analysis of factors:

- 1) Calculation of the correlation matrix for all variables;
- 2) Extraction of initial factors;
- 3) Rotation of the extracted (obtained) factors to the final solution.

Based on the correlation analysis, or the correlation between issues, for the empirical validation of the results, i.e. defining key factors that influence the business performance, factor analysis was used and the obtained results are presented in several next steps.

4.2.1. Assessment of the suitability of data for factor analysis

When determining the suitability of a particular set of data for factor analysis, two main issues should be considered: the size of the sample and the strength of the link between the variables. For the strength of the correlation among the variables, two tests are used: Kaiser-Meyer-Olkin (KMO) indicator of sample adequacy and the Bartler spherical test. The calculated values of these statistical indicators in this paper are given in Table 2.

Table 2. Calculated values of KMO indicators and Butler spherical test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.860
Approx. Chi-Square	1557.557
Bartlett's Test of Sphericity	
df	231
Sig.	0.000

In the presented result, the value of KMO test indicators (KMO = 0.860) and Bartlet's test ($p = 0.000$) confirmed that there are justified conditions for the application of factor analysis. KMO is 0.860 which means that it moves within the recommended interval and the results are statistically significant $p = 0.000$, so the factor analysis is fully justified for the analysis of this sample.

The use of the analysis of the faktorske is inadequate if the value of the KMO under 0.5. Bartletov test is based on hi-box statistics. Obtained in the value of the shows that the rejects the zero hypothesis (lack of significant correlations between non-crime incidents dealt). As well as the method of analysis faktorske in this survey was used in the analysis of

the main components, and due to the clearer interpretation of factors, used the varimaks rotation.

The use of factor analysis is not adequate if the value of the KMO are under 0.5. Bartlett's test is based on hi-square statistics. The obtained value shows that the hypothesis is rejected (there is no significant correlation between the variables). As a method of factor analysis in this study the analysis of the main components was used, and for the purpose of clearer interpretation of the factors was used the varimax rotation.

4.2.2. Extraction of initial factors

Factor extraction include the determination the smallest number of factors which represent interconnections in a set of variables. For determining the number of factors that should keep there are more techniques: Kaiser's criterion (criterion of characteristic values); Scree plot; parallel analysis (Manasijević, 2011).

The obtained results of factor analysis indicate that the analyzed claims grouped around three formed factors (Table 3). The first factor refers to “*Respect and understanding of clients*” and describes 30.706 % variations. Around this factor are grouped claims that refer to personal attention to clients, the kindness of employees, respect for clients, understanding of financial needs of clients, readiness to help clients, trust in employees, etc. Recognizing the attitudes and needs of clients is very important to gain loyalty of the users toward the banks. The second factor includes „*Professionality*“ and explains 16.933 % of variance. The quality and efficiency of the service provided depends on the professionalism of banking officers. The third selected factor refers to the „*Imaging*“, where the main elements were grouped: the image of the bank and the branch, the modernity of equipment and the look of the interior. The given factor explains 15.864% of the variation. All three factors together describe 63.503 % of the total variation.

Table 3. Results of Exploratory Factor Analysis

Claims	Factor 1	Factor 2	Factor 3
<u>Respect and understanding of clients</u>			
Devoting attention to clients	0.820		
Kindness of employees	0.799		
Respecting clients	0.760		
Understanding the financial needs of clients	0.748		
Focus on what's best for clients	0.702		
The readiness to help the client	0.689		
Confidence of clients in bank employees	0.631		
Orientation to clients	0.609		
A sense of security with clients	0.580		
Providing information to clients	0.538		
<u>Professionalism</u>			
The look of employees		0.701	
Accuracy of service provided		0.671	
Speed of service		0.648	
Efforts made to solve client problems		0.615	
Respecting deadlines with the client		0.592	
Fulfilling the promise given to clients		0.531	
<u>Image</u>			
Image compared to competitors			0.828
Interior			0.791
Modern equipment			0.703
The image of the bank			0.639
The image of the branch			0.579
<i>Percentage of variance</i>	<i>30.706</i>	<i>16.933</i>	<i>15.864</i>

All three factors have a high level of reliability. The reliability of the grouped factors according to the obtained values of Cronbah Alpha coefficient are higher than the minimum required confidence threshold of 0.7 which recommends Nunnally (1978). Obtained values of Cronbah Alpha coefficient for the first factor which refers to the respect and understanding of the clients is 0.87, which can be seen in Table 4. Around this factor were grouped ten claims.

Table 4. Statistical reliability of first factor - Respect and understanding of clients

Cronbach's Alpha	N of Items
0.87	10

When it comes to the second factor which refers to the professionalism of the employees when providing services to clients, the value of the Cronbah Alpha coefficient is 0.83 which can be seen in Table 5. Around this factor were grouped six claims.

Table 5. Statistical reliability of second factor - Professionalism

Cronbach's Alpha	N of Items
0.83	6

The overall reliability of the third factor (Table 6) who grouped around five claims refers to the image of the bank is 0.76. Therefore, in addition to show respect and professional service, for clients are also important the image of the banks whose services they use.

Table 6. Statistical reliability of the third factor - Image

Cronbach's Alpha	N of Items
0.76	5

At all three factors obtained value of the Cronbah Alpha coefficient is higher than 0.7, that can conclude that demands that have been grouped around each individual factor are internally consistent.

5. CONCLUSION

By carrying out research on the quality of the services provided by the banks to their clients in branches in Eastern Serbia, banks can determine the level of the quality of the services that require the customers, measure the current level in the quality of their service, and also their business strategy a direction that will make them better position on the market. The obtained results within the conducted research indicate that the quality of services in the banking system in Eastern Serbia is highly influenced on respect and understanding of clients, professionalism and image of the bank.

Improving these business segments, managers can significantly to improve their business, which will positively effect on the satisfaction of employees and their loyalty. In addition, should always have in mind that users of banking services still give precedence to those banks that offer the highest level of quality with the lowest fee.

REFERENCES

- Angur, M.G, Natarajan, R., Jahera, J.S. (1999). Service quality in the banking industry: an assessment in a developing economy. *International Journal of Bank Marketing*, 17(3), 116-123.
- Berg, L. (2008). Loyalty, naivety and powerlessness among Norwegian retail bank customers. *International Journal of Consumer Studies*, 32(3), 222-232.
- Ennew, C.T, Waite, N. (2007). *Financial services marketing: an international guide to principles and practice*. Oxford, Butterworth-Heinemann Elsevier Ltd.
- Garvin, D. (1984). What does 'product quality' really mean?. *Sloan Management Review*, 26(1), 25-43.
- Gronroos, C. (1984). A service quality model and its marketing implications. *European Journal of Marketing*, 18(4), 244-249.
- Heskett, J.L, Jones, T.O, Loveman, G.W, Sasser, W.E, Schlesinger, L.A. (1994). Putting the service-profit chain to work. *Harvard Business Review*, 164-174.
- Jamal, A., Anastasiadou, K. (2009). Investigating the effects of service quality dimensions and expertise on loyalty. *European Journal of Marketing*, 43(3/4), 398-420.
- Lewis, B.R., Soureli, M. (2006). The antecedents of consumer loyalty in retail banking. *Journal of Consumer Behaviour*, 5(1), 15-31.

- Manasijević D. (2011). Statistička analiza u SPSS programu, Tehnički fakultet u Boru, Bor.
- Marinković, V., Senić, V. (2012). Analiza elemenata kvaliteta usluga u korporativnom bankarstvu. *Ekonomski horizonti*, 14(1), 13-22.
- Nunnally, J.C. (1978). *Psychometric Theory*, 2nd Edition. McGraw-Hill, New York.
- Parasuraman, A., Zeithaml, V.A., Berry, L.L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, 49(4), 41-50.
- Radojević, P., Marjanović, D. (2011). Kvalitet usluga u bankarstvu: nesaglasnosti, odrednice i istraživačke tehnike za unapređenje kvaliteta. *Bankarstvo*, (7-8), 34-59.
- Seth, N., Deshmukh, S.G., Vrat, P. (2005). Service quality models: a review. *International Journal of Quality and Reliability Management*, 22(9), 913-949.
- Silver, L., Vegholm, F. (2009). The dyadic bank-SME relationship: customer adoption in interaction, role and organization. *Journal of Small Business and Enterprise Development*, 16(4), 615-627.



SMES, RESOURCE EFFICIENCY AND GREEN MARKETS – ASPECTS OF THE TRANSITION OF SMES IN THE REPUBLIC OF CROATIA

Sofija Turjak, Ivana Unukić, Dina Liović

J. J. Strossmayer University of Osijek, Faculty of Economics in Osijek, Croatia

Abstract: Green Economy is a form of economy that promotes human well-being and social equality, while reducing harmful impact on the environment and its further exploitation, thereby justifying its name known as survival strategy. As of 2014, the European Union has launched the Green Action Plan for small and medium-sized enterprises, and the initiative has been joined by the Republic of Croatia. The main objective of this paper is to provide answers to the following questions: Can the principles of the green and circular economy help the Republic of Croatia and the neighboring countries to reduce the impacts of global climate change and at the same time to provide development strategies of renewable energy, moreover to help preserve existing beauty and natural resources? Furthermore, paper will show how small and medium enterprises in the Republic of Croatia and Europe already use certain principles of the green economy, as well as to answer the question if the Green Action Plan is helping them to achieve these goals.

Keywords: green economy, circular economy, the Green Action Plan

1. INTRODUCTION

From the time when the Industrial Revolution happened, human behaviour and procedures have negative consequences on the environment. Since the beginning of the 21st century, all world-renowned scientists have constantly warned of growing environmental problems that could significantly aggravate living conditions on Earth. The biggest problem is climate change which is caused, among other things, by excessive use of fossil fuels whose combustion increases carbon dioxide emissions. In the second half of the 20th century the United Nations began to warn about environmental issues, so in 1972 the first International Conference dedicated to environmental issues was held in Stockholm [1]. The United Nations care about environmental issues, as well as the European Union, and with it, the Republic of Croatia as the newest member of the EU. In recent years, precisely because of this, there is a growing interest in distributed production from renewable energy sources [2].

The aim of this paper is to provide an insight into the current position of small and medium-sized enterprises of the Republic of Croatia in transition towards a green economy, which should be a "roadmap" to a "better tomorrow" and which should promote sustainable growth and development. In recent years there is a growing interest in distributed production from renewable energy sources, with an important impact on the environment. Renewable energy sources include sea energy, wind energy, biomass energy, gas energy from waste

dumps, geothermal energy, aerothermal and solar energy, and gas from sewage treatment plants and biogas.

Based on the Flash Eurobarometer 456 data, authors will analyze behavior of Croatian SMEs towards green economy. The Flash Eurobarometer 456 data is original primary data that has open access for everyone who is interested in research. Based on those data, each researcher can carry out their own research and test their own hypothesis as well as generate their own conclusion. This study uses different statistical analyzes (univariate, bivariate statistical methods) in order to define relationships between activities of green economy which are Croatian SMEs applying and their number of employees, enterprise age and annual turnover. There were eight activities involved in this study (saving water, saving energy, using predominantly renewable energy, saving materials, minimizing waste, selling scrap material to other company, recycling, designing products that are easier to maintain, repair or reuse) which were analyzed in comparison with number of employees, enterprise age and annual turnover.

2. LITERATURE REVIEW

As it is often the case when discussing sustainable development (even in the Smart Specialization Strategy of the European Union - in the context of smart, inclusive and sustainable growth), the notion of a green economy has been developed - a sustainable economy that should improve human well-being and life on the earth. According to the UNEP definition, green economy is defined as one that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities [3]. In addition to this, green economy also implies increased investment in economic sectors that improve the country's natural capital, reduce environmental problems and environmental risks. These sectors include renewable energy, low carbon transport, energy efficiency of buildings, clean technology, smart waste management, sustainable agriculture and forest management, and the like. Such investments and reforms should provide mechanisms for enterprise restructuring and the adoption of sustainable consumption and production processes [3].

The green economy seeks to drive the growth of GDP and jobs through shifting investments towards clean technologies and natural capital as well as human resources and social institutions. It focuses on the shifting of public and private investment as a decisive instrument to achieve growth, environmental improvement, poverty eradication and social equity, with policy reforms supporting the shift. In a green economy, social dimensions are considered as targets for shifted investments [4]. Only after a major global financial crisis the concept of a green economy begins to "take a serious look" in the context of economic recovery and sustainable growth and development [5].

In addition to the notion of green economy, it is possible to find the term green growth in literature, which means fostering economic growth and development while ensuring that natural resources continue to provide resources and environmental services on which our well-being relies [6]. Green growth can be considered as part of the green economy, and certainly implies sustainable development. In the context of the realization of strategies promoting green economy, a green industry is also mentioned which implies green growth in the industry sector [7]. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use.

In addition to green growth, an important part of the green economy is circular economy, which also implies sustainable development. Circular economy is a sustainable development strategy that is being proposed to tackle urgent problems of environmental degradation and resource scarcity and with its 3R principles of reducing, reusing and recycling material clearly illustrates the strong linkages between the environment and economics According to [8].

In order to implement the Green Economy guidelines into the economy of each country, the European Commission has adopted The Green Action Plan (GAP) for small and medium-sized enterprises. Given that small and medium-sized enterprises have a dominant role in economic growth and employment creation for countries in general [9], GAP is a good guide to transition to "green" whereas main guidelines [10]: to raise SMEs' awareness of resource efficiency improvements and the potential of the circular economy for productivity, competitiveness and business opportunities, to inform SMEs about EU resource efficiency actions under the COSME, Horizon 2020 and LIFE programmes, and the European Structural and Investment Funds. The GAP aims to help businesses by [10]: improving productivity, driving down costs, supporting green entrepreneurship and developing European leadership in green processes and technologies.

A major role in the economic growth and development of each country, as well as the creation of new jobs, are played by medium and small enterprises, which are the focus of this work and research. According to ETSI data, approximately 23 million small and medium-sized enterprises operate in the European Union. SMEs are the true backbone of the European economy. They are primarily responsible for economic growth and prosperity. Their capacity for innovation and flexibility in a changing business environment makes them crucial for Europe's success in the global economy [11].

According to the European Commission [12] for more efficient resource use, it is necessary to combine access to the value chain and to implement complex technical solutions at enterprise level. It is estimated that due to the more efficient use of resources throughout the value chain by 2030, the need for input material decreased by 17% to 24%. Additionally, in the EU, 60% of the total waste is not recycled, composted or reused, which shows that there are huge amounts of valuable resources that are not sufficiently exploited and significant business opportunities for small and medium-sized enterprises (MSPs) that can use and sell green products, services and solutions. Business opportunities can also be created by including more circular business models and green technologies in existing and future SMEs in all sectors, including service.

Based on the Eurobarometer data, the following authors analyse and present the current position of medium and small enterprises of the Republic of Croatia in the context of the implementation of green economy activities. The implementation of the activities that are part of green economy has been analysed by a number of employees and the annual turnover of enterprises. In addition to the before-mentioned, there is a comparison of enterprises in Croatia and EU28 according to the percentage of SMEs that are implementing these activities.

3. METHODOLOGY

The Eurobarometer is an official measurement instrument of EU that collects data among European residents in Member States as well as in applicant states and sometimes in other countries as well. The Eurobarometer publicly shows survey results in official reports, while primary data on microdata level is publicly available through GESIS. Authors choose to

analyse microdata from the Flash Eurobarometer 456 (topic: SMEs, resource efficiency and green markets). Data for 15,019 enterprises from 28 Member States of the EU and 9 non-EU countries has been analysed covering small and medium companies and the study has been conducted between 11th and 26th of September 2017. Study included small and medium-sized enterprises (SMEs) employing 1 or more persons and the upper limit designating an SME at 250 employees. Interviews were conducted with key decision-makers of companies via telephone in their mother tongue on behalf of the European Commission, DG Environment [13].

This study applies different statistical methods (univariate and bivariate methods) using statistical software IBM SPSS 23.0. in order to define relationships between activities of green economy which are Croatian SMEs applying and their number of employees and annual turnover. The Chi-square test was used to find statistically significant difference among 8 activities of green economy and the number of employees and annual turnover. There were eight activities involved in this study (saving water, saving energy, using predominantly renewable energy, saving materials, minimizing waste, selling own scrap to another company, recycling, by reusing material or waste within the company, designing products that are easier to maintain, repair, or reuse) which were analysed in comparison with number of employees and annual turnover.

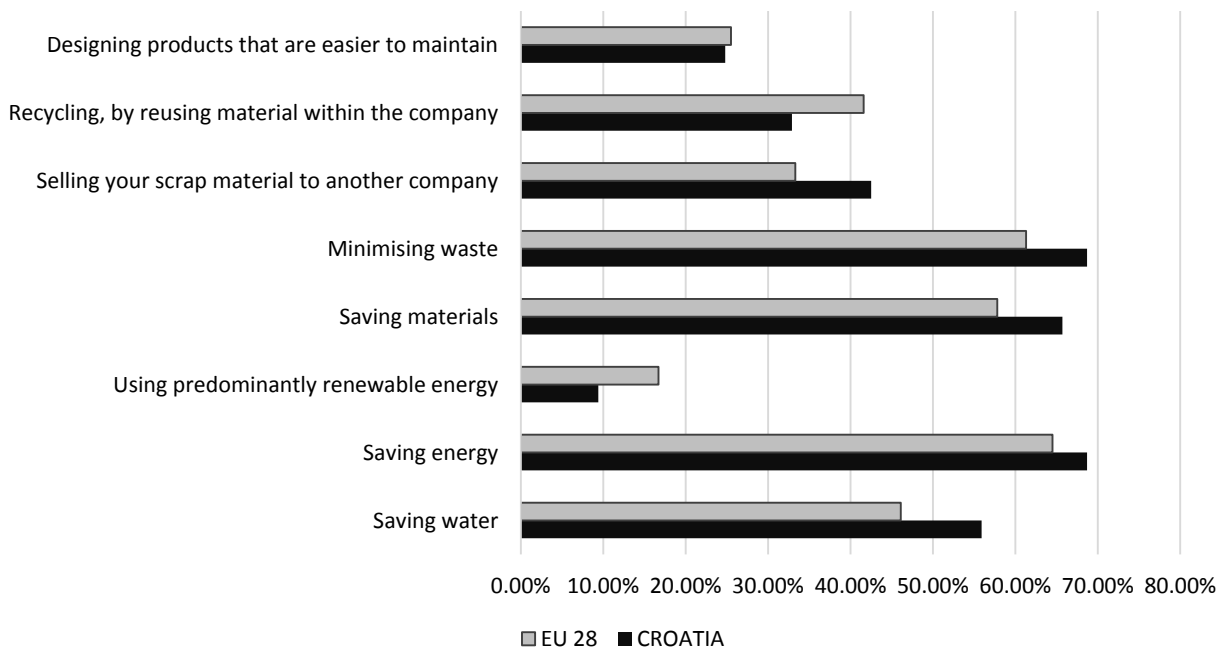


Figure 6. Comparison of Croatian and EU28 SMEs and their involvement in actions that make enterprises more resource efficient

A comparison between Croatian and EU28 SMEs and their involvement in actions that make enterprises more resource efficient is shown by Figure 1. Croatian enterprises show more involvement than EU28 in undertaking activities of green economy such as saving water, saving energy, saving materials, minimizing waste and selling own scrap material to another company. On the other hand, enterprises in EU28 are undertaking activities of green economy such as designing products that are easier to maintain, repair or reuse, recycling, by reusing material or waste within the company and using predominantly renewable energy more than Croatian enterprises.

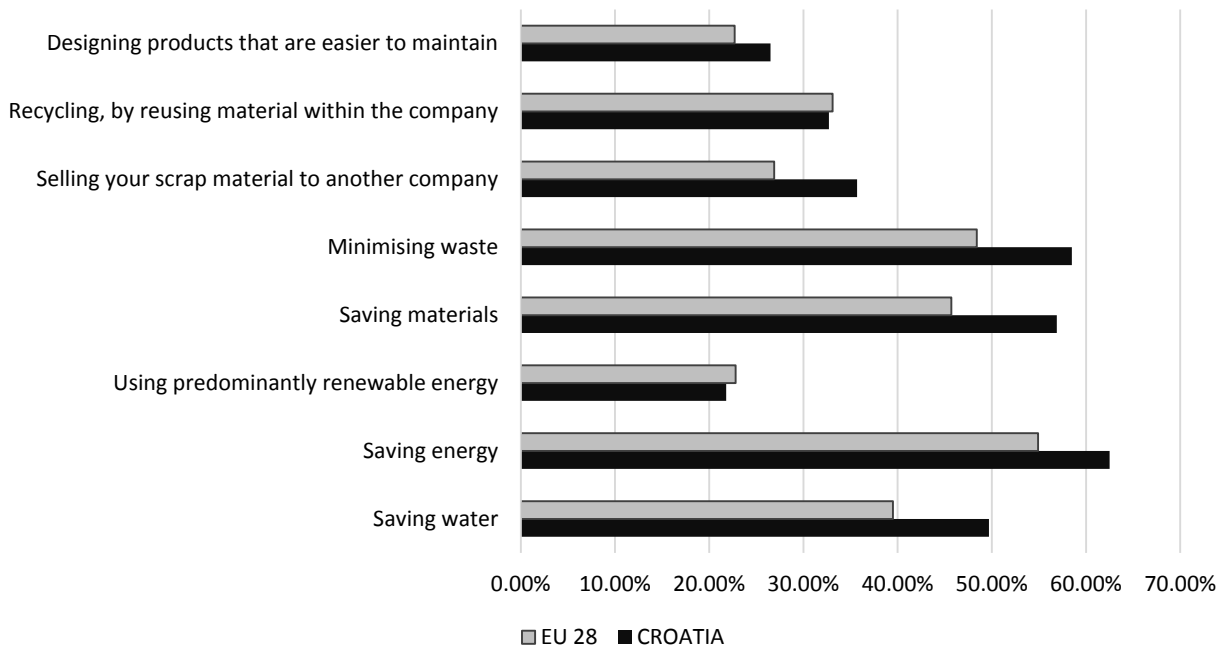


Figure 7. Comparison of Croatian and EU28 SMEs and their involvement over next 2 years in actions that make enterprises more resource efficient

A comparison between Croatian and EU28 SMEs and their involvement over next two years in actions that make enterprises more resource efficient is shown by Figure 2. Croatian enterprises show more involvement than EU28 in undertaking activities of green economy over the next two years such as saving water, saving energy, saving materials, minimizing waste and in selling own scrap material to another company. On the other hand, enterprises in EU28 are undertaking activities of green economy such as designing products that are easier to maintain, repair or reuse, recycling, by reusing material or waste within the company and using predominantly renewable energy more than Croatian enterprises.

4. RESULTS

Authors have used Chi-square test to find differences among eight activities of green economy and the number of employees as well as annual turnover. In the following 4 tables statistically significant results will be presented.

Table 4. Number of employees and actions that enterprise is undertaking to be more resource efficient

How many employees does your company have?	Saving energy			Chi - square
	No	Yes	Total	
1 to 9 employees n (%)	66 (36.9%)	113 (63.1%)	179 (100.0%)	$\chi^2 = 12.712$ df = 3 p = 0.005*
10 to 49 employees n (%)	56 (31.6%)	121 (68.4%)	177 (100.0%)	
50 to 249 employees n (%)	29 (32.2%)	61 (67.8%)	90 (100.0%)	
250 employees or more n (%)	5 (10.2%)	44 (89.8%)	49 (100.0%)	
Total n (%)	156 (31.5%)	339 (68.5%)	495 (100.0%)	
	Selling your scrap material to another company			
	No	Yes	Total	
1 to 9 employees n (%)	133 (74.3%)	46 (25.7%)	179 (100.0%)	$\chi^2 = 39.896$ df = 3 p = 0.000*
10 to 49 employees n (%)	91 (51.4%)	86 (48.6%)	177 (100.0%)	
50 to 249 employees n (%)	45 (50.0%)	45 (50.0%)	90 (100.0%)	
250 employees or more n (%)	15 (30.6%)	34 (69.4%)	49 (100.0%)	
Total n (%)	284 (57.4%)	211 (42.6%)	495 (100.0%)	
	Recycling, by reusing material or waste within the company			
	No	Yes	Total	
1 to 9 employees n (%)	130 (72.6%)	49 (27.4%)	179 (100.0%)	$\chi^2 = 11.543$ df = 3 p = 0.009*
10 to 49 employees n (%)	119 (67.2%)	58 (32.8%)	177 (100.0%)	
50 to 249 employees n (%)	59 (65.6%)	31 (34.4%)	90 (100.0%)	
250 employees or more n (%)	23 (46.9%)	26 (53.1%)	49 (100.0%)	
Total n (%)	331 (66.9%)	164 (33.1%)	495 (100.0%)	
	Designing products that are easier to maintain, repair, or reuse			Chi - square
	No	Yes	Total	
1 to 9 employees n (%)	152 (84.9%)	113 (15.1%)	179 (100.0%)	$\chi^2 = 16.349$ df = 3 p = 0.001*
10 to 49 employees n (%)	128 (72.3%)	121 (27.7%)	177 (100.0%)	
50 to 249 employees n (%)	63 (70.0%)	27 (30.0%)	90 (100.0%)	

* the mean difference is significant at the 0.05 level

Source: authors

Results of Chi-square test for saving energy and the number of employees in each company show statistically significant difference ($p=0.005$, $df = 3$, $\chi^2 = 12.712$). 63.1% of enterprises with 1 to 9 employees are saving energy, while 67.8% of enterprises with 50 to 249 employees are undertaking the same activity. Regarding the activity of selling own scrap material to another company and number of employees, Chi-square test results show statistically significant differences ($p=0.000$, $df = 3$, $\chi^2 = 39.896$). Only 25.7% of enterprises with 1 to 9 employees are undertaking that activity, while 50.0% of enterprises that have 50 to 249 employees are undertaking the same activity. In addition, there Chi-square test results show statistically significant differences ($p=0.009$, $df = 3$, $\chi^2 = 11.543$) in undertaking recycling, by reusing material or waste within the company. Just 27.4% of enterprises with 1 to 9 employees are undertaking that activity and 34.4% of enterprises with 50 to 249 employees are undertaking the same activity. Results of Chi-square test for last the activity, designing products that are easier to maintain, repair or reuse, are also showing statistically significant differences ($p=0.001$, $df = 3$, $\chi^2 = 16.349$) between number of employees in enterprises. Only 15.1% of enterprises with 1 to 9 employees are undertaking the before-mentioned activity, while 30.0% enterprises with 50 to 249 employees are designing products that are easier to maintain, repair or reuse.

Table 5. Number of employees and actions that enterprise is going to undertake over next two years to be more resource efficient

How many employees does your company have?	Sell your scrap material to another company			Chi - square
	No	Yes	Total	
1 to 9 employees n (%)	141 (78.8%)	38 (21.2%)	179 (100.0%)	$\chi^2 = 30.939$ df = 3 p = 0.000*
10 to 49 employees n (%)	105 (59.3%)	72 (40.7%)	177 (100.0%)	
50 to 249 employees n (%)	50 (55.6%)	40 (44.4%)	90 (100.0%)	
250 employees or more n (%)	21 (42.9%)	28 (57.1%)	49 (100.0%)	
Total n (%)	317 (64.0%)	178 (36.0%)	495 (100.0%)	
	Recycle, by reusing material or waste within the company			
	No	Yes	Total	
1 to 9 employees n (%)	135 (75.4%)	44 (24.4%)	179 (100.0%)	$\chi^2 = 12.109$ df = 3 p = 0.007*
10 to 49 employees n (%)	110 (62.1%)	67 (37.9%)	177 (100.0%)	
50 to 249 employees n (%)	62 (68.9%)	28 (31.1%)	90 (100.0%)	
250 employees or more n (%)	26 (53.1%)	23 (46.9%)	49 (100.0%)	
Total n (%)	333 (67.3%)	162 (32.7%)	495 (100.0%)	

* the mean difference is significant at the 0.05 level

Source: authors

Results of Chi-square test for the activity of selling own scrap material to another company over next two years and number of employees, show statistically significant differences ($p=0.000$, $df = 3$, $\chi^2 = 30.939$). Only 21.2% of enterprises with 1 to 9 employees are going to undertake that activity over the next 2 years, while 44.4% of enterprises that have 50 to 249 employees are going to undertake that activity over the next 2 years. Moreover, Chi-square test results show statistically significant differences ($p=0.007$, $df = 3$, $\chi^2 = 12.109$) in recycling, by reusing material or waste within the company over next 2 years. Just 24.4% of enterprises with 1 to 9 employees will undertake that activity and 37.9% of enterprises with 10 to 49 employees will undertake the same activity.

Table 6. Annual turnover and actions that enterprise is undertaking to be more resource efficient

What was your turnover last year?	Selling your scrap material to another company			Chi - square
	No	Yes	Total	
≤ 100 000 € n (%)	36 (83.7%)	7 (16.3%)	43 (100.0%)	$\chi^2 = 38.540$ $df = 3$ $p = 0.000^*$
100 000 € -500 000 € n (%)	85 (68.5%)	39 (31.5%)	124 (100.0%)	
500 000 € - 2 million € n (%)	52 (50.5%)	51 (49.5%)	103 (100.0%)	
2 - 10 million € n (%)	25 (41.7%)	35 (58.3%)	60 (100.0%)	
10 - 50 million € n (%)	8 (40.0%)	12 (60.0%)	20 (100.0%)	
> 50 million € n (%)	0 (0.0%)	7 (100.0%)	7 (100.0%)	
Total n (%)	206 (57.7%)	151 (42.3%)	357 (100.0%)	

* the mean difference is significant at the 0.05 level

Source: authors

Results of Chi-square test for the activity selling own scrap material to another company over next two years and annual turnover, show of statistically significant difference ($p=0.000$, $df = 3$, $\chi^2 = 38.540$). Only 16.3% enterprises with an annual turnover less than 100 000 Euros are undertaking that activity, while 58.3% of enterprises with an annual turnover between 2 and 10 million Euros are undertaking the same activity.

Table 7. Annual turnover and actions that enterprise is going to undertake over next two years to be more resource efficient

What was your turnover last year?	Selling your scrap material to another company			Chi - square
	No	Yes	Total	
≤ 100 000 € n (%)	35 (81.4%)	8 (18.6%)	43 (100.0%)	$\chi^2 = 27.819$ df = 5 p = 0.000*
100 000 € -500 000 € n (%)	96 (77.4%)	28 (22.6%)	124 (100.0%)	
500 000 € - 2 million € n (%)	59 (57.3%)	44 (42.7%)	103 (100.0%)	
2 - 10 million € n (%)	33 (55.0%)	27 (45.0%)	60 (100.0%)	
10 - 50 million € n (%)	11 (55.0%)	9 (45.0%)	20 (100.0%)	
> 50 million € n (%)	1 (14.3%)	6 (85.7%)	7 (100.0%)	
Total n (%)	235 (65.8%)	122 (34.2%)	357 (100.0%)	

* the mean difference is significant at the 0.05 level

Source: authors

Chi-square test results show statistically significant differences ($p=0.007$, $df = 3$, $\chi^2 = 12.109$) in recycling, by reusing material or waste within the company over next 2 years. Just 24.4% of enterprises with 1 to 9 employees will undertake that activity and 37.9% of enterprises with 10 to 49 employees will undertake the same activity.

5. CONCLUSION

Green economy is a topic of rising interest for many stakeholders, due to the numerous opportunities and benefits that it can provide. This paper has considered the differences between Croatian SMEs and their characteristics, which differentiates them from undertaking green economy activities. As it has been seen, Croatian enterprises differ from each other significantly regarding the activities undertaken. In all presented cases, larger enterprises undertake those activities, while enterprises with less employees do not undertake those activities, nor will they undertake them over the next two years.

In further research of this topic, authors suggest studying the reasons why Croatian SMEs differ in undertaking green economy activities further. Also, it would be beneficial to see if SMEs are using financial help from other sources in undertaking those activities.

REFERENCES

1. Nekić, B., Krajnović, A., Politika zaštite okoliša u RH nakon pristupanja Europskoj uniji, *Tranzicija/ Transition*, 16(34), (2015), 39-58.
2. Gašić, M., Zelena ekonomija, Učenje za poduzetništvo/Entrepreneurial learning, 3(1), (2013),174-180.

3. United Nations Environment Programme UNEP (2010), Green Economy Report: A Preview. Available at:
https://unep.ch/etb/publications/Green%20Economy/UNEP_Rio20PrepCom_GER_Preview_06May10_FINAL.pdf
4. United Nations Environment Programme UNEP (2012), Green Economy WHAT DO WE MEAN BY GREEN ECONOMY? Available at:
https://wedocs.unep.org/bitstream/handle/20.500.11822/8659/-%20Green%20economy_%20what%20do%20we%20mean%20by%20green%20economy_%20-2012Main%20briefing%202012--Final.pdf?sequence=2&isAllowed=y
5. Neusteurer, D., The concept of green economy and its role in hegemonic neoliberal capitalism, *Socijalna ekologija : journal for environmental thought and sociological research*, 25(3), (2017), 311–324.
6. Organisation for Economic Cooperation and Development OECD, Available at:
<http://www.oecd.org/general/whatisgreengrowthandhowcanithelpdeliversustainabledevelopment.htm>
7. Drvenkar, N., Marošević, K., The Green Industry and The Regional Competitiveness, 7th International Conference "An Enterprise Odyssey: Leadership, Innovation and Development for Responsible Economy, International Conference Proceedings, University of Zagreb, Faculty of Economics and Business, (2014), 125 – 144.
8. Heshmati, A., A Review of the Circular Economy and its Implementation. *International Journal of Green Economics*, 11(3-4), (2015), 251-288.
9. Katua, N. T., The role of SMEs in employment creation and economic growth in selected countries, *International Journal of Education and Research*, 2(12), (2014), 461-472.
10. European Commission, Green Action Plan for SMEs. Available at:
http://ec.europa.eu/growth/smes/business-friendly-environment/green-action-plan_hr
11. European Telecommunications Standards Institute ETSI, The strategic importance of SMEs. Available at: <http://www.etsi.org/news-events/news/14-about/900-the-strategic-importance-of-smes>
12. European Commission (2014), COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. Available at: <http://eur-lex.europa.eu/legal-content/HR/TXT/PDF/?uri=CELEX:52014DC0440&from=EN>
13. European Commission (2018), "Flash Eurobarometer 456 (Small and Medium Enterprises, Resource Efficiency and Green Markets, wave 4)", TNS Political & Social, GESIS Data Archive, Cologne, ZA6917 Data file Version 1.0.0.



COMPARATIVE ANALYSIS OF SAFETY CLIMATE ON CONSTRUCTION PROJECTS IN SERBIA IN 2014 AND 2017

Nenad Milijić, Ivan Mihajlović, Ivan Jovanović, Dejan Bogdanović, Anđelka Stojanović

*University of Belgrade, Technical Faculty in Bor, Engineering Management Department,
Serbia*

Abstract: This paper presents the results of a comparative analysis of the safety climate on construction projects in Serbia in 2014 and 2017. In a survey, the questionnaire methodology for data collection was used. The questionnaire has consisted of 31 questions grouped into 5 groups. The survey was conducted on a sample of 422 employees in 9 construction companies. The collected data were processed using statistical methods, where the employees' perception of the occupational safety climate was analyzed as well as its impact on the achievement of project goals and benefits in the mentioned years. The hypothesis testing was performed using the SEM (Structural Equation Modeling) methodology. The obtained results indicate some improvements in the occupational safety climate in the construction sector in Serbia.

Keywords: safety climate, construction projects, comparative analysis

1. UVOD

Povrede na radu predstavljaju svakodnevicu savremenog poslovanja. One izazivaju kako ekonomske gubitke, tako i one teže merljive, vezane za psihofizičke traume povređenih. Građevinski projekti, kao i građevinarstvo uopšte, su privredna delatnost sa izrazito visokim stepenom rizika od povređivanja zaposlenih [1]. To potvrđuju statistički podaci brojnih svetskih institucija za zaštitu bezbednosti i zdravlja zaposlenih na radu, kao i studije brojnih istraživača [2,3,4]. Posmatrano na globalnom nivou, građevinarstvo je delatnost koja konstantno beleži najveći procenat povreda i fatalnih ishoda u odnosu na sve druge delatnosti [5,6]. Međutim, broj povreda na radu u okviru građevinskih projekata je verovatno još i veći kada se ima u vidu praksa neprijavlivanja lakših povreda [7]. Ovakvo stanje bezbednosti je velikim delom posledica prirode posla, odnosno skupa kompleksnih aktivnosti koje su uglavnom radno intenzivne, često na velikim visinama uz korišćenje mehanizacije, brojnih alata i sl. [8]. Potrebno je naglasiti da je sistemsko poboljšanje bezbednosti na radu zaposlenih na građevinskim projektima veoma teško usled ovakve kompleksnosti i fragmentacije poslova i organizacije [9]. Zbog toga se nameće potreba za istraživanjima koja bi za cilj imala otkrivanje organizacionih faktora koji mogu uticati na poboljšanje klime bezbednosti u građevinskoj industriji, odnosno pronalaženje rešenja primenljivih u praksi [10].

Klima bezbednosti se može definisati kao percepcija zaposlenih u smislu vrednosti, stavova, politika i procedura vezanih za bezbednost na radu u organizaciji [11]. Obzirom da klima bezbednosti pozitivno utiče na stanje bezbednosti na radu i prevenciju povreda [12], ovaj koncept je bio u fokusu istraživanja brojnih autora. Njihov cilj je bio određivanje

uticajnih faktora, kako demografskih, tako i organizacionih. Potrebno je naglasiti da ti faktori ne moraju biti uniformni u različitim svetskim privredama (zbog uticaja kulturoloških razlika), te je fokus na uniformnosti percepcije zaposlenih [13,14]. Stoga je u cilju formiranja pozitivne klime bezbednosti potrebno postići konsenzus mišljenja, stavova, shvatanja i konačno percepcije bezbednosti među članovima različitih strukovnih grupa na projektu [15]. Na taj način se formira osnova za zadovoljavajuće stanje bezbednosti na radu. Konačno, u takvim uslovima, ostvarivanje projektnih ciljeva je olakšano [14].

U ovom radu su prezentovani rezultati istraživanja klime bezbednosti na građevinskim projektima u Srbiji kroz komparaciju njenog stanja u 2014. i 2017. godini.

2. ISTRAŽIVAČKE HIPOTEZE I KONCEPTUALNI MODEL

2.1. PODRŠKA MENADŽMENTA I PROJEKTNILILJEVI

Čest zaključak u brojnim istraživanjima je da rukovodstvo ima ključnu ulogu pri kreiranju pozitivne klime bezbednosti u okviru organizacije ili projekta [16]. Menadžeri svojim delovanjem utiču na određena ponašanja zaposlenih. Na taj način se protokom vremena vrši promena u percepcijama i stavovima zaposlenih, a što ishoduje popravljanjem klime bezbednosti u organizaciji, odnosno povoljnijim performansama bezbednosti [17]. Može se reći da je menadžent direktno odgovoran za kreiranje bezbedne radne sredine na projektima [18]. Takav ambijent stvara uslove za uspešno ostvarivanje projektnih ciljeva. Zbog toga predlažemo:

Hipoteza H1: *Podrška menadžmenta pozitivno utiče na ostvarivanje projektnih ciljeva.*

2.2. OBUKE O BEZBEDNOSTI I KOMPETENCIJE I PROJEKTNILILJEVI

Sprovođenje adekvatnih obuka o bezbednosti na radu dovodi do poboljšanja performansi bezbednosti na projektima [19]. Zaposleni postaju svesni rizika na radnim mestima, a takođe stiču i potrebne kompetencije [20]. Određena istraživanja naglašavaju da većina radnika poseduje izražen osećaj o postojanju rizika, kao i izražen stepen kompetencije u vezi bezbednosti. Međutim, odgovornost menadžmenta i obuke o bezbednosti podstiču bezbedno ponašanje na radnim mestima. Konačno, kod radnika je izražen osećaj kolektiviteta i potrebe za radom u bezbednijim okruženjima, tako da su pomenuti elementi samo njihovi inhibitori [21]. Zbog toga predlažemo:

Hipoteza H2: *Obuke o bezbednosti i kompetencije pozitivno utiču na ostvarivanje projektnih ciljeva.*

2.3. SPROVOĐENJE BEZBEDNOSNE PRAKSE I PROJEKTNILILJEVI

Za sprovođenje bezbednosne prakse odgovorni su kako menadžment, tako i zaposleni. Menadžment organizacije je u obavezi da obezbedi zaposlenima rad u uslovima u kojima se primenjuju odgovarajuće mere bezbednosti na radu. Sa druge strane, zaposleni su u obavezi da se pridržavaju svih bezbednosnih pravila i procedura prilikom izvođenja svojih radnih aktivnosti. Poštovanjem ovih obaveza, stvara se pozitivna klima bezbednosti, a projektni ciljevi postaju lakše ostvarivi. Međutim, u ovom procesu javljaju se brojne teškoće poput

problema u komunikaciji, fluktuacije radne snage, kao i kompleksnosti radnih zadataka na projektima [22,23]. Zbog toga predlažemo:

Hipoteza H3: *Sprovođenje bezbednosne prakse pozitivno utiču na ostvarivanje projektnih ciljeva.*

2.4. ORGANIZACIONO OKRUŽENJE I PROJEKTNI CILJEVI

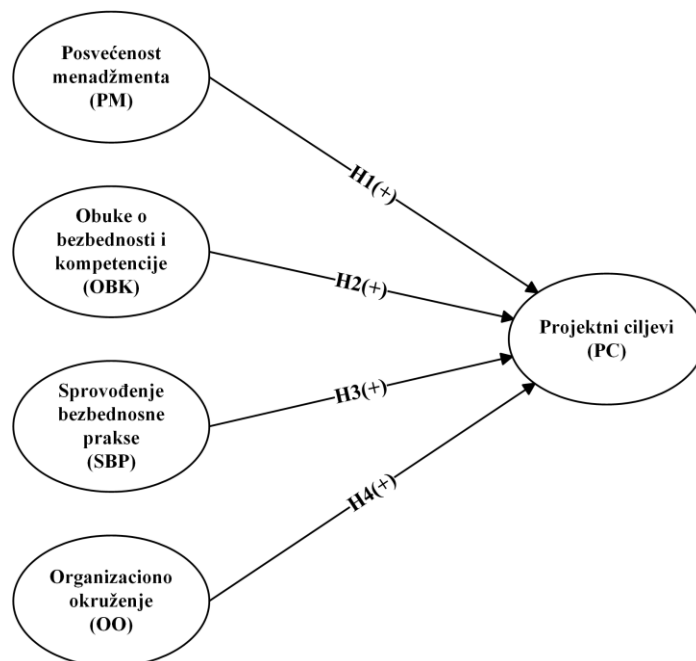
Rad u adekvatnom organizacionom okruženju, odnosno bezbednim uslovima rada, predstavlja imperativ svakog pojedinca, ali i uspeh i ponos za organizaciju. U takvom okruženju dolazi do povećanja posvećenosti poslu i dostizanja željene produktivnosti. Stoga je logičan zaključak Mullen-a da su organizacija i socijalno okruženje od najvećeg uticaja na zaposlene, pa tako i na njihovo ponašanje u vezi bezbednosti. Zbog toga organizacioni faktori moraju biti dodatak dizajnu radnog mesta pri uspostavljanju sistema bezbednosti na radu [24].

Arezes i Miguel naglašavaju da individualna percepcija bezbednosti i subjektivna evaluacija organizacionog okruženja od strane zaposlenih, imaju isto takvu važnost za bezbednost i ponašanje u skladu sa bezbednosnim pravilima kao i objektivna merila bezbednosti [25].

Važnost organizacionog okruženja prilikom realizacije građevinskih projekata postaje još značajnija kada se ima u vidu njihova kompleksnost i ranije navedene specifičnosti. Adekvatno organizaciono okruženje i zadovoljavajuća bezbednost na radnim mestima su neophodan preduslov za ostvarivanje projektnih ciljeva prema zadatim planovima [9]. Zbog toga predlažemo:

Hipoteza H4: *Organizaciono okruženje pozitivno utiču na ostvarivanje projektnih ciljeva.*

Na osnovu 4 predložene istraživačke hipoteze formiran je konceptualni model pozitivnih uticaja (Slika 1).



Slika 1. Konceptualni model

3. METODOLOGIJA ISTRAŽIVANJA

Istraživanje je sprovedeno u 2014. godini, a potom je ponovljeno u 2017. godini. Primenjena je metodologija upitnika za prikupljanje podataka. Anketni listić se sastoji iz dva dela. Prvi deo sadrži 6 pitanja kojima se dolazi do demografskih podataka, dok se drugi sastoji od 31 pitanja podeljenih u 5 grupa vezanih za oblast bezbednosti na radu. Anonimno anketiranje je sprovedeno među zaposlenima u 9 građevinskih kompanija na teritoriji Srbije. Ispitanici su bili menadžeri i radnici angažovani na izvođenju projektnih zadataka. U 2014. godini, anketiranje je obavljeno na skupu od 247 zaposlenih, od čega su prikupljena 204 ispravno popunjena anketna listića, što predstavlja 82.5 %. U 2017. godini, anketirano je 250 zaposlenih, od čega je prikupljena 218 ispravno popunjena anketna listića, odnosno 87.2 %.

Za gradaciju odgovora ispitanika je korišćena Likertova petostepena skala, sa vrednostima od 1 (apsolutno se ne slažem) do 5 (apsolutno se slažem). Skup prikupljenih podataka je analiziran statističkim alatima pomoću softverskog paketa SPSS 18.0 [26]. Demografske karakteristike ispitivanog uzorka su prikazane u Tabeli 1.

Tabela 1. Demografske karakteristike uzorka

Promenljiva	Kategorija	2014		2017	
		N	%	N	%
Pol	M.	198	97.1	213	97.7
	Ž.	6	2.9	5	2.3
Godine	≤ 29	21	10.3	36	16.5
	30-44	108	52.9	98	45.0
	45-54	48	23.5	51	23.4
	≥ 55	27	13.3	33	15.1
Nivo obrazovanja	Osnovna škola	69	33.8	63	28.9
	Srednja škola	118	57.8	137	62.8
	Viša škola	6	3.0	5	2.3
	Fakultet	11	5.4	13	6.0
Godine radnog iskustva	≤ 5	104	51.0	119	54.6
	6-15	67	32.8	76	34.9
	16-25	25	12.3	17	7.8
	≥ 26	8	3.9	6	2.7
Pozicija na brojektu	Menadžer	21	10.3	26	11.9
	Radnik	183	89.7	192	88.1
Broj zaposlenih	≤ 50	74	36.3	52	23.9
	51-100	51	25.0	166	76.1
	101-300	79	38.7	0	0
	≥ 301	0	0	0	0

4. REZULTATI I DISKUSIJA

Skup prikupljenih podataka je analiziran statističkim alatima pomoću softverskih paketa SPSS 18.0.

4.1. DESKRIPTIVNA STATISTIKA

U Tabeli 2. su prikazani rezultati deskriptivne statistike ispitivanog uzorka. Prikazani su standardni statistički parametri: sample size, range, mean, standard deviation and variance.

Tabela 2. Rezultati deskriptivne statistike

Oznaka (Promenljiva)	N	Rang	Srednja vrednost		St. devijacija	Varijansa
			Statistika	St. greška		
PM1	422	4	3.77	.054	1.107	1.225
PM2	422	4	3.73	.054	1.112	1.236
PM3	422	4	3.73	.055	1.126	1.269
MS4	422	4	3.82	.052	1.059	1.122
PM5	422	4	3.86	.047	.958	.917
PM6	422	4	3.88	.049	1.002	1.004
OBK1	422	4	3.82	.052	1.076	1.157
OBK2	422	4	4.05	.043	.882	.778
OBK3	422	4	3.94	.043	.891	.794
OBK4	422	4	3.89	.046	.951	.905
OBK5	422	4	3.96	.044	.903	.815
OBK6	422	4	3.91	.046	.944	.891
SBP1	422	4	3.93	.045	.920	.846
SBP2	422	4	4.03	.043	.886	.785
SBP3	422	4	3.85	.047	.971	.943
SBP4	422	4	3.82	.050	1.017	1.035
OO1	422	4	2.48	.054	1.113	1.238
OO2	422	4	2.49	.054	1.115	1.243
OO3	422	4	2.53	.053	1.098	1.205
OO4	422	4	2.64	.058	1.191	1.418
OO5	422	4	2.49	.052	1.067	1.139
OO6	422	4	3.66	.045	.923	.852
OO7	422	4	3.69	.046	.947	.897
PC1	422	4	3.95	.050	1.022	1.045
PC2	422	4	3.77	.046	.945	.892
PC3	422	4	4.06	.042	.867	.752
PC4	422	4	4.03	.043	.885	.783
PC5	422	4	3.96	.046	.947	.896
PC6	422	4	4.03	.046	.955	.911
PC7	422	4	3.53	.043	.873	.763
PC8	422	4	3.99	.044	.903	.815

Pitanja iz upitnika su raspoređena u pet grupa: PM – Podrška menadžmenta, OBK – Okuke o bezbednosti i kompetencije, SBP – Sprovođenje bezbednosne prakse, OO – Organizaciono okruženje i PC – Projektni ciljevi.

4.2. KONTROLNI MODEL

U cilju utvrđivanja jednodimenzionalnosti u okviru svih pet grupa razmatranog modela, primenjena je eksploratorna faktorska analiza (EFA - *Exploratory Factor Analysis*). Rezultati pokazuju jednodimenzionalnost kod svih pet grupa u modelu, pošto su najveća faktorska opterećenja u okviru istog faktora kod svake grupe pitanja. (Tabela 3). Prema tome, formirane grupe pitanja u modelu se mogu pouzdano opisati korišćenjem definisanih pitanja.

Kako bi se potvrdila pouzdanost i validnost razmatranog hiptetičkog modela, sprovedena je konfirmatorna faktorska analiza (CFA - *Confirmatory Factor Analysis*) nad kontrolnim modelom. U cilju ispitivanja pouzdanosti modela obavljena je ocena interne konzistentnosti korišćenjem Cronbach alpha testa. Cronbach-ovom formulom se izračunavaju prosečne vrednosti korelacija među stavkama mernog instrumenta (alpha koeficijent) kada su odgovori na pitanja ocenjeni na osnovu stepena zadatih skala (npr. Likertova petostepena skala) [27]. Prema ovom testu vrednosti koeficijenta α veće od 0.70 predstavljaju dobru mogućnost

modelovanja razmatranih podataka [28]. Na osnovu dobijenih rezultata, dokazana je validnost i pouzdanost upitnika o bezbednosti na radu tokom realizacije projekata (Tabela 3).

Konvergentna validnost kontrolnog modela potvrđena je na osnovu dobijenih vrednosti CFA analize (Tabela 3). Sve vrednosti t-testa su na nivou značajnosti $p < 0.000$. Dodatno, određene su mere fitovanja kontrolnog modela koje su na zadovoljavajućem nivou. Na osnovu dobijenih rezultata zaključuje se da je svaka stavka u okviru razmatranih grupa pitanja postigla konvergentnu validnost.

Tabela 3. Rezultati EFA i CFA statistike za kontrolni model

Grupa pitanja	Promenljiva	Eksploratorna Faktorska Analiza (EFA)		Konfirmatorna Faktorska Analiza (CFA)		
		PCA	Faktorsko opterećenje	Pouzdanost		Konvergentna validnost
				% varijanse koji se može opisati jednodimenzionim faktorom	Cronbach alpha	Faktorsko opterećenje	t-vrednost
		59.284		0.934		
PM	PM1		0.832		0.778	1.000
	PM2		0.827		0.760	37.653*
	PM3		0.795		0.544	8.993*
	PM4		0.756		0.592	10.155*
	PM5		0.736		0.697	26.067*
	PM6		0.776		0.703	26.785*
		57.181		0.885		
OBK	OBK1		0.794		0.788	1.000
	OBK2		0.657		0.628	13.030*
	OBK3		0.744		0.701	12.443*
	OBK4		0.710		0.695	12.309*
	OBK5		0.687		0.621	10.928*
	OBK6		0.731		0.716	10.847*
		63.132		0.894		
SBP	SBP1		0.756		0.753	1.000
	SBP2		0.748		0.739	20.934*
	SBP3		0.746		0.649	16.851*
	SBP4		0.757		0.690	17.602*
		67.238		0.790		
OO	OO1		0.631		0.627	1.000
	OO2		0.665		0.587	25.495*
	OO3		0.648		0.577	19.789*
	OO4		0.639		0.573	19.623*
	OO5		0.500		0.472	19.559*
	OO6		0.557		0.464	15.337*
	OO7		0.570		0.565	13.824*
		71.045		0.919		
PC	PC1		0.751		0.680	1.000
	PC2		0.582		0.574	17.747*
	PC3		0.680		0.598	11.593*
	PC4		0.772		0.747	12.147*
	PC5		0.661		0.610	10.648*
	PC6		0.773		0.722	19.591*
	PC7		0.570		0.485	15.274*
	PC8		0.718		0.624	18.378*

Napomena: nivo statističke značajnosti * $p < 0.000$

4.3. VIŠEGRUPNA ANALIZA

U nastavku istraživanja je sprovedena višegrupna analiza kontrolnog modela. Cilj ove analize je bio poređenje fitovanja modela između dve grupe podataka u okviru celokupnog uzorka od 422 ispitanika. Određene su podudarnosti i razlike u odgovorima zaposlenih u građevinskom sektoru u dva vremenska perioda. Na taj način je obavljena komparativna analiza klime bezbednosti u 2014. i 2017. godini na građevinskim projektima u Srbiji, a kroz njen uticaj na ostvarivanje projektnih ciljeva. Višegrupnom analizom su ispitane sve predložene hipoteze u odnosu na grupu 1 (2014. godina), kao i na grupu 2 (2017. godina). U ovoj proceduri se ispituje da li obrazac strukturnih veza, izraženih kroz četiri predložene hipoteze u PATH modelu, prati istu dinamiku na građevinskim projektima u Srbiji u 2014. i 2017. godini.

Višegrupna analiza započinje kreiranjem kontrolnog modela za jedinstveni uzorak ($N=422$), sa podacima za 2014. godinu ($N_a=204$) i za 2017. godinu ($N_b=218$). Testira se hipoteza da je kontrolni model adekvatan za procenu klime bezbednosti na građevinskim projektima kako u 2014., tako i u 2017. godini.

Vrednosti indikatora fitovanja za nepromenljivi (Group Invariant) i promenljivi (Group Variant) kontrolni model su prikazane u Tabeli 4. Vrednosti većine indikatora fitovanja za oba modela su iznad, ili veoma blizu preporučene minimalne vrednosti [29,30]. Na osnovu ovakvih rezultata se može zaključiti da predloženi model zadovoljavajuće fituje polazne podatke, da je primenljiv i da na osnovu 31 pitanja na pouzdan i validan način opisuju pet formiranih latentnih varijabli.

Tabela 4. Vrednosti indikatora fitovanja za nepromenljivi i varijabilni kontrolni model

Indikatori fitovanja	Kontrolni model (Invariant)	Kontrolni model (Variant)	Preporučene vrednosti
Chi-Square (χ^2)	2164	2013	-
Degree of freedom (d.f.)	856	830	-
Relative Chi-Square ($\chi^2/d.f.$)	2.53	2.43	< 3,0
Root Mean Square Error of Approximation (RMSEA)	0.060	0.059	< 0,08 – 0,10
Goodness-of-Fit Index (GFI)	0.76	0.77	> 0,8
Adjusted Goodness-of-Fit Index (AGFI)	0.88	0.89	> 0,9
Comparative Fit Index (CFI)	0.90	0.91	> 0,9
Incremental Fit Index (IFI)	0.96	0.96	> 0,9
Relative Fit Index (RFI)	0.91	0.91	> 0,9

Test kritičnih odnosa (*Critical Ratio test*) pokazuje vrednost svih parova u modelu od PM2(2014)-PM2(2017) do PC8(2014)-PC8(2017). Vrednosti testa kritičnih odnosa (Tabela 5) koje su veće od +1.92, ili manje od -1.92 ukazuju na parove za koje se ne može postaviti isti kontrolni model. Ti parovi nemaju isti uticaj na ispitanike u dve razmatrane grupe podataka, odnosno u 2014. i 2017. godini. Reč je o varijabilnim parovima i oni se isključuju iz dalje analize koja se sprovodi u PATH modelu. U razmatranoj populaciji se izdvaja devet parova kod kojih vrednost regresionog koeficijenta značajno odstupa (PM3(2014)-PM3(2017); PM4(2014)-PM4(2017); PM5(2014)-PM5(2017); SBP3(2014)-SBP3(2017); SBP4(2014)-SBP4(2017); OO2(2014)-OO2(2017); OO6(2014)-OO6(2017); OO7(2014)-OO7(2017) i PC3(2014)-PC3(2017)) i oni se isključuju iz dalje analize.

Tabela 5. Test kritičnih odnosa za razlike između regresionih veličina kontrolnog modela u 2014. i 2017. godini

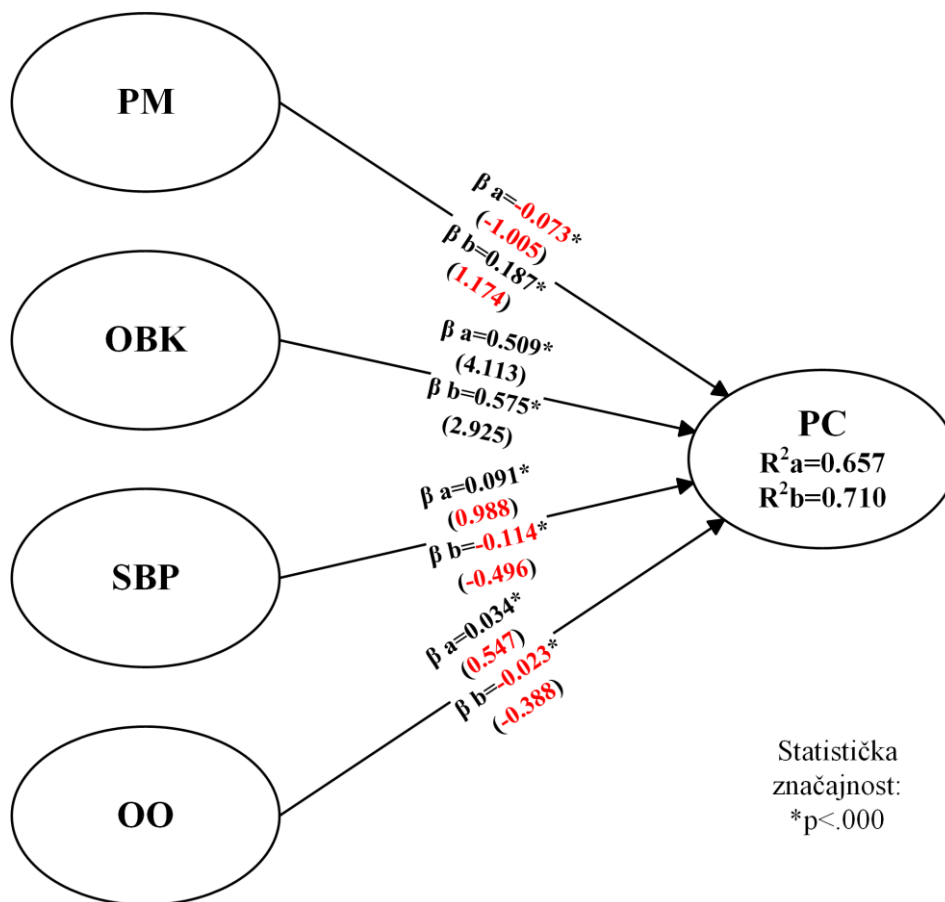
Parovi	C.R. vrednost (Variant)	Parovi	C.R. vrednost (Variant)
PM2(2014)-PM2(2017)	-0.593	OO2(2014)-OO2(2017)	2.175
PM3(2014)-PM3(2017)	4.205	OO3(2014)-OO3(2017)	0.393
PM4(2014)-PM4(2017)	2.834	OO4(2014)-OO4(2017)	-0.901
PM5(2014)-PM5(2017)	-2.475	OO5(2014)-OO5(2017)	-1.311
PM6(2014)-PM6(2017)	-1.766	OO6(2014)-OO6(2017)	5.642
OBK2(2014)-OBK2(2017)	-1.677	OO7(2014)-OO7(2017)	2.100
OBK3(2014)-OBK3(2017)	-0.011	PC2(2014)-PC2(2017)	-1.034
OBK4(2014)-OBK4(2017)	-0.641	PC3(2014)-PC3(2017)	-2.903
OBK5(2014)-OBK5(2017)	0.533	PC4(2014)-PC4(2017)	-1.724
OBK6(2014)-OBK6(2017)	1.424	PC5(2014)-PC5(2017)	-1.864
SBP2(2014)-SBP2(2017)	1.190	PC6(2014)-PC6(2017)	1.445
SBP3(2014)-SBP3(2017)	-2.739	PC7(2014)-PC7(2017)	0.360
SBP4(2014)-SBP4(2017)	2.749	PC8(2014)-PC8(2017)	0.208

Za definisani konceptualni model u nastavku je sprovedena višegrupna PATH analiza. U Tabeli 6. su prikazani rezultati testa kritičnih odnosa (*Critical Ratio test*) strukturnog modela višegrupne PATH analize. Hipoteze u parovima H1a-H1b, H3a-H3b i H4a-H4b mogu zameniti jedna drugu, jer ne variraju (sve vrednosti su u granicama prihvatljivosti ± 1.92). Konkretno, elementi klime bezbednosti “Podrška menadžmenta”, “Sprovođenje bezbednosne prakse” i “Organizaciono okruženje” su imali isti uticaj (ne postoje značajne razlike u mišljenju ispitanika) na “Projektne ciljeve” u 2014. i 2017. godini. Sa druge strane, hipoteze u paru H2a-H2b ne mogu zameniti jedna drugu, jer variraju (vrednost je van granica prihvatljivosti ± 1.92). Konkretno, “Obuke o bezbednosti i kompetencije” nisu imale isti uticaj (postoje značajne razlike u mišljenju ispitanika) na “Projektne ciljeve” u 2014. i 2017. godini. Ovakav rezultat sugerise na to da su se u građevinskom sektoru u Srbiji u period 2014-2017. desile izvesne promene na polju obuka u oblasti bezbednosti na radu, kao i da je ustanovljen različit nivo kompetencija zaposlenih u ova dva vremenska perioda.

Tabela 6. Test kritičnih odnosa za razlike između parametara višegrupnog PATH modela

	2017.	H1b	H2b	H3b	H4b
2014.					
H1a		1.485	-1.607	0.518	0.896
H2a		1.898	3.257	1.399	1.596
H3a		-0.169	-2.386	-0.829	-0.622
H4a		0.531	-3.868	-1.040	-0.663

Na Slici 2 su prikazani rezultati višegrupnog testiranja strukturnog modela. Prvu grupu predstavljaju rezultati testiranja zaposlenih na građevinskim projektima u 2014. godini, a drugu u 2017. godini. Vrednosti koeficijenta regresije, β_a za prvu i β_b za drugu grupu, objašnjavaju jačinu veze između zavisne i nezavisne promenljive, i na modelu su prikazane na strelicama. U zagradama su prikazane vrednosti t-testa. Na simbolu zavisne promenljive su prikazani koeficijenti determinacije (R^2_a za prvu i R^2_b za drugu grupu). R^2 označava učešće objašnjenog varijabiliteta u ukupnom, odnosno koliko je varijacija zavisne promenljive objašnjena prediktorskom promenljivom u modelu.



Slika 2. Višegrupni strukturni model

U prvoj grupi (anketiranje iz 2014. godine) vrednosti koeficijenata regresije pokazuju da su hipoteze H2a, H3a i H4a potvrđene. Sa druge strane hipoteza H1 nije potvrđena, a nije ni prihvatljiva sa statističkom značajnošću ($H1a \rightarrow \beta = -0.073$; $t = -1.005$; $p < 0.000$). Hipoteza H2a, pored toga što je potvrđena, prihvatljiva je sa statističkom značajnošću ($H2a \rightarrow \beta = 0.509$; $t = 4.113$; $p < 0.000$). Konačno, hipoteze H3a i H4a, iako su potvrđene, nisu prihvatljive sa statističkom značajnošću ($H3a \rightarrow \beta = 0.091$; $t = 0.988$; $p < 0.000$; $H4a \rightarrow \beta = 0.034$; $t = 0.547$; $p < 0.000$).

U drugoj grupi višegrupnog modela (anketiranje iz 2017. godine) vrednosti koeficijenata regresije pokazuju da su hipoteze H1b i H2b potvrđene, dok sa druge strane hipoteze H3b i H4b nisu potvrđene. Hipoteza H2b, pored toga što je potvrđena, prihvatljiva je sa statističkom značajnošću ($H2b \rightarrow \beta = 0.575$; $t = 2.925$; $p < 0.000$). Iako je hipoteza H1b potvrđena, nije prihvatljiva sa statističkom značajnošću ($H1b \rightarrow \beta = 0.187$; $t = 1.174$; $p < 0.000$). Konačno, hipoteze H3b i H4b osim što nisu potvrđene, nisu ni prihvatljive sa statističkom značajnošću ($H3b \rightarrow \beta = -0.114$; $t = -0.496$; $p < 0.000$; $H4b \rightarrow \beta = -0.023$; $t = -0.388$; $p < 0.000$).

Koeficijent determinacije R^2 (*Squared Multiple Correlations*) ukazuje na to da se uticaji latentnih prediktora “Podrška menadžmenta”, “Obuke o bezbednosti i kompetencije” “Sprovođenje bezbednosne prakse” i “Organizaciono okruženje” na latentnu endogenu promenljivu “Projektni ciljevi” može obračunati sa 65.7% varijanse u prvoj grupi (anketiranje iz 2014. godine) i sa 71.0% varijanse u drugoj grupi (anketiranje iz 2017. godine).

5. ZAKLJUČAK

Klima bezbednosti i njen uticaj na ostvarivanje projektnih ciljeva na građevinskim projektima se može pouzdano i validno opisati korišćenjem 31 istraživačkog pitanja, podeljenih u pet grupa. Proučavani kontrolni i strukturni modeli pokazuju zadovoljavajuću podudarnost, pouzdanost, validnost i dobro fituju polazne podatke.

Takođe, višegrupnom analizom, moguće je na pouzdan i validan način izvršiti komparaciju klime bezbednosti na građevinskim projektima u različitim vremenskim periodima, a na osnovu dobijenih rezultata izvode se značajni zaključci. Pošto hipoteze u paru H2a-H2b ne mogu zameniti jedna drugu, evidentna je razlika u obukama o bezbednosti i kompetencijama zaposlenih na građevinskim projektima u Srbiji u 2014. i 2017. godini. Vrednosti β koeficijenata ($\beta_a < \beta_b$) pokazuju da je došlo do blagog napretka kod kvaliteta obuka u oblasti bezbednosti na radu, kao i do porasta kompetencija zaposlenih. Ovo je veoma značajan zaključak obzirom da je ovaj element klime bezbednosti u svim prethodnim istraživanjima bio najkritičniji. Njegov progres je najverovatnije posledica ulaska stranih kompanija na naše tržište, kao i praktične primene propisa koji su usklađeni sa evropskim standardima. Kako hipoteze u parovima H1a-H1b, H3a-H3b i H4a-H4b mogu zameniti jedna drugu, evidentno je da elementi klime bezbednosti “Podrška menadžmenta”, “Sprovođenje bezbednosne prakse” i “Organizaciono okruženje” na osnovu odgovora zaposlenih na građevinskim projektima u Srbiji ne pokazuju nikakve promene u razmatranim godinama. Međutim, obzirom na pomenuto unapređenje kvaliteta obuka o bezbednosti i porasta kompetencija zaposlenih, opravdano je očekivati postepene pozitivne pomake i kod ostalih elemenata, pa tako i kod ukupne klime bezbednosti na građevinskim projektima. Takav trend može doprineti popravljaju stanja bezbednosti na radu, a time i olakšati ostvarivanje projektnih ciljeva.

REFERNCE

1. Misiurek, K., Misiurek, B. (2017) Methodology of improving occupational safety in the construction industry on the basis of the TWI program. *Safety Science* 92, 225–231.
2. Cigularov, K.P., Adams, S., Gittleman, J.L., Haile, E., Chen, P.Y. (2013) Measurement equivalence and mean comparisons of a safety climate measure across construction trades. *Accident Analysis and Prevention* 51, 68–77.
3. Fang, D., Wu, H. (2013) Development of a Safety Culture Interaction (SCI) model for construction projects. *Safety Science* 57, 138–149.
4. Rubio-Romero, J.C., Gámez, M.C.R., Carrillo-Castrillo, J.A. (2013) Analysis of the safety conditions of scaffolding on construction sites. *Safety Science* 55, 160–164.
5. Yiu, N.S.N., Sze, N.N., Chan, D.W.M. (2018) Implementation of safety management systems in Hong Kong construction industry – A safety practitioner's perspective. *Journal of Safety Research* 64, 1–9.
6. Chan, A.P.C., Wong, F.K.W., Hon, C.K.H., Lyu, S., Javed, A.A. (2017) Investigating ethnic minorities' perceptions of safety climate in the construction industry. *Journal of Safety Research* 63, 9–19.

7. Probst, T., Estrada, E.X. (2010) Accident under-reporting among employees: testing the moderating influence of psychological safety climate and supervisor enforcement of safety practices. *Accident Analysis and Prevention* 42, 1438–1444.
8. Tam, C.M., Zeng, S.X., Deng, Z.M. (2004) Identifying elements of poor construction safety management in China. *Safety Science* 42(7), 569–586.
9. Saunders, L.W., Kleiner, B.M., McCoy, A.P., Ellis, K.P., Smith-Jackson, T., Wernz, C. (2017) Developing an inter-organizational safety climate instrument for the construction industry. *Safety Science* 98, 17–24.
10. Mohamed, S. (2002) Safety climate in construction site environments. *Journal of Construction Engineering and Management* 128(5), 375–384.
11. Zohar, D. (1980) Safety climate in industrial organizations: theoretical and applied implications. *Journal of Applied Psychology* 60(1), 96–102.
12. He, Q., Dong, S., Rose, T., Li, H., Yin, Q., Cao, D. (2016) Systematic impact of institutional pressures on safety climate in the construction industry. *Accident Analysis and Prevention* 93, 230–239.
13. Ismail, Z., Doostdar, S., Harun, Z. (2012) Factors influencing the implementation of a safety management system for construction sites. *Safety Science* 50, 418–423.
14. Cheng, E.W.L., Ryan, N., Kelly, S. (2012) Exploring the perceived influence of safety management practices on project performance in the construction industry. *Safety Science* 50, 363–369.
15. Huang, Y-H., Verma, S.K., Chang, W.-R., Courtney, T.K., Lombardi, D.A., Brennan, M.J., Perry, M.J. (2012) Management commitment to safety vs. employee perceived safety training and association with future injury. *Accident Analysis and Prevention* 47, 94– 101.
16. Zou, P.X.W., Sunindijo, R.Y. (2013) Skills for managing safety risk, implementing safety task, and developing positive safety climate in construction project. *Automation in Construction* 34, 92–100.
17. Chen, Y., McCabe, B., Hyatt, D. (2017) Impact of individual resilience and safety climate on safety performance and psychological stress of construction workers: A case study of the Ontario construction industry. *Journal of Safety Research* 61, 167–176.
18. Zuofa, T., Ocheing, E.G. (2017) Senior managers and safety leadership role in offshore oil and gas construction projects. *Procedia Engineering* 196, 1011–1017.
19. Zhang, L., Chen, H., Li, H., Wu, X., Skibniewski, M.J. (2018) Perceiving interactions and dynamics of safety leadership in construction projects. *Safety Science* 106, 66–78.
20. Demirkesen, S., Arditi, D. (2015) Construction safety personnel's perceptions of safety training practices. *International Journal of Project Management* 33(5), 1160–1169.
21. Mohamed, S., Ali, T.H., Tam, W.Y.V. (2009) National culture and safe work behaviour of construction workers in Pakistan, *Safety Science* 47, 29–35.
22. Gao, R., Chan, A.P.C., Lyu, S., Zahoor, H., Utama, W.P. (2018) Investigating the difficulties of implementing safety practices in international construction projects. *Safety Science* 108, 39–47.

23. Bavafa, A., Mahdiyar, A., Marsono, A.K. (2018) Identifying and assessing the critical factors for effective implementation of safety programs in construction projects. *Safety Science* 106, 47–56.
24. Mullen, J. (2004) Investigating factors that influence individual safety behavior at work, *Journal of Safety Research* 35, 275–285.
25. Arezes, P.M., Miguel, A.S. (2008) Risk perception and safety behaviour: A study in an occupational environment. *Safety Science* 46(6), 900-907.
26. Pallant, J. (2008) *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS for Windows*, Open University Press, United Kingdom.
27. Kupermintz, H. (2003) Lee J. Cronbach's contributions to educational psychology. In B.J. Zimmerman and D.H. Schunk (Eds.). *Uducational psychology: A century of contributions*, pp. 289-302. Mahwah, NJ, US: Erlbaum.
28. Nunnally, JM. (1994) *Psychometric Theory*, third ed. McGraw-Hill, New York.
29. Bentler, P.M., Bonett, D.G. (1980) Significance Tests and Goodness of Fit in the Analysis of Covariance Structures. *Psychological Bulletin*, 88(3), 588-606.
30. Ho, R. (2006) *Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS*, Chapman & Hall/CRC, Taylor & Francis Group.



MULTIGROUP ANALYSIS OF THE ELEMENTS OF KNOWLEDGE MANAGEMENT IN PROJECT-BASED ORGANIZATIONS

Ivan Jovanović, Nenad Milijić, Dejan Bogdanović, Anđelka Stojanović

University of Belgrade, Technical Faculty in Bor, Engineering Management Department, Serbia

Abstract: In this study, the hypothesis testing was performed by multigroup analysis, i.e. the influence of knowledge management (tools for knowledge management and knowledge exchange) on the successful realization of project goals and achieving of project benefits was tested. The subjects of the research were project-based organizations in 2015 and 2017 in Southeast Serbia. For data collection, the questionnaire methodology was used. Statistical data processing was performed by using the SPSS 17.0 software package. A research model with three hypotheses has been developed. The hypotheses were tested using the SEM (*Structural Equation Modeling*) methodology and the AMOS 18 software package. The results of the empirical research indicate certain differences in the attitudes of the respondents which have been measured by the research model.

Keywords: Knowledge management elements, project goals, project benefits, project-based organizations, multigroup analysis

1. UVOD

Znanje predstavlja jedan od ključnih i najznačajnijih resursa u savremenom poslovnom okruženju. Sa aspekta znanja, projekat predstavlja skup aktivnosti zasnovanih na razvoju zajedničkih interpretacija i shvatanja usmerenih u pravcu ostvarivanja postavljenih ciljeva [1]. Na ovaj način je moguće tokom realizacije projekta generisati kako lična, tako i kolektivna znanja [2], a time doprineti efikasnoj realizaciji projektnih zadataka. Tako se formira baza znanja koja za organizaciju predstavlja resurs od izuzetne važnosti u smislu efikasnosti realizacije budućih projekata [3]. Ovaj proces se dešava samo u slučaju da organizacija na zadovoljavajući način upravlja znanjem, odnosno da organizacija uz adekvatna sredstva generiše nova znanja, vrši njihovu akumulaciju i u procesu distribucije među članovima projektnih timova ih ponovo upotrebljava, razvija i unapređuje [4]. Pomenuta problematika je motivisala istraživanje sa ciljem procene stepena razvoja i unapređenja koncepta upravljanja znanjem kod projektnih organizacija u jugoistočnoj Srbiji.

Nakon detaljne analize relevantne literature, došlo se do zaključka da se pitanje povezanosti između elemenata upravljanja znanjem i dostizanja projektnih ciljeva i benefita pojavljuje kao problem istraživanja u mnogim radovima kod razvijenih ekonomija širom sveta, kao što su radovi [5-8]. Ipak, istraživanja koja se bave navedenom problematikom u tranzicionim ekonomijama su prilično retka, a prema dostupnoj literaturi, ovakva istraživanja nisu rađena u Srbiji. Dakle, veruje se da postoji istraživački jaz koji se odnosi na proučavanje

koncepta upravljanja znanjem kod projektnih organizacija u Srbiji, koji bi bilo delimično otklonjeno ovim istraživanjem.

Rezultati dobijeni ovim istraživanjem bili bi pogodni za komparativnu analizu sa rezultatima dobijenim kod istraživanja u drugim regionima. Na ovaj način bilo bi moguće utvrditi univerzalno važeće veze koje bi mogle biti važne za razvoj koncepta upravljanja znanjem, što bi predstavljalo naučni doprinos ovog istraživanja. Takođe, naučni doprinos bi se mogao ogledati i u otklanjanju pomenutog istraživačkog jaza.

Prvi cilj ovog istraživanja je da se sa nivoa pojedinaca angažovanih na realizaciji projekata, u projektno orijentisanim organizacijama, utvrde mehanizmi na osnovu kojih elementi znanja na projektu (alati za upravljanje znanjem i razmena znanja) utiču na dostizanje projektnih ciljeva i benefita. Drugi cilj koji je nametnut ovim istraživanjem je utvrđivanje stepena napretka u stavovima ispitanika kod percepcije i interpretacije koncepta upravljanja znanjem za period od 2015. do 2017. godine.

Na osnovu navedenog nameću se nekoliko istraživačka pitanja. U kom je obimu razvijen projektni menadžment u jugoistočnoj Srbiji sa aspekta upravljanja znanjem kod projektno-orijentisanih organizacija? Da li projektne organizacije razvijaju i koriste znanje zasnovano na projektnom učenju kako bi dostigle projektne ciljeve u benefite? Da li je kod ispitanika u projektno orijentisanim organizacijama došlo do pomaka u primeni koncepta upravljanja znanjem u periodu od 2015. do 2017. godine?

2. RAZVOJ ISTRAŽIVAČKIH HIPOTEZA I KONCEPTUALNI MODEL

Autor De Fillippi u svom radu [9] ističe da projekti generalno pružaju odlične preduslove za stvaranje novih znanja i na taj način povoljno utiču na ostvarivanje projektnih ciljeva i benefita, a to je naročito izraženo kod projekata čija realizacija traje duže od 10 godina, tvrdi autor Sydow u radu [10]. Međutim, isti autor dalje tvrdi da je praksa potvrdila da u nekim slučajevima ono što je dobro za projekat nije uvek dobro za organizaciju i obrnuto. To je najčešće slučaj sa kratkoročnim projektima sastavljenih od multidisciplinarnih timova. Kod takvih projekata sam proces učenja i razmene znanja je iz tog razloga otežan, a vrlo često je u suprotnosti sa organizacionim učenjem i vrednostima. Zbog toga se često čine kompromisi u vezi sticanje znanja i upravljanje projektima [10].

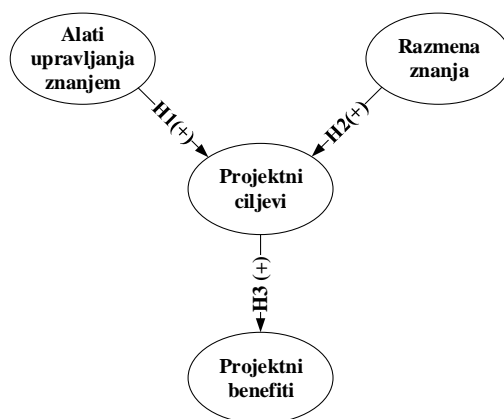
Primena alata i tehnika upravljanja znanjem (internet, softveri za pretraživanja, elektronska pošta, ekspertske sistemi upravljanja dokumentacijom, tehnike data mining-a, baze podataka, sistemi za upravljanje bazama podataka) olakšava protok i kontrolu informacija na projektu, a takođe potpomaže i proces razmene znanja među članovima projektnih timova [1,11]. Njihova primena čini efikasnijim procese integracije, distribucije i upravljanja znanjem [8]. Autori Adamides i Karacapilidis u radu [12] tvrde da uloga proizvođa savremenih IT nije samo da organizuje podatke u korisnu informaciju, već i da podrže transformaciju informacije u organizaciono znanje. Autor Pellerin sa svojim saradnicima u radu [13] ide korak dalje i tvrdi da primena alata i tehnika upravljanja znanjem pomaže menadžerima i projektnim timovima kako pri rešavanju operativnih zadataka tako i u procesu učenja, a samim tim povećava šanse za uspeh projekta. Iz svega navedenog predložena je hipoteza H1: *Primena alata za upravljanje znanjem u projektno orijentisanim organizacijama pozitivno utiče na dostizanje projektnih ciljeva.*

Organizacije koje kontinuirano uvećavaju svoja znanja su bolje pripremljene za suočavanje sa dinamičnim i neizvesnim okruženjem [14]. Najveću podršku u organizacionom učenju upravo predstavlja razmena znanja u okviru organizacije. Projektno orijentisane organizacije su suočene sa dodatnim izazovima. Naime, potrebno je obezbediti efikasne

processe razmene znanja kako unutar tako i između projekata, kao bi se izbegao efekat dupliranja znanja, ili ponavljanja grešaka [4]. Razmena znanja se takođe obavlja i između projekata i matične organizacije. Na taj način, znanja i inovativna rešenja se akumuliraju u okviru organizacije i njihova primena poboljšava performanse svakog budućeg projekta i doprinosi efikasnijem postizanju projektnih ciljeva [15]. Zbog toga je predložena hipoteza: H2: *Razmena znanja u projektno orijentisanim organizacijama pozitivno utiče na dostizanje projektnih ciljeva.*

Zadovoljavajuće performance projekta bazirane na znanju, predstavljaju jedan od elemenata dostizanja projektnih ciljeva. Kumulativ znanja sa projekata koji su uspešno ostvarili svoje ciljeve predstavlja bazu znanja projektno orijentisane organizacije. Kreiranjem i korišćenjem ovakve baze znanja sa ranijih projekata se inicira organizaciono učenje koje poboljšava performanse organizacije, a što predstavlja projektne benefite za samu organizaciju [16]. Zbog toga je predložena hipoteza H3: *Dostizanje projektnih ciljeva u projektno orijentisanim organizacijama pozitivno utiče na ostvarivanje projektnih benefita.*

Na osnovu predložene tri istraživačke hipoteze formiran je konceptualni model pozitivnih uticaja, koji je prikazan na Slici 1.



Slika 1. Konceptualni model

U konceptualnom modelu egzistiraju dve nezavisne latentne promenljive: alati za upravljanje znanjem (AUZ), razmena znanja (RZ), i dve zavisna latentna promenljive: projektni ciljevi (PC) i projektni benefiti (PB).

3. METODOLOGIJA

U istraživanju je korišćena metodologija anketiranja. Za prikupljanje podataka razvijen je upitnik na osnovu dostupne relevantne literature i pokušaja drugih istraživača da kreiraju podesan instrument za analizu i evaluaciju koncepta upravljanja znanjem u projektno orijentisanim kompanijama. Polaznu osnovu činio je upitnik razvijen u radu [16], a njegovom modifikacijom kreiran je finalni upitnik koji je korišćen u ovom istraživanju. Upitnik sadrži 6 pitanja demografskog karakera i 25 pitanja koja opisuju elemente koncepta upravljanja znanjem: AUZ, RZ, PC i PB (Tabela 1).

Tabela 1. Stavke upitnika i rezultati deskriptivne statistike

Grupe pitanja	Stavke upitnika	Sr. vr.	Mod	Varijansa
AUZ	1. U organizaciji se koristi internet kao podrška upravljanja znanjem	3,75	3	0,97
	2. U organizaciji se koristi e-mail kao podrška menadžmenta znanjem	3,52	3	1,01
	3. U organizac. se koristi elektr. sis. upravljanja dokumentacijom kao podrška upravljanja znanjem	2,35	3	1,04
	4. U organizaciji se koriste softveri za pretraživanje kao podrška upravljanja znanjem	2,26	2	0,94
	5. U organizaciji se koriste tehnike rudarenja podataka kao podrška menadžmenta znanjem	1,83	1	0,84
	6. U organizaciji se koriste video konferencije kao podrška upravljanja znanjem	1,32	1	0,39
	7. U organizaciji se koriste sistemi za upravljanje bazama podataka podrška upravljanja znanjem	2,20	2	1,11
	8. U organizaciji se koriste sistemi za upravljanje znanjem kao podrška menadžmenta znanjem	2,16	2	0,94
RZ	1. Među angažovanim članovima na projektu se vrši razmena znanja	3,70	3	0,60
	2. Članovi različitih sektora u organizaciji razmenjuju znanje sa ciljem bolje realizacije projekta	3,37	3	0,61
	3. Članovi projektnog tima koriste bazu znanja pri rešavanju problema	3,91	4	0,56
	4. Članovi projektnog tima koriste bazu znanja u cilju efektivnijeg i efikasnijeg obavljanja posla	3,89	4	0,58
	5. Prilikom realizacije projekta znanje ima praktičnu primenu	4,15	4	0,54
PC	1. Realizacija svake faze projekta je identičan planiranom	4,36	5	0,43
	2. Svi projektni zadaci se izvršavaju prema planu	4,31	5	0,51
	3. Projekat se može realizovati pre roka	2,35	2	1,53
	4. Projekat se realizuje prema zahtevima naručioca i u skladu sa ugovorenim uslovima	4,50	5	0,36
	5. Ciljevi vezani za kvalitet projekta se ostvaruju	4,44	5	0,33
	6. Projekat se realizuje u skladu sa budžetom	4,02	4	0,69
	7. Projekta se realizuje u skladu sa zahtevima zaštite životne sredine, zdravlja i bezbednosti na radu	4,05	4	0,54
	8. Akcidenti tokom realizacije projekta su retkost	3,97	4	0,72
	9. Povrede na radu tokom realizacije projekta su retkost	2,85	3	1,06
PB	1. Projekat generiše puno novih znanja, metoda i inovacija	3,49	4	0,84
	2. Ukupni benefiti projekta premašuju očekivanja kompanije	3,45	4	0,70
	3. Projekat daje odlične rezultate i pozitivne ishode	4,15	4	0,54

Prikupljanje podataka je izvršeno anonimnim anketiranjem neposrednih izvršioaca projektnih aktivnosti, kao i članova projektnih timova angažovanih na realizaciji projekata. Anketiranje je sprovedeno u projektne orijentisanim organizacijama u jugoistočnoj Srbiji u dva ciklusa, i to: april-jun 2015. i maj-septembar 2017. godine. Ispitanici su upitnik popunjavali zaokruživanjem ponuđenih odgovora, a za ocenu odgovora korišćena je Likertova petostepena skala (od 1-apsolutno se ne slažem do 5-apsolutno se slažem). Ukupno je prikupljeno 1.528 ispravno popunjenih upitnika, i to 730 u prvom (2015. god.) i 798 u drugom (2017. god.) ciklusu anketiranja.

4. REZULTATI ISTRAŽIVANJA SA DISKUSIJOM

Za empirijsku validaciju konceptualnog modela korišćena je SEM (*Structural Equation Modeling*) metodologija. Statistička analiza prikupljenih podataka urađena je korišćenjem softverskog paketa SPSS v.17. Kod *deskriptivne statistike* praćeni su statistički parametri: srednja vrednost, modus, i varijansa, čije su vrednosti prikazane u Tabeli 1. Srednja vrednost odgovora ispitanika kreće u granicama od 1,32 do 4,50, modus od 1 do 5, a varijansa od 0,33 do 1,53. Ukoliko se izuzmu odgovori na pitanja od AUZ3 do AUZ7 i pitanje PC3, može se zaključiti da ispitanici generalno imaju pozitivno mišljenje na postavljena pitanja.

4.1. FAKTORSKA ANALIZA

U cilju primene *faktorske analize* najpre je izvršeno ispitivanje adekvatnosti uzorkovanja preko KMO indikatora (*Kaiser-Meyer-Olkin Measure of Sampling Adequacy*) i Bartlett-ovog testa sferičnosti (*Bartlett's Test of Sphericity*). Za latentne promenljive AUZ, RZ, PC i PB, vrednost KMO indikatora jesu 0,892; 0,710; 0,883 i 0,688, respektivno. Dobijene vrednosti su iznad preporučenih minimalnih vrednost za $KMO > 0,6$ na osnovu

preporuka u radu [17]. Dobijeni rezultati za KMO indikator upućuju na zaključak da su prikupljeni podaci pogodni za primenu faktorske analize. Rezultati Bartlett-ovog testa sferičnosti za sve latentne promenljive iznose $\text{Sig.}=0,000$, koji su iznad preporučenih minimalnih vrednost za $\text{Sig.}\leq 0,05$, na osnovu preporuka u radu [17] Rezultati upućuju na zaključak da postoje korelacije među pitanjima u okviru grupa, tj. da korelaciona matrica nije jedinična.

Tabela 2. Rezultati EFA i CFA statistike za kontrolni model

Grupa pitanja	Promenljiva	Eksploratorna Faktorska Analiza (EFA)		Konfirmatorna Faktorska Analiza (CFA)		
		PCA		Pouzdanost	Konvergentna validnost	
		% varijanse objašnjen preko jednodimenzionalnog faktora	Faktor opterećenja	Cronbach's alpha	Faktor opterećenja	t-statistika
		65,134		0,922		
AUZ	AUZ 1		0,809		0,724	1,000
	AUZ 2		0,705		0,549	17,622*
	AUZ 3		0,843		0,770	26,201*
	AUZ 4		0,866		0,881	25,680*
	AUZ 5		0,827		0,823	21,118*
	AUZ 6		0,590		0,485	12,710*
	AUZ 7		0,887		0,915	24,369*
	AUZ 8		0,883		0,904	23,622*
		70,286		0,892		
RZ	RZ 1		0,811		0,571	1,000
	RZ 2		0,712		0,486	19,141*
	RZ 3		0,891		0,979	18,252*
	RZ 4		0,907		0,995	18,164*
	RZ 5		0,831		0,734	17,631*
		60,486		0,898		
PC	PC 1		0,828		0,769	1,000
	PC 2		0,860		0,837	36,421*
	PC 3		0,733		0,703	19,695*
	PC 4		0,785		0,723	20,252*
	PC 5		0,844		0,743	23,034*
	PC 6		0,641		0,588	15,911*
	PC 7		0,859		0,866	25,201*
	PC 8		0,806		0,788	22,392*
	PC 9		0,595		0,591	15,984*
		72,325		0,804		
PB	PB 1		0,889		0,805	1,000
	PB 2		0,797		0,393	10,433*
	PB 3		0,866		0,841	22,866*

Napomena: nivo statističke značajnosti: * $p < 0,000$ - velika

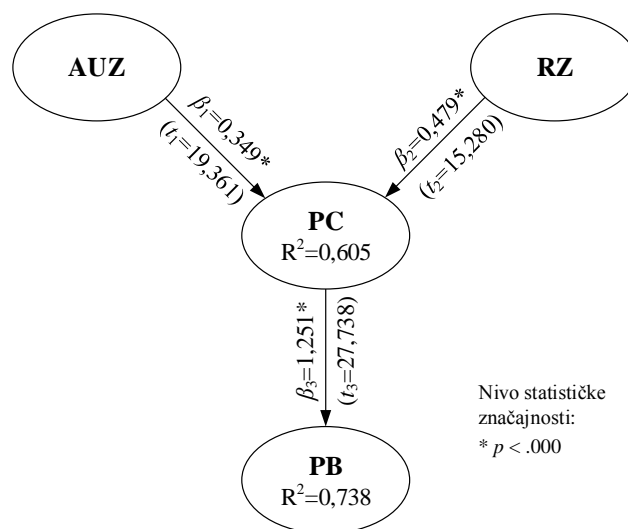
Eksploratorna faktorska analiza (EFA) je urađena sa ciljem utvrđivanja jednodimenzionalnosti kod glavnih faktora (grupe pitanja-latentne promenljive) u predloženom modelu. Rezultati EFA analize (Tabela 2) ukazuju na činjenicu da je potvrđena jednodimenzionalnost kod svih latentnih promenljivih koje su postavljene u modelu, jer su sve ispitivane stavke (promenljive-pitanja u okviru grupa) svrstane u po jedan faktorski skup sa sopstvenom vrednošću većom od 1. Procenat varijanse koji je objašnjen preko jednodimenzionim faktorm se kreće od 60,486% do 72,325%. Faktorsko opterećenje promenljivih se nalazi u granicama od 0,590 do 0,907, što je iznad preporučene vrednosti od 0,4, za uzorke veće od 300, na osnovu literaturne preporuke autora u radu [18]. Može se zaključiti da se formirane latentne grupe promenljivih mogu pouzdano opisati korišćenjem definisanih istraživačkih pitanja (promenljive).

Konfirmatorna faktorska analiza (CFA) je urađena sa ciljem utvrđivanja pouzdanosti i validnosti kontrolnog (mernog) modela. Za pouzdanost kontrolnog modela korišćen je pokazatelj unutrašnje saglasnosti, koji je meren Kronbah-ovim koeficijentom alfa (Cronbach's Alpha). Kod svih latentnih grupa ovi koeficijenti se kreću od 0,804 do 0,922, što je iznad preporučene vrednosti 0,7, koja je data u literaturi [19]. Zato se nameće zaključak da postoji unutrašnja saglasnost latentnih promenljivih i da su istraživačka pitanja pouzdana za dalju analizu.

4.2. STRUKTURNI MODEL

Pre ocene konvergentne validnosti definisan je kontrolni (merni, korelacioni) model koji uspostavlja koelacione veze između definisanih grupa pitanja (AUZ, RZ, PC i PB), sa ciljem da se potvrdi da 25 promenljivih (pitanja upitnika) na pouzdan način reflektuje 4 posmatrane grupe pitanja.

Na osnovu dobijenih podataka, korišćenjem softverskog paketa AMOS 18, koje su prikazane u poslednje dve kolone Tabele 2, može se zaključiti da je postignuta konvergentna validnost kod svih pitanja u razmatranim grupama. Faktorsko opterećenje je kod svih promenljivih iznad preporučene vrednosti 0,4, prema preporukama datim u radu [18], a vrednosti t -statistike su dostigle odgovarajući nivo statističke značajnosti ($p < 0,01$).



Slika 2. Strukturni model

Nakon utvrđivanja jednodimenzionalnosti formiranih grupa pitanja, pouzdanosti merne skale i validnosti modela, izvršena je *PATH analiza*, sa ciljem da se ispita uticaj dva prediktora (AUZ i RZ) na dostizanje projektnih ciljeva (PC), a zatim i uticaj PC na ostvarivanje projektnih benefita. Rezultati su prikazani na Slici 2.

Vrednosti koeficijenta regresije β , koji objašnjava jačinu veze između zavisne i nezavisne promenljive, prikazani su na strelicama. Zvezdicama je označen nivo statističke značajnosti. U zagradama su predstavljene vrednosti t -testa. U poljima zavisnih promenljivih prikazani su koeficijenti determinacije R^2 . Koeficijent determinacije označava učešće objašnjenog varijabiliteta u ukupnom, odnosno koliko je varijacija zavisne promenljive objašnjena prediktorskom promenljivom.

Na osnovu rezultata se može zaključiti da su sve tri hipoteze H1, H2 i H3 potvrđene i prihvaćene sa statističkom značajnošću, jer su dobijene vrednosti H1 ($\beta=0,349$; $t=19,361$; $p<0,000$); H2 ($\beta=0,479$; $t=15,280$; $p<0,000$) i H3 ($\beta=1,251$; $t=27,738$; $p<0,000$).

4.3. VIŠEGRUPNI STRUKTURNI MODEL

Višegrupna (multigrupna) analiza kontrolnog modela je urađena sa ciljem poređenja fitovanja modela između grupa. U ovoj analizi pažnja je usmerena na istovetnost i razlike u odgovorima ispitanika u projektno orijentisanim organizacijama u jugoistočnoj Srbiji u 2015. godini (1. grupa) i 2017. godini (2. grupa). Dakle ispituje se svaka hipoteza ponaosob u odnosu na faktor 2015. i 2017. godina. Pitanje koje se ispituje je da li obrazac strukturnih veza, izraženih kroz hipoteze u path modelu, prati istu dinamiku u projektno orijentisanim organizacijama u 2015. i 2017. godini.

Višegrupna analiza započinje kreiranjem kontrolnog modela za kombinovan uzorak ($N=1.528$), sa podacima za 2015. ($N_1=730$) i za 2017. godinu ($N_2=798$). Testira se hipoteza da kontrolni model važi kako za projektno orijentisane organizacije u jugoistočnoj Srbiji u 2015. tako i u 2017. godini. Vrednosti nekih od indikatora fitovanja za nepromenljivi (Group Invariant) i promenljivi (Group Variant) kontrolni model prikazane su u Tabeli 3. Kod obe grupe RMSEA indikator je manji od preporučene vrednosti 0,08, na osnovu preporuka u radovima [18,19], što ukazuje da su vrednosti prihvatljive podudarnost. Za GFI indikator se može reći da pokazuje dobru podudarnost obe grupe, iako su neznatno manje od preporučene vrednosti $>0,9$. Vrednosti za RMSEA i GFI, kao dva primarna goodness-of-fit indeksa, ukazuju na apsolutnu podudarnost oba grupe kontrolnog modela. Uz vrednosti dobijene za ostale fit-indikatore može se zaključiti da je osigurano dobro fitovanje i da su podaci zaista reprezentativni, tj. sva 25 pitanja mogu na pouzdan i validan način da opišu formirane četiri latentne grupe na osnovu predloženog modela.

Tabela 3. Mere fitovanja za nepromenljivi i promenljivi kontrolni model

Indikatori fitovanja	Kontrolni model		Preporučene vrednosti
	Nepromenljivi (Group Invariant)	Promenljivi (Group Variant)	
Chi-Square (χ^2)	4.592	4.570	-
Degree of freedom (d.f.)	501	480	-
Relative Chi-Square ($\chi^2/d.f.$)	9,166	9,521	< 3,0
Root Mean Square Error of Approximation (RMSEA)	0,073	0,075	< 0,08 – 0,10
Goodness-of-Fit Index (GFI)	0,815	0,816	> 0,9
Adjusted Goodness-of-Fit Index (AGFI)	0,760	0,751	> 0,9
Comparative Fit Index (CFI)	0,883	0,883	> 0,9
Incremental Fit Index (IFI)	0,883	0,883	> 0,9
Normed Fit Index (NFI)	0,870	0,871	> 0,9
Relative Fit Index (RFI)	0,845	0,839	> 0,9

Critical Ratio test (test kritičnih odnosa) pokazuje vrednost svih parova od AUZ2(15) do PB3(15) i AUZ2(17) do PB3(17). Vrednost Critical Ratio testa (Tabela 4) koje su veće od $\pm 1,92$ pokazuju za koje parove se ne može postaviti isti kontrolni model, jer oni nemaju isti uticaj na ispitanike u 2015. i 2017. godini. Ti parovi su sigurno varijabilni i oni se izbacuju iz dalje analize, koja se sprovodi u path modelu. U Tabeli 4 se može izdvojiti samo jedan par kod kojeg vrednost regresionog koeficijenta značajno odstupa, a to je: PB2(15)-PB2(17).

Tabela 4. Critical Ratio test za razlike između regresionih veličina u 2015. i 2017. godini - “Group Variant” kontrolni model

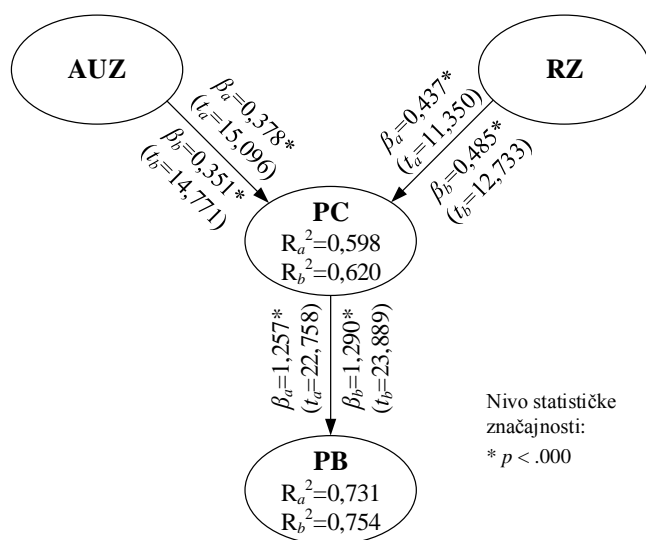
Parovi	AUZ2(15) AUZ2(17)	AUZ3(15) AUZ3(17)	AUZ4(15) AUZ4(17)	AUZ5(15) AUZ5(17)	AUZ6(15) AUZ6(17)	AUZ7(15) AUZ7(17)	AUZ8(15) AUZ8(17)
C.R. vrednost	1,077	0,319	-1,005	0,361	1,190	0,215	-0,009
Parovi	RZ2(15) RZ2(17)	RZ3(15) RZ3(17)	RZ4(15) RZ4(17)	RZ5(15) RZ5(17)	PC2(15) PC2(17)	PC3(15) PC3(17)	PC4(15) PC4(17)
C.R. vrednost	1,576	-0,150	-247	0,601	0,314	1,279	0,245
Parovi	PC5(15) PC5(17)	PC6(15) PC6(17)	PC7(15) PC7(17)	PC8(15) PC8(17)	PC9(15) PC9(17)	PB2(15) PB2(17)	PB3(15) PB3(17)
C.R. vrednost	0,828	1,305	0,793	-0,419	-0,923	1,950	-0,235

U daljem postupku je za definisani konceptualni model, koji je prikazan na Slici 1, primenjena višegrupna PATH analiza. Ponovnim proračunom, u softverskom paketu AMOS 18, dobijaju se rezultati za Critical Ratio test, za strukturni model višegrupne PATH analize, koji su prikazani u Tabeli 5.

Tabela 5. Critical Ratio test za razlike između parametara za višegrupni PATH model

Pairwise Parameters Comparisons (Group Variant)				
	2017.	H1b	H2b	H3b
2015.				
H1a		-0,922	-1,978	-14,297
H2a		2,451	1,042	-10,847
H3a		14,435	12,173	0,565

Na osnovu rezultata iz Tabele 5 se može zaključiti da sve hipoteze (H1a–H1b, H2a–H2b, H3a–H3b) mogu zameniti jedna drugu, jer ne variraju, tj. sve vrednosti su u granicama $\pm 1,92$. To znači da “Alati za upravljanje znanjem” i “Razmena znanja” imaju isti uticaj (nema razlike u mišljenju ispitanika) na “Projektne ciljeve” u 2015. i 2017. godini, i da “Projektne ciljevi” imaju isti uticaj (nema razlike u mišljenju ispitanika) na “Projektne benefite” u 2015. i 2017. godini.



Slika 3. Višegrupni strukturni model

U “Variant” grupi, na Slici 3, prikazani su rezultati višegrupnog testiranja strukturnog modela. Prvu grupu predstavljaju rezultati testiranja ispitanika u projektno orijentisanim organizacijama u 2015. godini, a drugu u 2017. godini. Vrednosti koeficijenta regresije za prvu grupu je označen sa βa a za drugu grupu sa βb . Zvezdicom je označen nivo statističke značajnosti, a u zagradama su predstavljene vrednosti t -testa. U polju zavisne promenljive, oznakom R_a^2 prikazan je koeficijent determinacije za prvu i sa R_b^2 za drugu grupu.

Kod prve grupe (projektno orijentisane organizacije u 2015. godini) su dobijeni takvi rezultati koji upućuju na zaključak da su sve tri hipoteze H1a, H2a i H3a potvrđene i prihvaćene sa statističkom značajnošću, jer su dobijene vrednosti H1a ($\beta=0,378$; $t=15,096$; $p<0,000$); H2a ($\beta=0,437$; $t=11,350$; $p<0,000$) i H3a ($\beta=1,257$; $t=22,758$; $p<0,000$). Za drugu grupu (projektno orijentisane organizacije u 2017. godini) takođe se izvodi zaključak da su sve tri hipoteze H1b, H2b i H3b potvrđene i prihvaćene sa statističkom značajnošću, jer su dobijene vrednosti H1b ($\beta=0,351$; $t=14,771$; $p<0,000$); H2b ($\beta=0,485$; $t=12,733$; $p<0,000$) i H3b ($\beta=1,290$; $t=23,889$; $p<0,000$).

Kod prve grupe (ispitivanje u 2015. godini), vrednost koeficijenta determinacije ($R_a^2=0,598$) upućuje na činjenicu da se uticaj latentnih prediktora „Alati za upravljanje znanjem” i „Razmena znanja” na latentnu endogenu promenljivu „Projektni ciljevi” može obračunati sa 59,8% varijanse. Veći uticaj na promenljivu „Projektni ciljevi” ima prediktor „Razmena znanja” ($\beta=0,437$; $t=11,350$; $p<0,000$). Dalje, uticaj latentnog prediktora „Projektni ciljevi” na endogenu promenljivu „Projektni benefiti” može se obračunati sa 73,1% varijanse.

Kod druge grupe (ispitivanje u 2017. godini), vrednost koeficijenta determinacije ($R_b^2=0,620$) ukazuje na to da se uticaj latentnih prediktora „Alati za upravljanje znanjem” i „Razmena znanja” na latentnu endogenu promenljivu „Projektni ciljevi” može obračunati sa 62% varijanse. Takođe, veći uticaj na promenljivu „Projektni ciljevi” ima prediktor „Razmena znanja” ($\beta=0,485$; $t=12,733$; $p<0,000$). Uticaj latentnog prediktora „Projektni ciljevi” na endogenu promenljivu „Projektni benefiti” može se obračunati sa 73,1% varijanse.

5. ZAKLJUČAK

Rezultati dobijeni ovim istraživanjem navode na zaključak da se primena koncepta upravljanja znanjem kod projektno orijentisanih organizacija, može pouzdano i validno opisati korišćenjem 25 istraživačkih pitanja (promenljive), podeljenih u 4 grupe (latentne promenljive), što predstavlja predloženi konceptualni model. Proučavani kontrolni i strukturni modeli pokazuju zadovoljavajuću podudarnost, pouzdanost, validnost i dobro fituju polazne podatke. Empirijskim istraživanjem potvrđene su sve tri postavljene hipoteze. Testiranjem hipoteza, tj. njihovim dokazivanjem, formiranih na osnovu konceptualnog modela, ukazano je na faktore upravljanja znanjem koji utiču na mišljenja, stavove i uverenja ispitanika (radnika i menadžera) u projektno orijentisanim organizacijama u jugoistočnoj Srbiji. Faktori “Alati za upravljanje znanjem” i “Razmena znanja” neposredno pokazuju pozitivan efekat na ostvarivanje projektnih ciljeva i posredno na projektne benefite.

Na osnovu rezultata višegrupne analize može se tvrditi da je zajednički uticaj dva prediktora AUZ i RZ na PC obračunat sa većim procentom varijanse u drugoj (ispitivanje u 2017. godini) nego u prvoj grupi (ispitivanje u 2015. godini). Takođe, endogena promenljiva PB u drugoj grupi (ispitivanje u 2017. godini) može se opisati većim procentom varijanse prediktorske promenljive PC nego u prvoj grupi (ispitivanje u 2015. godini). To nam nameće zaključak da je koncept upravljanja znanjem, u projektno orijentisanim organizacijama u jugoistočnoj Srbiji, kod ispitanika u 2017. godini prihvatljiviji nego kod ispitanika u 2015.

godini. Međutim, razlike koje postoje nisu statistički značajne, odnosno da postoje nebitne razlike u stavovima ispitanika koje su merene istraživačkim modelom.

Tokom ovog istraživanja evidentna su nekoliko ograničenja koja ujedno nameću i pravce budućeg rada. Prvo ograničenje se ogleda u činjenici da je istraživanje sprovedeno u Srbiji gde još uvek nisu stvoreni najpovoljniji uslovi za primenu koncepta upravljanja znanjem, kakvi su prisutni u ekonomijama razvijenih zemalja. Drugo ograničenje predstavljao je otpor prilikom anketiranja, ispoljen uglavnom od strane starijih ispitanika, uslovljen nepoverenjem, neupućenošću ili neshvatanjem značajnosti istraživanja. Treće ograničenje predstavljala je činjenica da je prikupljanje podataka obavljeno na području jugoistočne Srbije, što je zahtevalo dodatni fizički napor istraživača. Četvrto ograničenje se odnosi na činjenicu da se istraživanje fokusiralo na mehanizme upravljanja znanjem, a ne na proučavanje mehanizama apsorpcije znanja od strane organizacije. Ova ograničenja ujedno ističu i pravac budućih istraživanja, koja bi mogla da se zasnivaju na prezentovanim rezultatima. Kod daljih istraživanja bi se nastupilo sa većim brojem podataka (veći broj varijabli, veći broj proučavanih organizacija, prikupljanje podataka sa šireg geografskog područja) i sofisticiranijim analitičkim metodama.

Rezultati dobijeni ovim istraživanjem se mogu iskoristiti za komparativnu analizu sa rezultatima istraživanja dobijenih iz drugih regiona. Na taj način mogle bi se utvrditi univerzalno važeće veze koje bi doprinele razvoju koncepta upravljanja znanjem.

REFERENCE

1. Jackson, P., Klobas, J. (2008). Building knowledge in projects: A practical application of social constructivism to information systems development. *International Journal of Project Management*, 26, 329–337.
2. Prencipe, A., Tell, F. (2001). Inter-project learning: processes and outcomes of knowledge codification in project-based firms. *Research Policy*, 30, 1373–1394.
3. Ebert, C., De Man, J. (2008). Effectively utilizing project, product and process knowledge. *Information and Software Technology*, 50, 579–594.
4. Almeida, M.V., Soares, A.L. (2014). Knowledge sharing in project-based organizations: Overcoming the informational limbo. *International Journal of Information Management*, 34, 770–779.
5. Reich, B.H., Gemino, A., Sauer, C. (2014). Knowledge management and project-based knowledge in it projects: A model and preliminary empirical results. *International Journal of Project Management*, 30(6), 663–674, 2012.
6. Sokhanvar, S., Matthews, J. Yarlagadda, P. (2014). Importance of Knowledge Management Processes in a Project-based organization: a Case Study of Research Enterprise, *Procedia Engineering*, 97, 1825–1830.
7. Wong, P.S.P., Cheung, S.O., Fan, J.K.L. (2009). Examining the relationship between organizational learning styles and project performance: a Structural Equation Modeling approach. *Journal of Construction Engineering and Management*, ASCE, 135(6), 497–507.
8. Chen, Z., Liu, Z. (2011). A study of Knowledge Management in Construction Project Management, *Energy Procedia*, 11, 1039–1044.

9. DeFillippi, R.J. (2001) Introduction: project-based learning, reflective practices and learning outcomes. *Management Learning*, 32, 5–10, 2001.
10. Sydow, J., Lindkvist, L., DeFillippi, R. (2004). Project-Based Organizations, Embeddedness and Repositories of Knowledge: Editorial, *Organization Studies*, 25(9), 1475–1489.
11. Whyte, J., Lobo, S. (2010). Coordination and control in project-based work: digital objects and infrastructures for delivery, *Construction Management and Economics*, 28(6), 557–567.
12. Adamides, E.D., Karacapilidis, N. (2006). Information technology support for the knowledge and social processes of innovation management, *Technovation*, 26(1), 50–59.
13. Pellerin, R., Perrier, N., Guillot, X., Léger, P.-M. (2013). Project management software utilization and project performance. *Procedia Technology*, 9, 857–866.
14. Liebowitz, J., Megbolugbe, I. (2003). A set of frameworks to aid the project manager in conceptualizing and implementing knowledge management initiatives. *International Journal of Project Management*, 21(3), 189-198.
15. Hansen, M.T. (2002). Knowledge networks: explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232-248.
16. Yang, L.-R., Huang, C.-F., Hsu, T.-J. (2014). Knowledge leadership to improve project and organizational performance. *International Journal of Project Management*, 32, 40–53.
17. Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L. (2006). *Multivariate Data Analysis*, 6th Edt., Pearson Prentice Hall, Upper Saddle River, NJ.
18. Floyd, F.J., Widaman, K.F. (1995). Factor Analysis in the Development and Refinement of Clinical Assessment Instruments, *Psychological Assessment*, 7(3), 286-299.
19. Ho, R. (2006). *Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS*, Chapman & Hall/CRC, Taylor & Francis Group.



THE IMPACT OF CREATIVITY, SELF-EFFICIENCY AND TEAMWORK ON INNOVATION OF MSMEs

Ivan Jovanović, Milica Arsić

*University of Belgrade, Technical Faculty in Bor, Engineering Management Department,
Serbia*

Abstract: The aim of this study was to analyze the impact of entrepreneur's creativity, entrepreneurial self-efficiency, and teamwork on the innovation of MSMEs (*Micro, Small and Medium-sized Enterprises*) in South-East Serbia. The conceptual model with three research hypothesis was proposed. For data collection, the questionnaire method was used and the survey covered a total of 412 respondents (entrepreneurs-owners of MSMEs). The research model was tested using SPSS 17.0 and LISREL 8.8. The structural equation modeling (SEM) was adopted for the causal relationship data analyses between the constructs. The obtained results confirm hypotheses, and indicate the existence of a positive correlation between variables.

Keywords: Entrepreneur's creativity, entrepreneurial self-efficiency, teamwork, innovativeness of organizations, SEM

1. UVOD

Poslednjih decenija, prelazak na tržišno orjentisanu privredu u Srbiji podrazumevao je određene promene unutar organizacije, kao i u spoljnom okruženju. U tom periodu je najviše pažnje bilo usmereno na stvaranje političkog i ekonomskog ambijenta u zemlji, kako bi se privukao strani i domaći kapital za pokretanje sopstvenog preduzetničkog poduhvata. Sa druge strane, premalo pažnje se posvećivalo ljudima unutar organizacije i određenim karakteristikama ličnosti koje sa sobom nosi duh preduzetništva, bez obzira na poznatu činjenicu da je upravo preduzetništvo specifičan način razmišljanja i poslovanja koji se oslanja na kreativnost i inovativnost pojedinaca.

MMSP (mikro, mala i srednja preduzeća) su veoma važan pokretač ekonomskog razvoja svake privrede [1]. U Srbiji MMSP predstavljaju bitne izvore zaposlenosti i privrednog rasta, a ujedno predstavljaju i najefikasniji segment privrede Srbije. Preduzetnička orijentisanost vlasnika MMSP u Srbiji igraju važnu ulogu u ostvarivanju ovog zadatka. U mnogim inostranim istraživanjima se pokazalo da preduzetnička orijentisanost ima pozitivan uticaj na poslovanje i profitabilnost organizacija, kao npr u radu [2]. U svim ovim činjenicama, kao i činjenici da u Srbiji postoji relativno mali broj istraživanja iz oblasti preduzetništva u području kreativnosti i inovativnosti MMSP, a to je aktuelna tema istraživanja mnogih svetskih istraživača, može se pronaći glavni motiv ovog istraživanja.

Istraživanje je usmereno na preduzetnike-vlasnike MMSP u jugoistočnoj i istočnoj Srbiji. Iako, zbog relevantnosti otkrića, autor rada [3] ističe da se preduzetničko istraživanje

treba ograničiti samo na napredne privrede, autori u radu [4] navode da istraživanje u različitim kulturama može samo da unapredi preduzetništvo, jer se na taj način mogu istaknuti veze koje su univerzalno važeće u odnosu na veze koje važe u pojedinačnim kulturama. Takođe, autori u radu [5] naglašavaju važnost pitanja o prenosivosti zaključaka širom zemalja, i ističu da otkrića u istraživanjima u naprednim zemljama nisu neophodno relevantna za objašnjenje ponašanja u tranzicionim privredama.

Zbog svega navedenog, postavljen je glavni cilj ovog rada da se na nivou pojedinca utvrde mehanizmi na osnovu kojih preduzetničke aktivnosti kao što su: kreativnost preduzetnika (KP), preduzetnička samoeфикаsnost (PS) i timski rad (TR) utiču na inovativnost organizacija (IO) u ovom delu Srbije. Postavljena su i nekoliko istraživačkih pitanja. Gde se trenutno nalaze MMSP jugoistočne i istočne Srbije sa aspekata njihove inovativnosti? Da li pomenuta MMSP u dovoljnoj meri upotrebljavaju i razvijaju koncept preduzetništva, kako bi dostigle zadovoljavajući nivo inovativnosti? Zbog svega navedenog autori rada su predložili i testirali konceptualni model sa tri istraživačke hipoteze.

2. RAZVOJ ISTRAŽIVAČKIH HIPOTEZA I KONCEPTUALNI MODEL

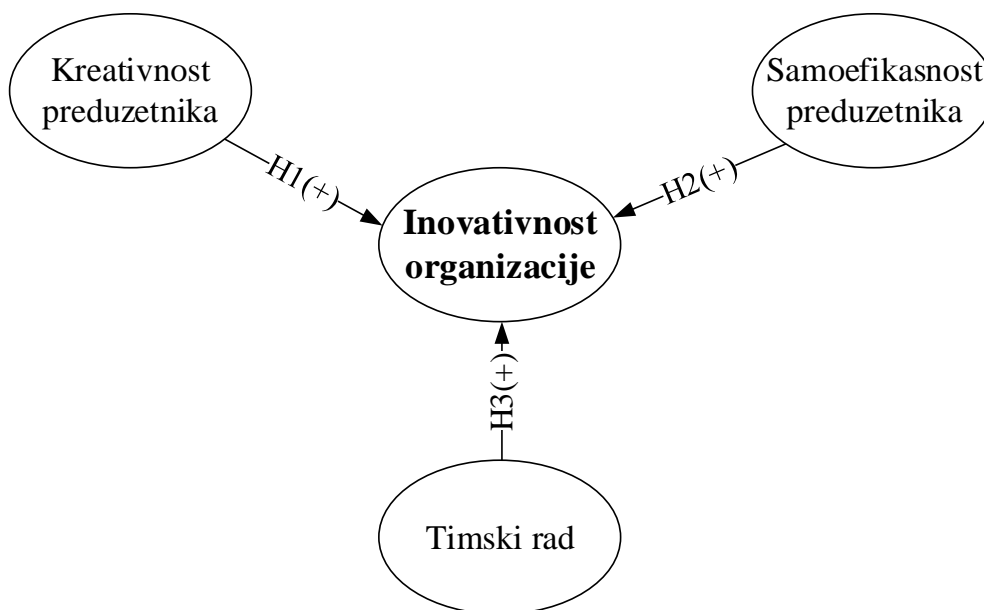
U svojoj teoriji “Kreativna destrukcija” Šumpeter je prvi ukazao da preduzetnička kreativnost ima ključnu ulogu u pokretanju tehnoloških inovacija i privrednih promena. Od tada kreativnost preduzetnika postaje predmet naučnog proučavanja u mnogim studijama. Prema Maslow-u kreativnost je urođena osobina svih ljudi, ali da samo mali deo populacije deluje kreativno. Autor Nystrom u radu [6] ističe da je preduzetnička kreativnost “izum budućnosti”. Autori Baron i Tang u radu [7] ističu pozitivan uticaj kreativnosti preduzetnika na učinak organizacija. U radu [8] autori Silvia i saradnici ističu da ljudi koji su kreativni u jednoj oblasti su, vrlo verovatno, kreativni i u drugim oblastima, baš kao što i ljudi koji su jako inteligentni imaju dobre rezultate pri mnoštvu kognitivnih zadataka. Autor Hall i saradnici u radu [9] ističu da je inovacija ključni element konkurencije i dinamičke ефикаsnosti tržišta. Posmatrano na duže staze, inovativne organizacije će rasti brže, biti ефикаsnije i profitabilnije u odnosu na neinovativne. Zbog svega navedenog autori predlažu hipotezu H1: *Kreativnost preduzetnika pozitivno utiče na inovativnost organizacije.*

Preduzetnik koji je samouveren u svoje sposobnosti da izvršava svoje zadatke, koji se ne boji izazova, koji je inovativan, može kao takav da organizaciji obezbeđuje inovativnost. Boyd i saradnici u radu [10] ističu da se preduzetnička samoeфикаsnost odnosi na jačinu verovanja osobe da je ona sposobna da uspešno izvršava različite uloge i zadatke preduzetništva. Preduzetnici sa istim veštinama mogu imati slab, adekvatan ili izvanredan učinak, zavisno od toga da li njihova sopstvena verovanja o ефикаsnosti jačaju ili umanjuju njihovu motivaciju i pokušaje rešavanja [11]. Bandura u svom radu [12] ističe da postoje veće šanse da će pojedinci sa visokom samoeфикасношću za određeni zadatak više tragati i izdržati na tom zadatku, nego li pojedinci sa niskim verovanjima o samoeфикаsnosti. Preduzetnici sa čvrstim uverenjima o preduzetničkoj samoeфикаsnosti teže da izazovne situacije dovode u vezu sa nagradama kao što je profit, priznanje zajednice i psihološka ispunjenost, zato što se samoeфикаsnost ne bavi prošlošću, već sudovima o tome šta bi se moglo postići u budućnosti [13]. U svom radu [14] autor Tang ističe pozitivan efekat preduzetničke kreativnosti na inovativnost organizacije, koja stimuliše preduzetničku improvizaciju i sam poslovni učinak. Zbog svega navedenog predložena je hipoteza H2: *Samoeфикаsnost preduzetnika pozitivno utiče na inovativnost organizacije.*

Ljudi i timovi predstavljaju osnovni element svake organizacije. Timskim radom se postiže Sinergetski efekat, gde se zbirno postiže veći rezultat od bilo kog pojedinačnog, a da

pri tome svaki pojedinac postiže više nego što bi to ikada mogao sam, moguće je postići timskim radom. Moderno poslovanje bez timskog rada gotovo da postaje nezamislivo. Korišćenje timova u organizacijama uvećava zadovoljstvo i lojalnost zaposlenih i organizaciju dovodi brže do postavljenih ciljeva. Timski rad je suštinski deo korporativne odgovornosti, jer povećava komunikaciju, poverenje u organizaciji, promovira drugarstvo i stimuliše inovativnost organizacije [15]. Zato je predložena hipoteza H3: *Timski rad pozitivno utiče na inovativnost organizacije*.

Konceptualni model pozitivnih uticaja za predložene 3 hipoteze prikazan je na Slici 1.



Slika 1. Konceptualni model

U konceptualnom modelu egzistiraju tri nezavisne latentne promenljive: kreativnost preduzetnika (KP), samoefikasnost preduzetnika (SP) i timski rad (TR), i jedna zavisna latentna promenljiva: inovativnost organizacije (IO).

3. METODOLOGIJA

U istraživanju je korišćena metodologija anketiranja. Iskorišćeno je iskustvo drugih istraživača [16-19] u kreiranju univerzalno primenljivog instrumenta za analizu i evaluaciju koncepta preduzetništva u MMSP, bez obzira na vrstu industrije, a njihovom modifikacijom kreiran je i finalni upitnik. Upitnik sadrži 8 pitanja demografskog karakera (Tabela 1), i 16 istraživačkih pitanja raspoređenih u 4 grupe (Tabela 2). Tri grupe pitanja opisuju elemente preduzetničke aktivnosti: KP, SP i TR, a jedna koncept inovativnosti organizacije (IO).

Tabela 1. Demografske karakteristike uzorka

R.br.	Kontrolne promenljive	Kategorija	Frekvencija	Udeo (%)
1	Pol poslodavca-vlasnika	Muški	310	75,24
		Ženski	102	24,76
2	Godine starosti poslodavca-vlasnika	≤ 25	25	6,07
		26-35	105	25,49
		36-45	135	32,77
		46-55	108	26,21
		≥ 56	39	9,46
3	Broj zaposlenih u organizaciji	≤ 10	277	67,23
		11-50	95	23,06
		51-250	40	9,71
4	Hronološka starost organizacije (godine)	≤ 5	108	26,21
		6-10	95	23,06
		11-20	116	28,15
		21-30	55	13,35
		≥ 31	38	9,23
5	Predhodno poslovno iskustvo poslodavca-vlasnika	Ne	138	33,49
		Da	274	66,51
6	Predhodno poslovno iskustvo u struci poslodavca-vlasnika	Ne	196	47,57
		Da	216	52,43
7	Vlasnička struktura vaše organizacije	Domaće vlasništvo	374	90,78
		Strano vlasništvo	13	3,15
		Mešovito vlasništvo	25	6,07
8	Sektor privredne delatnosi	Poljoprivreda	24	5,83
		Proizvodni	95	23,06
		Neproizvodni	53	12,86
		Uslužni	240	58,25

U periodu od aprila do jula 2017. godine su prikupljeni podaci neposrednim anonimnim anketiranjem preduzetnika-vlasnika slučajno odabranih MSP u jugoistočnoj i istočnoj Srbiji. Prikupljeno je 412 ispravno popunjenih upitnika. Odnos veličina uzorka prema broju pitanja jeste 25,75, što je daleko iznad preporučene vrednosti 5, prema autorima u radu [20]. U anketi je za ocenu odgovora korišćena Likertova petostepena skala (od 1-apsolutno se ne slažem do 5-apsolutno se slažem).

4. REZULTATI ISTRAŽIVANJA I DISKUSIJA

Najpre je urađena *deskriptivna statistika* korišćenjem softverskih paketa SPSS 17.0. Praćeni su standardni statistički parametri: srednja vrednost, modus i varijansa, koji su prikazani u Tabeli 2.

Na osnovu odgovora se može uočiti da ispitanici imaju pozitivno mišljenje na postavljena pitanja. Naime, srednja vrednost odgovora ispitanika kreće u granicama od 3,315 do 4,156, modus od 3 do 4, a varijansa od 0,56 do 1,01. Na osnovu parametara deskriptivne statistike se takođe može zaključiti da ispitanici, odnosno vlasnici MMSP, mogu zadovoljiti bitne pretpostavke preduzetničke aktivnosti, koje su definisane kroz 4 grupe pitanja.

Tabela 2. Stavke upitnika i rezultati deskriptivne statistike

Grupe pitanja	Oznaka	Stavke upitnika	Sr. vr.	Mod	Varijansa
KP	KP 1	Mogu da osmislim iznenadna rešenja	3,950	4	0,65
	KP 2	Moje ideje su obično vrlo jedinstvene	3,788	4	0,83
	KP 3	Kad predvidim moguće prepreke, sposoban sam da ih savladam	3,997	4	0,68
	KP 4	Pokušavam da nadjem nova rešenja, čak i kad to nije potrebno	3,695	4	1,01
	KP 5	Uvek imam u glavi veliki broj ideja	4,026	4	0,71
SP	SP 1	Sposoban sam da postavim i ispunim poslovne ciljeve	4,156	4	0,56
	SP 2	Sposoban sam da kontrolišem troškove	3,937	4	0,88
	SP 3	Sposoban sam da sprovedem analizu tržišta	3,821	4	0,68
	SP 4	Sposoban sam da razvijem nove ideje	3,937	4	0,67
TR	TR1	Pomoć svih članova tima prilikom stvaranja novih rešenja je uvek dostupna	3,699	3	0,70
	TR2	Članovi mog tima su uvek spremni za nove ideje	3,636	3	0,69
	TR3	Čl. mog tima uvek traže nova rešenja i svaki problem sagledaju iz novog ugla	3,586	3	0,74
	TR4	Članovi tima pružaju jedni drugima pomoć prilikom relazacije problema	3,791	4	0,81
IO	IO1	Broj proizvoda ili usluga koje je organizacija prva plasirala	3,315	3	0,85
	IO2	Broj proizvoda ili usluga koje je organizacija plasirala	3,374	3	0,77
	IO3	Brzina razvoja novih proizvoda ili usluga	3,374	3	0,82

Kontrolni model je testiran korišćenjem softverskih paketa SPSS 17.0 i LISREL 8.80.

Najpre je izvršeno ispitivanje adekvatnosti uzorkovanja preko KMO indikatora i Bartlett-ovog testa sferičnosti, sa ciljem primene faktorske analize. Minimalno prihvatljiva vrednost za KMO indikator iznosi 0,6, a za nivo značajnosti Bartlett-ovog testa iznosi $\text{Sig.} \leq 0,05$, na osnovu preporuka u radu [21]. Kod ispitivanog uzorka, za latentne promenljive, KMO indikator se kreće u granicama od 0,712 do 0,865, a Bartlett-ov test sveričnosti je $\text{Sig.} \leq 0,000$ kod svih grupa. Dobijeni rezultati za KMO indikator upućuju na zaključak da su prikupljeni podaci pogodni za primenu faktorske analize, a za Bartlett-ov test sferičnosti da korelaciona matrica nije jedinična, tj. da postoje korelacije među pitanjima (promenljive) u okviru grupa.

Sa ciljem utvrđivanja jednodimenzionalnosti glavnih faktora (grupe pitanja) urađena je eksploratorna faktorska analiza (EFA–*Exploratory Factor Analysis*). Rezultati testiranja potvrđuju jednodimenzionalnost kod svih faktora, jer su sve ispitivane stavke svrstane u po jedan faktorski skup sa sopstvenom vrednošću većom od 1 (jedan), a procenti varijabiliteta su prikazani u Tabeli 3. Faktorskog opterećenja promenljivih su iznad preporučene vrednosti od 0,4, koja važi za uzorke veće od 300, na osnovu preporuke u radu [22]. Na osnovu rezultata izvlači se zaključak da se formirane latentne grupe promenljivih mogu pouzdano opisati korišćenjem definisanih istraživačkih pitanja.

Kako bi se potvrdila pouzdanost i validnost konceptualnog modela, urađena je konfirmatorna faktorska analiza (CFA–*Confirmatory Factor Analysis*) nad kontrolnim modelom, a dobijene vrednosti su prikazane u Tabeli 3. Za pouzdanost kontrolnog modela koristi se pokazatelj unutrašnje saglasnosti, koji je meren Kronbahovim koeficijentom alfa (*Cronbach's Alpha*). Za testirani uzorak, vrednost koeficijenta, kod svih grupa, je iznad preporučene vrednosti 0,7, koja se navodi u literaturi [23]. Zato se nameće zaključak da postoji unutrašnja saglasnost latentnih promenljivih i da su istraživačka pitanja pouzdana za dalju analizu. Konvergentna validnost kontrolnog modela potvrđuje se na osnovu vrednosti faktorskog opterećenja i *t*-testa (Tabela 3), kao i potvrde fitovanja modela (Tabela 4). Vrednosti faktorskog opterećenje su iznad preporučene vrednosti od 0,4, a vrednosti *t*-testa su dostigle nivo značajnosti od $\text{Sig.} < 0,05$. Ovi rezultati upućuju na zaključak da je svaka odrednica (pitanje) razmatranih grupa pitanja postigla konvergentnu validnost.

Na osnovu urađene CFA analize utvrđene su *mere fitovanja* kontrolnog i strukturnog modela, a vrednosti nekih od parametara prikazani su u Tabel 4. Kod oba modela su oučena

mala odstupanja kod $\chi^2/d.f.$, GFI i AGFI indikatora. Ipak se može zaključiti da je postignuto dobro fitovanje modela i da su podaci zaista reprezentativni.

Tabela 3. Rezultati EFA i CFA statistike za kontrolni model

Grupa pitanja	Promenljiva	Eksplozivna Faktorska Analiza (EFA)		Konfirmatorna Faktorska Analiza (CFA)		
		PCA		Pouzdanost		Konvergentna validnost
		% varijanse koji se može opisati jednodimenzionim faktorom	Faktorsko opterećenje	Cronbach alpha (Spearman-Brown)	Faktorsko opterećenje	t-vrednost
		63,56		0,805		
KP	KP1		0,51		0,48	13,25 *
	KP2		0,62		0,54	11,56 *
	KP3		0,65		0,55	12,12 *
	KP4		0,55		0,50	15,36 *
	KP5		0,49		0,45	10,36 *
		64,52		0,835		
SP	SP1		0,76		0,53	15,52 *
	SP2		0,72		0,57	14,34 *
	SP3		0,78		0,62	15,36 *
	SP4		0,72		0,63	16,84 *
		59,15		0,712		
TR	TR1		0,55		0,48	18,35 *
	TR2		0,69		0,56	19,56 *
	TR3		0,71		0,63	23,56 *
	TR4		0,66		0,62	24,31 *
		78,65		0,923		
IO	IO1		0,92		0,84	28,03 *
	IO2		0,95		0,89	25,34 *
	IO3		0,94		0,84	27,54 *

Napomena: Nivo statističke značajnosti * $p < 0,05$

Konačan zaključak je da sva 16 istraživačka pitanja mogu na pouzdan i validan način da opišu formirane 4 grupe pitanja na osnovu konceptualnog modela prikazanog na Slici 1.

Tabela 4. Vrednosti indikatora fitovanja za kontrolni i strukturni model

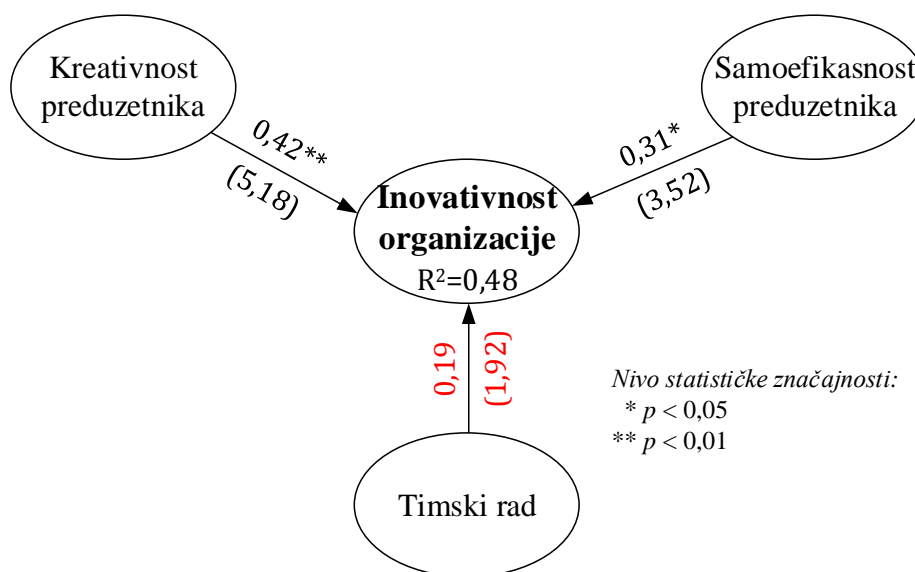
Indikatori fitovanja	Vrednosti za kontrolni (merni) model	Vrednosti za strukturni (PATH) model	Preporučene vrednosti
Chi-Square (χ^2)	835	832	-
Degree of freedom (d.f.)	255	251	-
Relative Chi-Square ($\chi^2/d.f.$)	3,27	3,31	< 3,0
Root Mean Square Error of Approximation (RMSEA)	0,096	0,097	< 0,08 – 0,10
Goodness-of-Fit Index (GFI)	0,83	0,83	> 0,9
Adjusted Goodness-of-Fit Index (AGFI)	0,81	0,81	> 0,9
Comparative Fit Index (CFI)	0,92	0,92	> 0,9
Incremental Fit Index (IFI)	0,93	0,92	> 0,9
Normed Fit Index (NFI)	0,90	0,90	> 0,9
Non-Normed Fit Index (NNFI)	0,91	0,91	> 0,9
Relative Fit Index (RFI)	0,92	0,90	> 0,9

Nakon potvrde o pouzdanosti konceptualnog modela, kao i validacije i dobijenih zadovoljavajućih mera fitovanja kontrolnog modela, izvršeno je testiranje strukturnog modela, definisanog konceptualnim modelom na Slici 1. Testiranje je urađeno korišćenjem softverskog paketa LISREL 8.80, a rezultati analize su prikazani na Slici 2. Vrednost koeficijenta regresije (koeficijent putanje) je predstavljen iznad strelica, a zvezdicom je označen nivo statističke značajnosti. U zagradi ispod strelica je predstavljena vrednosti t -testa. U polju zavisne promenljive je prikazan koeficijent determinacije (R^2), koji određuje koliko je varijacija zavisne promenljive objašnjena prediktorskom promenljivom.

Svi koeficijenti regresije imaju pozitivnu vrednost, što znači da su potvrđene sve tri hipoteze H1, H2, i H3. Odluka o prihvatanju hipoteza se donosi na osnovu rezultata t -testa.

Koeficijenti t -testa za hipoteze H1 i H2 su iznad preporučene vrednosti od 1,96, prema preporukama autora u radovima [20,23]. To znači da su te dve hipoteze prihvatljive. Za hipotezu H1 obezbeđen je nivo statističke značajnosti manje od 0,01, a za hipotezu H2 manje od 0,05. Koeficijent t -testa za hipotezu H3 je ispod preporučene vrednosti od 1,96. To znači da ova hipoteza nije prihvatljiva i nije statistički značajna.

Za ispitivani uzorak, može se izvesti konačan zaključak da su istraživačke hipoteze H1 i H2 potvrđene, prihvatljive i statistički značajne, jer su dobijeni sledeći rezultati: H1 ($\beta=0,42$; $t=5,18$; $p<0,01$); H2 ($\beta=0,31$; $t=3,52$; $p<0,05$). Istraživačka hipoteza H3 je potvrđena ali nije prihvatljiva i nije statistički značajna, jer su dobijeni sledeći rezultati: H3 ($\beta=0,19$; $t=1,92$; $p>0,05$).



Slika 2. Strukturni (Path) model

Rezultati koeficijenta determinacije R^2 (*Squared Multiple Correlations*) upućuju na zaključak da se uticaj latentnih prediktora “Kreativnost preduzetnika”, “Samoefikasnost preduzetnika” i “Timski rad” na latentnu endogenu promenljivu “Inovativnost organizacije” može obračunati (objasniti) sa 48% varijanse.

5. ZAKLJUČAK

Srbija, koju je do 2000. godine pretežno karakterisala planska i monostrukturalna privreda, ima veoma kratku istoriju preduzetništva. Kao i u svim zemljama u tranziciji, i u Srbiji je preduzetništvo još uvek u razvoju, kako zbog privrednih uslova tako i zbog nacionalne kulture, kojoj nije svojstveno preuzimanje rizika, a sa čime je pojam preduzetništva neraskidivo vezan.

Ovim istraživanjem je učinjen pokušaj da se da doprinos u oblasti preduzetništva u Srbiji. Konkretno, istraživani su uticaji elemenata preduzetništva (kreativnost preduzetnika, samoefikasnost preduzetnika i timski rad) na inovativnost organizacije. Implikacije koje bi ovo istraživanje moglo imati na kreatore poslovne politike, a pre svega na one na koje se samo istraživanje odnosi, na preduzetnike, je to da se kreativnost, samoefikasnost, timski rad i inovativnost moraju podsticati.

Tokom istraživanja evidentirana su i određena ograničenja. Prvo ograničenje se odnosi na činjenicu da su preduzetnici sami ocenjivali pomenute elemente preduzetništva (KP, SP, TR, IO) tako da je čitavo istraživanje zasnovano na njihovim subjektivnim ocenama, koje se uvek mora uzeti sa rezervom. Buduća istraživanja bi mogla da smanje objektivnost koristeći neku drugu skalu, koja isključuje samoocenjivanje preduzetnika. Drugo ograničenje se odnosi na činjenicu da je istraživanje sprovedeno u regionu koji važi za nerazvijeniji deo Srbije. Na taj način se dobijeni rezultati ne mogu generalizovati i odnositi za celu Srbiju, ali mogu biti dobra osnova za dalja istraživanja i u drugim regionima. Tako dobijeni rezultati se mogu upotrebiti za komparativnu analizu sa ciljem utvrđivanja univerzalno važećih veza koje bi mogle biti važne za razvoj preduzetništva u Srbiji. Zbog toga je želja autora bila da se, na nivou pojedinca, utvrde mehanizmi na osnovu kojih preduzetničke aktivnosti utiču na inovativnost MMSP u jugoistočnoj i istočnoj Srbiji.

REFERENCE

1. Acs, Z., Desai, S., and Hessels, J. (2008). Entrepreneurship, economic development and institutions. *Small Business Economics*, 31(3), 219-234.
2. Keh, H.T., Nguyen, T.T.M., Ng, H.P. (2007). The effects of entrepreneurial orientation and marketing information on the performance of SMEs. *Journal of Business venturing*, 22, 592-611.
3. Naude, W. (2010). Entrepreneurship, Developing countries, and development economics: New approaches and insights. *Small Business Economics*, 34(1), 1-12.
4. Engelen, A., Heinemann, F., Brettel, M. (2009). Cross-cultural entrepreneurship research: Current status and framework for future studies. *Journal of International Entrepreneurship*, 7(3), 163-189.
5. Leskovar-Spacapan, G., Bastić, M. (2007). Differences in organizations' innovation capability in a transition economy: Internal aspect of the organizations' strategic orientation. *Technovation*, 27(9), 533-546.
6. Nystrom, H. (1993). Creativity and entrepreneurship. *Creativity and Innovation Management*, 2(4), 237-242.
7. Baron, R. A., Tang, J. (2011). The role of entrepreneurs in firm-level innovation: The joint effects of positive affect, creativity, and environmental dynamism. *Journal of Business Venturing*, 26(1), 49-60.
8. Silvia, P.J., Kaufman, J.C., Pretz, J.E. (2009). Is creativity domain-specific? Latent class models of creative accomplishments and creative self-descriptions. *Psychology of Aesthetics, Creativity, and the Arts*, 3(3), 139-148.
9. Hall, B.H., Lotti, F., Mairesse, J. (2009). Innovation and productivity in SMEs: Empirical evidence for Italy. *Small Business Economics*, 33, 13-33.
10. Boyd, N.G., Vozikis, G.S. (1994). The influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice*, 18(4), 63-77.

11. Wood, R., Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review*, 14(3), 361-384.
12. Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1-26.
13. Yang, H.L., Cheng, H.H. (2009). Creative self-efficacy and its factors: An empirical study of information system analysts and programmers. *Computers in Human Behavior*, 25(2), 429-438.
14. Tang, J. (2008). Environmental munificence for entrepreneurs: entrepreneurial alertness and commitment. *International Journal of Entrepreneurial Behaviour and Research*, 14(3), 128-151.
15. Levine, C., (2007). Neural correlates of corporate camaraderie and teamwork. *Annals of the New York Academy of Sciences*, 1118, 102-108.
16. Hills, G.E., Lumpkin, G.T. and Singh, R.P. (1997). Opportunity recognition: Perceptions and behaviors of entrepreneurs. *Frontiers of Entrepreneurship Research*, 17, 168-182.
17. Chen, C.C., Greene, P.G. and Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *Journal of Business Venturing*, 13(4), 295-316.
18. Jimé'nez-Jimé'nez, D. and Sanz-Valle, R. (2011). Innovation, organizational learning, and performance. *Journal of Business Research*, 64(1), 408-417.
19. Yang, H.L., Cheng, H.H. (2009). Creative self-efficacy and its factors: An empirical study of information system analysts and programmers. *Computers in Human Behavior*, 25(2), 429-438.
20. Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L. (2006). *Multivariate Data Analysis*, 6th Edition, Pearson Prentice Hall, Upper Saddle River, NJ.
21. Cerny, C.A., Kaiser, H.F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate Behavioral Research*, 12 (1), 43-47.
22. Floyd, F.J., Widaman, K.F. (1995). Factor Analysis in the Development and Refinement of Clinical Assessment Instruments. *Psychological Assessment*, 7(3), 286-299.
23. Ho, R. (2006). *Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS*, Chapman & Hall/CRC, Taylor & Francis Group



THE INFLUENCE OF LEADERSHIP ON THE SUCCESS OF STRATEGIC MANAGEMENT

Taip Jakupi, Marija Kotevska-Dimovska

Business Academy Smilevski-BAS, Macedonia

Abstract: The business world is changing faster than ever before, and technology and globalization bring new economic paradigms and increased demand for leaders with visions and authority. Leadership has a significant impact on the stages of strategic management that determines the vision and mission of an organization and facilitates effective strategies for achieving this vision. This paper deals with the nature and importance of strategic leadership and the most modern theory of transformational leadership. The purpose of this paper is to find out the role of leadership in the formulation and implementation of the strategy. The study reveals that leadership serves as a link between emotional and social capital and the successful implementation of the strategy. Leadership challenge is the assessment of leaders with optimal competencies, so leadership must have a process of assessing performance of leaders in order to ensure the efficiency of the entire process, and this aspect will help to identify shortcomings and make strategies in line with changes. Findings of empirical research indicate the importance of leadership style and leadership competence as an important part of corporate strategic management. The contribution of work consists of clear analytical material that will show the importance of strategic leadership and socio-emotional, professional and personal competencies of leaders with proven successful strategy. The study contributes to the theoretical and empirical level of strategic management, and also confirms that organizations need experienced leaders with well-developed competencies.

Keywords: leadership, strategic management, competencies, organization

1.UVOD

Strateški menadžment se može definisati kao skup odluka koje menadžeri preduzimaju, a koji odlučuju o rezultatima poslovanja firme. Menadžer mora imati temeljito znanje i analizu opšteg i konkurentnog organizacionog okruženja kako bi donosio ispravne odluke. Za to su potrebne analize snage i slabosti, kao i mogućnosti i pretnje. Strateški menadžment se primjenjuje za male i velike organizacije kao način na koji strateški menadžeri postavljaju ciljeve i uspevaju ih učinkovito ostvariti. To je kontinuirani proces koji treba da uključi različite funkcionalne oblasti organizacije, kao i da obezbedi da se oni usklade. Druga uloga strateškog menadžmenta je da neprekidno prati ciljeve organizacije, kao i da kontroliše poslovanja u kojima je uključena organizacija.

Strategijski menadžment daje šire perspektive zaposlenima u organizaciji da bi mogli razumjeti kako se njihov posao uklapa u organizacioni plan, kao i sa drugim članovima. To je umetnost menadžiranja humanih resursa na način koji maksimizira sposobnost postizanja

poslovnih ciljeva. Da bismo razumeli kako organizacije funkcionišu moramo shvatiti ljude na vrhu - njihove sposobnosti, kompetencije, vrijednosti, aspiracije, iskustva i druge ljudske karakteristike. Akcije relativno malog broja ključnih ljudi na vrhu organizacije mogu dramatično uticati na organizacione ishode. Obim strateškog liderstva uključuje pojedinačne menadžere, posebno glavne izvršne rukovodioce, grupe menadžera i upravna tijela. Shodno tome, ovaj rad se bavi nizom tema koje se odnose na lidere i njihovu ličnost, uključujući emocionalni, socijalni i kognitivni aspekt. Rad sintetizuje ono što je poznato o strateškom liderstvu i ukazuje na nove smernice istraživanja.

2. TEORISKA OSNOVA

Pristupi organizacione strategije i njenom izvršenju se menjaju tokom vremena. Dok je ranije fokus bio na strateškom planiranju u većini kompanija, to se promenilo ka strateškom liderstvu, da bi u 2000-im fokus bio na transformacionom liderstvu kao najefektivnije u realizaciji strateških promena. Zadnjih 20 godina studije strategiskog menadžmenta i liderstva u organizacijama obeležuju teorije u koje dominiraju termini kao transformacion, inspirativni i harizmatičan lider - vizionar, (Bass i Avolio, 1994). To su teorije koje stvaraju relativno koherentnu cjelinu, dok se bave procesima strateškog liderstva koji su u prošlosti bili potpuno zanemareni. Dok je u ranijim teorijama fokusiranost na racionalne procese i transakcionih stilova liderstva, nove teorije se fokusiraju na emocionalne i motivacione procese liderstva (Bass, 1990; Yukl, 1998). Stoga se razvijaju transformacijski, transakcioni, kolaborativni i drugi modeli liderstva koji se vezuju za određene obrasce ponašanja kao: stav prema ljudima, uticaj i odnos prema vrijednostima (Bush, 1995). Modeli liderstva su teorijski konstrukti koji u stvarnosti gotovo da ne postoje kao odvojeni tipovi.

U kontekstu sve veće globalizacije i brzog tehnološkog inoviranja, primarni zadatak menadžmenta danas je liderstvo organizacija u uslovima permanentnih promjena. Savremeni menadžment i liderstvo nastoje da ispita ulogu lidera u upravljanju izazovom promene velikih razmjera, kao i faktore koji su od ključne važnosti za efikasno vođenje promjena. Takođe se istražuje mišljenje da efektivno vođenje promena uključuje instrumentalne i harizmatične lidere, integrišući operativno znanje sa snažnim interpersonalnim veštinama. Analiza efektivnih strateških organizacija ukazuje na to da lideri promena prepoznaju važnost mešanja harizmatičnih i instrumentalnih dimenzija vođenja promjena. Sposobnost pomirenja i balansiranja dve uloge zavisi pre svega od toga da li lider poseduje određene kvalitete i attribute potrebne za efikasno vođenje promena. Snažne interpersonalne veštine prožimaju ove ključne liderske kvalitete i pružaju jedinstvo između karizmatičnih i instrumentalnih uloga.

3. STRATEŠKO LIDERSTVO

Centralno za strateški menadžment je određivanje dugoročnih ciljeva organizacije koja služi kao okvir u kome se donose odluke o prirodi i pravcu organizacije, koji pomaže u raspoređivanju resursa kako bi se poboljšao finansijske i strateške performanse (Stoney, 2001). Iz ove perspektive, strategija se smatra smišljenim procesom planiranja, iniciranom na vrhu menadžment, zasnovan na elaboratnoj analizi industrije i ima za cilj dizajniranje kohezivne strategije, osigurava da organizacija ima odgovarajuće strukture, procese i kulturu ili način razmišljanja, kako bi sproveli program promjena (Stoney, 2001).

Strateško liderstvo se odnosi na sposobnost lidera da artikulira stratešku viziju kompanije i da motiviše druge da kupe tu viziju. Lideri formuliraju odgovarajuće strategije za

implementaciju od strane rukovodnih timova sa struktuiranim mehanizmima praćenja i evaluacije. U današnjem okruženju dinamični lideri usmeravaju svoje organizacije ka postizanju unapred utvrđenu viziju i strategiju koja odgovara promenama koje nisu bile predviđene u fazi planiranja.

Pobednička strategija se mora uklapati u spoljnu i unutrašnju situaciju kompanije, izgraditi održivu konkurentsku prednost i poboljšati performanse. Uspeh u organizaciji može se pripisati kombinaciji faktora koji uključuju efikasno strateško menadžiranje karakterizirano izradom, izvršavanjem i praćenjem ključnih strategija. Da bi se ovo postiglo, organizacije zahtijevaju odgovarajuće strateške procese - planiranje, efikasno liderstvo, posvećeni tim menadžment, jasne strukture za implementaciju i jaku korporacijsku kulturu.

Ekonomski i tehnološki razvoj u poslednjih nekoliko godina naglašava neočekivane izazove i promene, a kompanije koje žele prosperitet u tako promenljivom globalnom poslovnom okruženju imaju potrebu za strategiskom liderstvom više nego ikada ranije (Pearce & Robinson, 2003). Liderstvo i menadžment nastavili su da budu od velikog značaja za uspeh preduzeća. S obzirom na povećanje turbulencije u okolini, strateška pitanja planiranja i implementiranja organizacijske strategije pojavljuju se s većom frekvencijom. Takođe se dovodi u pitanje ravnoteža moći i odlučivanja između onih lidera i sledbenika. Performanse firme su veoma zavisne od strateškog liderstva. Potrebno je sprovesti još empirijska istraživanja za potvrđivanje odnosa u ovoj oblasti. U strategiskom liderstvu, naglasak je na treniranje i mentoriranje budućih generacija lidera od kojih se očekuje da će osigurati korporativne performanse na promjenama paradigmi koje su uzrokovale promjene u društvu.

3.1. TRANSFORMACISKO LIDERSTVO

Liderstvo se može koncipirati i mjeriti na različite načine. Moguće je razdvojiti dvije široke kategorije:

1. Liderstvo kao fenomen, koje se odnosi na to da li se pojedinci smatraju liderima bez informacija o njenoj efikasnosti, (Lord, 1986).
2. Efikasnost liderstva, koji se odnosi se na uspeh lidera u uticaju i usmeravanju aktivnosti na postizanje strateških ciljeva (Stogdill, 1950).

Bas i Avolio sugerišu da efektivnost lidera treba meriti kroz sposobnost lidera da primjenjuju savremene motivacijske stilove liderstva, utičući na podređene. Jedan od ovih vodećih stilova je transformacijski, kao jedan od najuticajnijih stilova danas, predstavljen kroz Basovu teoriju liderstva, (Bass, 1990). Ova teorija uspela je odgovoriti na pitanje efikasnog, aktivnog i uspješnog vođstva. Snaga transformacijskog liderstva je da lideri koriste principe i moralne vrednosti koje transformišu lidere i sledbenike. Lider ispunjava više motive sledbenika, naročito potrebu za samo-aktualizacijom, što dovodi do međusobne stimulacije koja pretvara sledbenike u lidere i razvija lidere u agente promjena.

Transformacijsko liderstvo se razlikuje od drugih oblika postavljanje ciljeva, jer ima jasnu i izazovnu sliku koju nudi novi način poboljšanja rada, pozivajući na tradiciji i uključujući promene prihvatljive ljudima. Ovo liderstvo provocira emocije i energiju ljudi i može stvoriti entuzijazam koji vraća energiju i posvećenost radu. Transformacijski stil liderstva ima inspirativne karakteristike koje se fokusiraju na vrednosti koje se mogu postići vizuelnom prezentacijom. Poželjne vizije drže korak sa vremenom i okolnostima i odražavaju

jedinstvenost organizacije, ljudi u organizaciji moraju da veruju da se vizija može postići, a moraju biti predstavljeni izazovi koji se mogu prevazići. Vizija koja ima jasnu artikulaciju i može se vizuelno izraziti može lako biti prihvatljiva za ljude.

3.1.1. Emocionalna inteligencija i uspješno liderstvo

Koncept emocionalne inteligencije, predstavljen emocionalnim i društvenim kompetencijama, je komponenta uspješnog liderstva. Brojni empirijski dokazi su potvrdili da je visoki nivo emocionalne inteligencije lidera u vezi sa uspešnom organizacionom strategijom koja obezbeđuje konkurentnu prenost (Palmer, 2001). Goleman navodi da osobe sa visoko razvijenim emocionalnim sposobnostima koje poznaju svoja osećanja, prepoznaju i efikasno reaguju na emocije drugih ljudi, imaju prednost u strategiskom liderstvu, (Goleman, 1998).

Uspešni lideri bi trebalo da poseduju emocionalnu i socijalnu kompetentnost kako bi mogli kreirati i izraziti stvarnu, kredibilnu i atraktivnu viziju budućnosti organizacije koja nadmašuje sadašnju situaciju i kako bi olakšali humanim resursima da se uključe u procese promene. Transformacioni lider ima razvijenu emocionalnu inteligenciju koja je izvor energije koja poziva na uključivanje svih resursa, veština i talenata. Transformacioni lider poseduje socijalne kompetencije kako bi motivisao ljude na dugoročne ciljeve, vidi pojedinačne ljude u grupi i objašnjava ciljeve organizacije na način koji će osigurati njihovu podršku. Kada se identifikuje vizija, ovi lideri imaju tri kompetencije koje su povezane s efikasnosti njihovih vizionarskih uloga, a to su: sposobnost da objasni viziju drugima, sposobnost da izrazi viziju verbalno i ponašanjem i veštine proširiti viziju u različite kontekste liderstva. Emocionalno inteligentni lider je vizionar koji nudi izazovnu ideju kako organizacija treba izgledati u budućnosti (Du Brin, 1995).

4. EMPIRISKI DEO

Pojava istraživanja u ovom radu je strateško liderstvo koje je efikasno za promene i inovacije. Lideri su najvažniji faktori da li će i kako će se strateške promjene sprovesti. Stil liderstva utiče na procese definisanja, modernizacije i implementacije strategija u uslovima promjena. Različiti stilovi liderstva, posebno suvremeni su u velikoj meri uslovljeni emocionalnom inteligencijom lidera. Suvremeni prilazi teorijskih studija govore o transformacionom stilu liderstva, koji se smatra pogodan za strategijski menadžment u savremenim uslovima, a koji je povezan sa emocionalne inteligencije lidera.

Problem istraživanja ovog rada je koliko emocionalna kompetentnost lidera utiče na kvalitet strateškog liderstva i na strateški menadžment. Problem može biti formulisana sa pitanjem: Da li će poboljšanje emocionalne inteligencije menadžera/ lidera dovesti do poboljšanja kvaliteta strategiskog liderstva? Svi naučni nalazi govore da se transformaciono liderstvo razlikuje od klasičnih stilova u odnosu na indikatore uspešnog strateškog upravljanja. Dokazano je da transformacioni stil liderstva pozitivno korelira sa inicijativom, inovacijama i rukovanjem u nepoznatim situacijama. U suštini, zainteresovani smo dali emocionalne kompetencije lidera utiču na preferiranje transformacionog liderstva, koje je efikasno u formuliranju i realizaciji organizacione strategije. Da bi odgovorili na problem istraživanja neophodno je empirijski potvrditi postojanje povezanosti emocionalne inteligencije lidera sa sposobnošću primene transformacionog stila liderstva.

4.1. METODOLOGIJA ISTRAŽIVANJA

Problem uticaja emocionalne inteligencije na preferencije uspešnih i manje uspešnih strategiskih liderskih stilova zahteva njegovu empirijsku potvrdu i određuje predmeta istraživanja. Premet istraživanja je određivanje odnosa emocionalne inteligencije, koja je predstavljena emocionalnim kompetencijama: samosvesti, samokontrole, samopouzdanja i društvene svesti u preferiranju transformacijskog stila liderstva.

U radu su istraživne sledeće relacije:

1. Određivanje stepena zastupljenosti transformacijskog stila strategiskog liderstva među menadžerima
2. Određivanje nivoa zastupljenosti emocionalne inteligencije među menadžerima u ispitivanim organizacijama.
3. Određivanje nivoa povezanosti između stilova strategiskog liderstva i emocionalne kompetentnosti lidera.

Uzorak od 65 ispitanika na menadžerskim pozicijama iz srednjih i velikih proizvodnih organizacija u Republici Makedoniji je služio kao predmet ove studije.

Merni instrumenti za utvrđivanje varijabli su sledeći validirani i standardizovani psihološki instrumenti:

- Da bi se odredio stepen zastupljenosti stila strategiskog liderstva primenjen je multifaktorska upitnik za merenje nivoa zastupljenosti transformacijskog stila liderstva - MUK (MLQ, Avolio, 2001).
- Da bi se odredio stepen zastupljenosti emocionalne inteligencije primenjen je upitnik za merenje emocionalne kompetencije - Upitnik emocionalne kompetencije (UEK -45 Takšić, 1998)

4.1. 2. Ciljevi istraživanja

Osnovni cilj istraživanja je zasnovan na dijagnosticiranje situacije u vezi sa preferencije stilova strategiskog liderstva koje su pod uticajem nivoa emocionalne inteligencije, u izgradnji institucionalnih strategija za poboljšanje kvaliteta upravljanja u organizacijama. Cilj je da se utvrdi odnos između emocionalne inteligencije i strateških liderskih stilova menadžera u organizacijama. Krajnji cilj je zapravo da se naglasi značaj emocionalne inteligencije menadžera u procesu strateškog liderstva. Istraživanje počinje iz pretpostavke da postoji veza između stepena razvijenosti emocionalne inteligencije lidera i efektivno stila strateškog liderstva. Takođe se pretpostavlja da je ova veza različita u različitim stilovima upravljanja, odnosno liderstvu. Opšta hipoteza ovog rada glasi: Postoji veza između stepena razvijenosti emocionalne inteligencije lidera i transformacijskog liderstva, kao efektivnog stila strateškog liderstva.

5. REZULTATI I INTEPRETACIJA

Prikazivanje rezultata je predstavljen statističkom analizom podataka dobivene odgovorima na upitnike i testove koji su zadati ispitanicima. Ispitivanje odnosa između dve

varijable: emocionalna inteligencija (koja zastupa tri emocionalne kompetencije: samosvesti, samopoštovanje i samokontrole) i transformacijskom stilu liderstva, vrši se određivanjem višestruke korelacije. Izračunava se multipla korelacija između zavisne varijable - transformacijski stil strategijskog liderstva, predstavljeni kao prosek dobijenih rezultata u merenju četiri subskala transformacijskog stila liderstva i prediktorima koje predstavljaju emocionalnu inteligenciju: samosvest, samopoštovanje, samokontrola. Pored višestruke korelacije izračunata je i korelacija između svake emocionalne kompetencije sa rezultatima merenja o nivou zastupljenosti transformacijskog stila liderstva.

U tabeli koja sledi prikazuje se korelacija između transformacijskog stila liderstva (kolona 1) i tri pojedinačne prediktore: samosvesti (kolona 2), samopoštovanje (kolona 3), samokontrola (kolona 4) i interkorelacije između prediktora.

Tablica 1. Korelacije između rezultata stepena zastupljenosti transformacionog liderstva i rezultata razvijenosti emocionalnih kompetencija: samosvesti, samopoštovanje i samokontrole, i interkolacije između njih.

	Transformacijsko liderstvo	Samo svest	Samo poštovanje	Samo kontrola
Transformacijsko liderstvo	1			
Samosvest	0,33***	1		
Samopoštovanje	0,41***	0,41	1	
Samokontrola	0,50***	0,38	0,32	1

Značenje *** 0,001; ** 0,01; * 0,05; alfa = 0,05

Rezultati statističke analize su pokazali statistički značajnu povezanost nivoa zastupljenosti transformacionog liderstva sa rezultatima emocionalne inteligencije sa tri prediktora: samosvest, samopouzdanje i samokontrole. Koeficijent multiple korelacije $r = 0.58$ je statistički značajna na nivou 0,001 ($p < 0,001$).

Tablica 2. Višestruka korelacija između rezultata stepena razvijenosti emocionalnih kompetencija: samosvesnosti, samopoštovanja i samokontrole i tanceforacijskog stila liderstva

Broj ispitanika	Koef. multiple korekacija	Koef. determinacije	Varijansa	Koef. efikasnosti	Standardna greška
N	R	r^2	%	E	T
65	0,58***	0,34	34%.	18,5 %	0,06

Značenje *** 0,001; ** 0,01; * 0,05; alfa = 0,05

Statističke analize koeficijenta determinacije omogućava utvrđivanje procenata kojim emocionalne kompetencije učestvuju u određivanju varijanse transformacijskog liderstva. Rezultati prikazani u tablici 2 pokazuju da koeficijent determinacije za tri prediktora emocionalne inteligencije zajedno: samosvesnosti, samopoštovanja i samokontrole iznosi $r^2 = 0,34$. To znači da se 34 procenata varijanse transformacijskog liderstva može objasniti emocionalnim kompetencijama: samosvesti, samokontrole i samopoštovanja, kada se

posmatraju zajedno. Ovi statistički pokazatelji ukazuju da lideri sa višim stepenom razvijenosti emocionalne inteligencije preferiraju transformacijsko strategijsko liderstvo.

6. ZAKLJUČAK

Značaj liderstva kako fenomena i njegovo učešće u strategiskom, ekonomskom i društvenom smislu, zahteva proučavanje interakcije ličnosti i drugih sredinskih i razvojnih faktora. Povezanost ličnosti lidera i njegove emocionalne kompetentnosti za efektivne organizacione strategije je neosporna. To je potvrđeno i u ovom istraživanju, o povezanosti emocionalnih kompetencija lidera i transformacijskog liderstva. Hipoteza o odnosu između emocionalne inteligencije lidera i efektivnog strategijskog liderstva koji je predstavljen sa transformacijskog liderstva je potvrđeno postojanjem visoke korelacije između emocionalne inteligencija i stepena zastastupljenosti transformacionog liderskog stila. Menadžeri sa višim nivoima razvoja emocionalne inteligencije preferiraju transformacijski stil vođstva, što je potvrđeno visokim koeficijentom determinacije 34% emocionalnih kompetencija. Indeks efikasnosti je definisan kao procenat smanjenja grešku u predviđanju za povezanosti varijabli, koi iznosi $E=18.5\%$. To znači da je veličina greške u predviđanju transformacijskog stila liderstva zasnovane na znanju nivoa razvoja kompetencija emocionalne inteligencije je 18.5% manje u odnosu na greške u predviđanju kada nema saznanja o vrednostima emocionalne inteligencije.

Prema ovim rezultatima može se očekivati da će lideri sa visokim stepenom razvijenosti emocionalne kompetencije preferirati efektivne stilove strategijskog liderstva. Ovi nalazi potvrđuju prediktivnu validnost emocionalne kompetentnosti lidera za efektivno strtegjsko liderstvo, što odgovara brojnim nalazima sličnih istraživanja. Ovi empirijski nalazi pružaju snažnu podršku budućim perspektivama lidera, kada su njihove kompetencije u skladu sa navedenom modelu emocionalne inteligencije.

Preostaje da se ova povezanost doistraži i da se dokazuje uticaj na uspešnost liderstva u različitim situacijama. Kako postoji veliki broj konstrukta i teorija, pred istraživača se postavljaju važna pitanja kada je reč o onosu ličnosti lidera, strategijskog menadžmenta i liderstva.

REFERENCE

1. Bass, B. M., *Transformational Leadership: Industrial, Military and Educational Impact*. London: Lawrence Erlbaum Associates, 1990.
2. Bass B. M, & Avolio, B. J Introduction. In BM Bass and BJ Avolio (Eds New York: The free press, 1994.
3. Bush, T., *Theories of education management*, London: P. Chapman, 1995.
4. Barling, J., Slater, F., Kelloway E. K., *Transformational leadership and emotional intelligence: an exploratory study*, *Leadership and Organization Development Journal*, 2000.
5. Du Brin, A. J *Leadership*, Houghton Mifflin, London, 1995.
6. Goleman, D., Boyatzis, R., McKee, A., *Primal Leadership, Reali-zing the power of emotional intelligence*. Boston: Harvard Business Review Press. 2002.
7. Gardner, L., & Stough, C. (2001). Emotional intelligence in senior level managers. *Leadership and Organization, Development Journal*, (2001), 23 (2), 68-78.

8. Salvoley, P.; Bedell, B.; Detweiler, J. B.; Mayer, J. D., "Coping intelligently: emotional intelligence and the coping process", U: Snyder, C. R. (ur.), *The Psychology of What Works*, vol. 1: Oxford University Press, New York, (1999.). 388-399
9. Stoney, C., "Strategic Management or Strategic Typology? A Case Study into Change within a Local U.K. Local authority", *The International Journal of Public Sector Management*, Vol.14, No.1, (2001). pp. 27-42.
10. Palmer, B., Walls, M.; Burgess, Z.; Stough, C., "Emotional intelligence and effective leadership", *Leadership and Organization Development Journal*, (2001). (22),
11. Pearce, J. A., & Robinson Jr., R. B., *Strategic Management: Formulation, Implementation and Control*. 8th Edition, Business Week, McGraw-Hill Companies Inc., New York, N.Y.2003.
12. Takšić, V., "Validacija konstrukta emocionalne inteligencije. Doktorska disertacija. Zagreb: Odsjek za psihologiju Filozofskog fakulteta, Zagreb, 1998.
13. Kotevska-Dimovska, M., Kevreski, Lj., "Emocionalna inteligencija Nova vizija liderstva, Bitola: Graphoprom, 2017.
14. Yukl. G., A, *Leadership in organizations*. London: Prentice Hall,1998.



CHALLENGES OF PUBLISHING FOR SCIENTIFIC WORKERS IN DEVELOPING COUNTRIES: THE CASE OF SERBIAN ACADEMICS

Milica Arsić, Ivan Jovanović

University of Belgrade, Technical Faculty in Bor, Engineering Management Department, Serbia

Abstract: In the last decades researchers did not feel the pressure like they feel today regarding publishing their results in international journals. Having in mind that large part of the world's research community do not use English as their mother language, it is not surprising that their English is not so good compared to someone to whom English is native, and in many cases they have major problems in writing papers that are acceptable to international editors. This paper presents the results of the research conducted in Serbia, which reflect the perception of Serbian researchers regarding the existence of discrimination against those whom English is not a native language and also other barriers they face with when they want to publish their papers. The aim of this study was to investigate whether the scientific community in Serbia consider to be discriminated by the editors and reviewers, because of the fact that their English is not their mother language or they believe that only quality of results affects the decision on the acceptance or rejection of a work.

Keywords: English for research purposes, publishing papers, international journals

1. UVOD

U sve konkurentnijem i međuzavisnom svetu, objavljivanje časopisa u zemljama u razvoju se suočava s nizom problema u poređenju s časopisima objavljenim u industrijalizovanom svetu [1]. Prvi problem je da ukoliko bi radovi u pomenutim časopisima bili pisani na lokalnim jezicima, onda bi retko kada bili viđeni ili komentarisani od strane šire naučne javnosti. Tada bi oni bili nevidljivi, a stručnjaci bi bili uskraćeni za akademsko napredovanje. Drugi problem lokalnih časopisa je da je njihova čitalačka publika veoma mala i da jedva prevazilazi nacionalne granice. Ove časopise po pravilu, nažalost, čitaju samo oni koji ih i objavljuju. Iz pomenutih razloga, vodeći naučnici iz zemalja u razvoju ne objavljuju u tim časopisima, čak ih i retko kada konsultuju, jer su svesni mnogih njihovih uredničkih i tehničkih nedostataka. Da bi se bolje shvatio razlog nedostataka objavljenih naučnih radova iz zemalja u razvoju, koji nisu samo u interesu nauke, već su i od suštinskog značaja za promovisanje ekonomskog i društvenog razvoja perifernih regiona u svetu, moramo da posmatramo širu sliku. Postoji jaka veza između nauke i tehnološkog razvoja s jedne, i ekonomskog razvoja s druge strane [2, 3]. Naučni svet, podeljen u one koje “imaju” (industrijalizovani svet) i oni koji “nemaju” (zemlje u razvoju), je značajno nejednak u pogledu obima i izrade naučnih radova. Štaviše jaz između onih koji “imaju” i onih koji “nemaju” nije samo drastično evidentan nego se konstantno proširuje [1, 4, 5].

Za naučnike iz zemalja u razvoju, koji su daleko od elitnih akademskih institucija, postoje brojne nevolje i prepreke sa kojima se suočavaju prilikom objavljivanja radova u uglednim naučnim časopisima. Nekoliko njih je nabrojano:

Nedostatak poznavanja engleskog jezika kao maternjeg jezika;

Nedostatak budžeta za specijalizovano osoblje;

Nedostatak stručne pomoći od izdavača, konsultanata, profesionalnih prevodioca [6] koji su takođe previše skupi.

Tvrđi se da je engleski jezik kao maternji i engleski jezik kao nematernji jezik u akademskim krugovima postao prilično problematičan, a njegova korist, važnost i povezanost se dovodi u pitanje [7, 8, 9, 10, 11]. Glavni argument je, da je stepen iskustva i ekspertize u akademskom objavljivanju i nivo znanja u pojedinim oblastima akademskog delovanja (npr. početnik protiv stručnog naučnika) mnogo važniji od položaja istraživača kome je engleski jezik maternji jezik i istraživača kome engleski jezik nije maternji jezik.

Baš kao što zemlje u razvoju ne formiraju homogenu grupu, tako ni istraživači kojima engleski jezik nije maternji jezik nije homogen. Postoje istraživači kojima engleski jezik nije maternji jezik i u razvijenim zemljama, kao i u nerazvijenim zemljama. Preciznije, dodatno treba napraviti razliku između onih “privilegovanih” kojima engleski jezik nije maternji jezik, a koji su proveli određeno vreme u području zemlje gde se govori engleski jezik i/ili onih koji su članovi prestižne međunarodno poznate istraživačke grupe s jedne strane, i onih koji nikada nisu napustili svoju zemlju s druge strane i/ili nemaju priliku da sprovedu istraživanja pod nadzorom i mentorstvom međunarodnih naučnika. Očigledno je, da će ovima iz druge grupe pisanje naučno-akademskih radova na engleskom jeziku biti malo teže i da im je potrebno više vremena u odnosu na naučnike koji tečno govore engleski jezik.

Nekoliko skorašnjih studija iz različitih disciplina pruža jasne dokaze o favorizovanju naučnika iz SAD, kao i engleskih govornih zemalja izvan Sjedinjenih Američkih Država, i prestižnih akademskih institucija [12]. Za razliku od toga pojedini autori sugerišu da nema dokaza o diskriminaciji nematernjeg engleskog jezika i njegove potčinjenosti, iako pojedini izvori informacija sa sigurnošću mogu potvrditi da postoji takva diskriminacija.

Treba istaći, međutim, da se osećaj nedostatka poznavanja engleskog jezika različito izražava prema naučnom centru, gde engleski jezik nije maternji jezik. Istraživanja koja su sprovedli Murray i Dingwall [13] i Truchota [14], jasno ukazuju da švajcarski i nemački naučnici ne osećaju da dominacija engleskog jezika predstavlja smetnju njihovim karijerama, što bi bilo za očekivati iz političkih i istorijskih razloga, dok sa druge strane Francuzi imaju taj osećaj [11].

U protekloj deceniji, upotreba zajedničkog jezika u istraživačkoj komunikaciji dovela je do naučne diskusije o napredovanju engleskog jezika, kao zajedničkog jezika za objavljivanje naučnih radova i širenja znanja tog istog jezika. U radu, sprovedenom u Rumuniji, ispitani su neki aspekti izrade istraživanja i širenja znanja akademske zajednice u rumunskim visokoškolskim ustanovama i istražen odnos rumunskih akademaca prema upotrebi engleskog jezika za potrebe tih istraživanja [1].

U ovom radu, želja autora bila je da ukažu na potpune razlike i nejednakosti koje postoje u svetu objavljenih naučnih radova i na činjenicu, da se jaz između bogatih (razvijenih i centralnih) zemalja i siromašnih (zemlje u razvoju i tranzitne zemlje) sve više proširuje. Cilj rada je da se ukaže na probleme autora koji koriste engleski jezik kao dodatni jezik prilikom objavljivanja naučnih radova u međunarodnim časopisima.

2. METODOLOGIJA

Cilj istraživanja bio je da se ispita mišljenje akademske zajednice u Srbiji, vezano za objavljivanje radova u međunarodnim naučnim časopisima i korišćenja engleskog jezika kao univerzalnog jezika za akademsku komunikaciju.

Korišćen je upitnik koji je dizajnirao Ferguson sa saradnicima [15], koji je zatim prilagođen lokalnim uslovima. Za gradaciju dobijenih odgovora korišćena je Likertova petostepena skala, gde 1 označava ‘potpuno se ne slažem’, 5 ‘potpuno se slažem’.

Na samom početku istraživanja, ideja je bila da se on-line upitnik distribuira što većem broju istraživača. Mail adrese istraživača i profesora preuzete su sa zvaničnih sajtova fakulteta. Poslato je preko 800 mailova, međutim odgovorilo je svega 204 njih, tako da je procenat vraćenih maliova bio manji od 25,5%. U Tabeli 1 prikazan je procenat učesnika po akademskim zvanjima.

Tabela 1. Pregled akademskih zvanja

Akadska zvanja	Ukupan broj	Procenat
Redovni profesor	38	18,6
Vanredni profesor	30	14,7
Docent	60	29,4
Asistent	58	28,4
Istraživač saradnik	18	8,8
Ukupno	204	100

Iz Tabele 1 može se videti da je u istraživanju učestvovalo najviše docenata (29,4%), a najmanje istraživača saradnika, svega 8,8%.

3. REZULTATI ISTRAŽIVANJA

Sledeće pitanje u anketi bilo je “nivo poznavanja engleskog jezika”. Od istraživača se tražilo da sami odrede nivo poznavanja engleskog jezika i to za sve tri veštine: čitanje, pisanje i komunikacija. Rezultati su prikazani u Tabeli 2.

Tabela 2. Poznavanja engleskog jezika (u %)

	Čitanje	Pisanje	Komunikacija
Odlično	2,0	7,8	5,9
Vrlo dobro	9,8	19,6	27,5
Zadovoljavajuće	37,3	32,4	36,3
Loše	51,0	40,2	30,4
Ukupno	100	100	100

Na osnovu rezultata prikazanih u Tabeli 2, može se zaključiti da je najveći broj ispitanika sebe ocenio ocenama “loše” i “zadovoljavajuće” kada su u pitanju veštine čitanja i pisanja (skoro 90%).

U Tabeli 3 prikazani su odgovori ispitanika na pitanje “Da li smatraju da dominacija engleskog jezika daje prednost akademcima kojima je engleski maternji jezik”. Čak 73,6% ispitanika složilo se sa ovom konstatacijom, dok 21,6% njih smatra da ova grupa akademaca nema prednost u odnosu na ostale.

Tabela 3. Dominacija engleskog jezika kao međunarodnog jezika akademske komunikacije koja daje prednost akademcima kojima je engleski jezik maternji jezik.

Odgovor	Procenat	Kumulativ %
Potpuno se ne slažem	5,9	
Ne slažem se	15,7	21,6
Nemam mišljenje	4,9	
Slažem se	46,5	73,6
Potpuno se slažem	27,5	
Ukupno	100	

Na pitanje “Da li dominacija engleskog jezika kao međunarodnog jezika akademske komunikacije daje nepravednu prednost akademcima kojima je engleski jezik maternji jezik” 39,2% ispitanika se ne slaže ili potpuno ne slaže sa sa ovom konstatacijom.

S druge strane, gotovo 37,3% ispitanika se složilo ili potpuno složilo da engleski jezik daje nepravednu prednost akademcima kojima je engleski jezik maternji jezik.

Tabela 4. Dominacija engleskog jezika kao međunarodnog jezika akademske komunikacije daje nepravednu prednost akademcima kojima je engleski jezik maternji jezik.

Frekvencija	Procenat	Kumulativ %
Potpuno se ne slažem	7,8	39,2
Ne slažem se	31,4	
Nemam mišljenje	23,5	
Slažem se	20,6	37,3
Potpuno se slažem	16,7	
Ukupno	100	

Iako je 37,3% ispitanika izjavilo da se slaže ili potpuno slaže, da dominacija engleskog jezika daje nepravednu prednost akademcima kojima je engleski jezik maternji jezik, 67,7% ispitanika se slaže ili potpuno slaže da je lično osetilo veću prednost nego nedostatak zbog toga što je engleski jezik međunarodni jezik za akademsku komunikaciju. Rezultati su prikazani u Tabeli 5.

Tabela 5. Lični osećaj prednosti nego nedostatak zbog toga što je engleski jezik međunarodni jezik za akademsku komunikaciju.

Frekvencija	Procenat	Kumulativ %
Potpuno se ne slažem	6,9	20,6
Ne slažem se	13,7	
Nemam mišljenje	11,8	
Slažem se	51,0	67,7
Potpuno se slažem	16,7	
Ukupno	100	

Na pitanje da li urednici međunarodnih časopisa razumeju problem sa kojima se suočavaju istraživači čiji maternji jezik nije engleski, svega 18,6% njih smatra da urednici imaju razumevanja, a preko 50% njih se ne slaže sa ovakvom tvrdnjom.

Tabela 6. Urednici međunarodnih časopisa razumeju poteškoće sa kojima se suočavaju naučnici čiji maternji jezik nije engleski jezik.

Frekvencija	Procenat	Kumulativ %
Potpuno se ne slažem	6,9	
Ne slažem se	52,0	58,8
Nemam mišljenje	22,5	
Slažem se	17,6	18,6
Potpuno se slažem	1,0	
Ukupno	100	

Na pitanje da li smatraju da bi trebalo da postoji univerzalan jezik za međunarodnu akademsku komunikaciju 48% ispitanika je odgovorilo potvrdno, dok 24,5% smatra da nema potrebe za univerzalnim jezikom.

Tabela 8. Postoji potreba za samo jednim međunarodnim jezikom za akademsku komunikaciju

Frekvencija	Procenat	Kumulativ %
Potpuno se ne slažem	5,9	24,5
Ne slažem se	18,6	
Nemam mišljenje	27,5	
Slažem se	34,3	48
Potpuno se slažem	13,7	
Ukupno	100	

4. DISKUSIJA

Prema kriterijumima za sticanje naučnih zvanja istraživači u Srbiji su u obavezi da objavljuju radove u časopisima sa JCR i SCI liste. Razlog tome je da bi njihov rad bio vidljiv svim istraživačima koji se bave sličnom tematikom, a sa druge strane, želja fakulteta i univerziteta da postignu što bolje poziciju na listi najbolje rangiranih fakulteta i univerziteta u svetu. Jezik koji se najčešće koristi za objavljivanje radova je engleski jezik, s obzirom na to da najveći deo istraživačke populacije u svetu najbolje vlada engleskim jezikom, mada vrlo često možemo naći i međunarodne časopise u kojima je francuski dominantan jezik. Naravno da u svakoj zemlji postoje i nacionalni časopisi u kojima se radovi objavljuju na lokalnom jeziku, ali je njihova vidljivost manja i svedena je na granice date države. Međutim, ako istraživač želi da bude svetski priznat i da čuje mišljenje šire naučne zajednice onda njegov rad mora biti objavljen na nekom od svetskih jezika, po mogućstvu da to bude engleski. Tu dolazi do problema, jer vrlo često se dešava da zbog lošeg engleskog jezika čitavi radovi ne budu uopšte uzeti u razmatranje ili poslani na recenziju, čak iako su u pitanju vrhunski rezultati u datoj oblasti. Zbog toga se i nameće pitanje da li su naučnici u zemljama van engleskog govornog područja u podređenom položaju po pitanju objavljivanja radova u međunarodnim časopisima!?

Istraživanje čiji su rezultati prikazani u ovom radu sprovedeno je u periodu od juna do oktobra 2016. godine u Srbiji, putem on-line upitnika. U istraživanju su učestvovali istraživači i naučni radnici sa fakulteta svih univerziteta u Srbiji. Upitnik je poslat na elektronske adrese istraživača sa svih fakulteta i univerziteta u Srbiji, ali je nažalost procenat odgovora u odnosu na ukupan broj poslanih poruka (mailova) bio mali. Razlog tome možda leži u činjenici da je istraživanje obavljeno u periodu kada je većina istraživača bila na odmoru, no i pored toga dobijeni su značajni rezultati, koji oslikavaju mišljenje naučne zajednice po pitanju dominacije engleskog jezika kao jezika za međunarodnu akademsku komunikaciju.

Rezultati su pokazali da na osnovu samoevaluacije poznavanja veština čitanja, pisanja i komunikacije na engleskom jeziku, većina istraživača, skoro 90% njih je sebe ocenilo kao zadovoljavajuće ili loše. Na pitanje da li smatraju da istraživači sa engleskog govornog područja imaju nepravednu prednost u odnosu na druge, 37,3% njih se složilo ili potpuno složilo sa ovom tvrdnjom; ipak sa druge strane na pitanje da li osećaju ličnu prednost što je engleski jezik, jezik međunarodne komunikacije, čak 67,7% njih se složilo sa tom konstatacijom, što je u totalnoj nesaglasnosti sa prethodnom tvrdnjom.

Najčešći razlozi objavljivanja radova u međunarodnim časopisima su želja da se prikažu rezultati međunarodnoj zajednici i da rad bude međunarodno priznat. Takođe, veliku važnost prilikom odabira časopisa ima i obaveza istraživača zbog sticanja višeg zvanja, kao i veća vidljivost i citiranost rezultata. Faktori koji imaju malu važnost prilikom slanja jesu da se odgovori na poziv za slanje od strane institucija i urednika i želja da se poboljšaju sposobnosti pisanja radova na engleskom jeziku.

Interesantna je činjenica da kod većine pitanja poštoji kritična masa istraživača (njih skoro trećina) koji nemaju mišljenje, što je poražavajuće.

5. ZAKLJUČAK

Poznavanje engleskog jezika danas predstavlja imperativ za sve istraživača, s obzirom na to da bilo koji istraživački proces koji počinje listanjem literature zahteva vladanje engleskim jezikom. Ipak za mnoge od njih pisanje radova na engleskom jeziku je zaista složen proces i teško je očekivati da ti radovi budu kvalitetno napisani, kao što su radovi onih kojima je engleski jezik maternji jezik.

U poslednje vreme pokrenute su različite inicijative za pronalaženje nekih kompromisnih rešenja, koja bi pomogla istraživačima van engleskog govornog područja, u vidu posebnih recenzenata za engleski jezik, koji bi pružili pomoć u poboljšanju kvaliteta onih radova koji zaslužuju po svojoj sadržini da budu objavljeni. Postoje čak i posebni međunarodni časopisi koji za cilj imaju da skrenu pažnju na problem i na diskriminaciju koja postoji u odnosu na poznavanje engleskog jezika. Ti časopisi su i pokrenuti da bi se ispitalo mišljenje akademaca i analizirala veličina problema. Jedan od časopisa, *Journal of English for Academic Purposes*, nalazi se na SCI listi i ima veoma visok impakt faktor, što pokazuje veliku citiranost i to da su sa ovom temom upoznati oni koji bi o tome trebalo da odlučuju.

Nažalost, danas je i nauka, kao i sve u potrošačkom društvu, komercijalizovana. Časopisi i izdavačke kuće postale su mašine za zgrtanje novca. Ukoliko želite da objavite rad, za to treba odvojiti određenu količinu novca, koliko god da su rezultati interesantni ili epohalni. Većina tih časopisa nudi usluge recenzenata za engleski jezik čije usluge takođe treba platiti, tako da dolazimo do poražavajuće činjenice da bavljenje naukom u današnjem svetu predstavlja veoma skupu aktivnost, počevši od istraživanja pa do objavljivanja rezultata, i privilegiju bogatijih, što dodatno produbljuje jaz između razvijenih i nerazvijenih zemalja.

REFERENCE

1. Muresan L.M., Perez-Llantada C., *Journal of English for Academic Purposes*, 13, (2014), 53-64.
2. King D., *Nature*, 430, (2004), 311-316.
3. Man J.P., Weinkauff J.G., Tsang M., Sin D.D., *European Journal of Epidemiology*, 19, (2004), 811-817.
4. Marusic M., Marusic A., *Science Editor*, 23, (2000), 81-83.
5. Arunachalam S., *The global research village: a view from the periphery*. The University of Arizona, (2002).
6. Shashok K., *BMC Medical Research Methodology*, 8(8), (2008), 3.
7. Davies A., *The native speaker: Myth and reality*. Clevedon: Multilingual Matters, (2003).
8. Swales J. *Research genres: Explorations and applications*. Cambridge: Cambridge University Press, (2004).
9. Ferguson G., *Is English really a Tyrannosaurus rex? Scientific communication and the global spread of English*. In P. Duran Escrivano, G. Aguado de Cea, & A. M. Roldan Riejos (Eds.), *Reflections on language use in the academic context* (pp. 73-93). Madrid: Universidad, (2005).

10. Hwee L.S., *The Write Stuff*, 15(2), (2006), 47.
11. Ferguson G., *Revista de la Asociación Europea de Lenguas para Fines Específicos*, 13, (2007), 7-38.
12. Flowerdew J., *TESOL Quarterly*, 34(1), (2000), 127-150.
13. Murray H., Dingwall S., *The dominance of English as a language of science*, Berlin: Mouton de Gruyter, (2001).
14. Truchot C., *The dominance of English as a language of science*, Berlin: Mouton de Gruyter, (2001).
15. Ferguson G., Pérez-Llantada C., Plo R. *World Englishes*, 29(3), (2011), 41–59.



MODELLING ELECTRONIC TRUST USING BAYESIAN NETWORKS

Jelena D. Velimirovic¹, Aleksandar Janjic², Lazar Z. Velimirovic¹

¹*Mathematical Institute of the Serbian Academy of Sciences and Arts;*

²*Faculty of Electronic Engineering, University of Nis, Serbia*

Abstract: This paper discusses importance of trust in the context of digital economy. Even though electronic commerce continues to grow worldwide due to many of its advantages, it has not been fully adopted yet. The reason for some barriers in adopting e-commerce lies in potential customers who still perceive online setting as quite risky. Customers who have concerns related to sellers' IT infrastructure resilience, and secured and safe personal data, will hardly ever engage in e-transactions. The nature of trust is very subjective, complex and multi-faceted. Trust issues are not present only between buyers and sellers, but also between suppliers and sellers, trust in recommendations and references on certain products, etc. In this paper authors propose modelling trust using Bayesian networks and provide an illustrative example which is typical in online transactions.

Keywords: Trust model, electronic commerce, Bayesian networks, uncertainty, subjective

1. INTRODUCTION

Internet, along with cheap and easy-to-use technologies, redefined the ways organizations and individuals transact. Country economies are becoming globalized, and the world is starting to look like one big market without geographical borders, time differences, currencies, etc.

Electronic commerce adoption enables companies around the world to gain competitive advantage, break into new markets, and strengthen their strategic positions.

E-commerce has many advantages, but it also brings out issues related to privacy, security, and reliability. Buyers who hesitate adopting e-commerce question whether it is safe to engage in online transactions at all [1]. They are usually concerned with online opportunistic behavior which includes risky money transfers, privacy violation, or IT infrastructure breach [2-3].

Since online setting is still identified with risk, uncertainty and potential malicious actions, the concept of trust in this context is of paramount importance. Without trust, which relates to truthfulness, confidentiality, partnership, collaboration, and dependability, no online industry-consumer relationship will be possible.

The paper is organized as follows – after the introduction, in the second part, the concept of trust is defined which is followed by discussing digital trust and its importance. Part three deals with modelling trust and offers an illustrative example on trust evaluation. In the conclusion part some directions for future research are given.

2. TRUST IN DIGITAL ECONOMY

2.1. TRUST DEFINITIONS

Trust is the base of all society interactions on many levels. It is crucial for social, economic, and political relations. Its nature is multidimensional and highly subjective, therefore quite complex [4]

When we trust somebody, we believe in the reliability, truth, or ability of that person; we have faith in his or her competences, and we believe that our interaction will have a positive outcome.

In the context of electronic commerce, a buyer will trust a provider if he is able to deliver bought products on time and if these items are of desired quality. Other example may include trust in the process of registering on the website, ordering and paying for the goods which should be completely safe and confidential. If customers find that buying from a certain website is satisfying, they will come back in the future and become loyal customers. The more familiar they are with the provider and the process, the more trust they have in e-commerce in general.

The concept of trust has been addressed across many disciplines – psychology, economy, management, engineering, etc. However, one universally accepted definition has not come up yet [5-6].

From the probability point of view, the most adopted definition was created by the sociologist Diego Gambetta in which he says that "Trust is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he can monitor such action and in a context in which it affects its own action" [7].

Some trust definitions that can be found in literature are the following:

- a consumer's expectation that an online interaction will go securely, without vulnerabilities exploited or any harm done to the consumer [8].
- Trust in the online setting can be defined as a consumer's confidence in the provider's reliability and benevolence to deliver the desired product or service on time, and the website or platform to be able to perform the supposed functions [9].
- Trust can also be seen as belief of an agent, trustor, that the other agent, trustee, will act positively. This means that trust is characterized by the actions performed by the trustee and their effect on the trustor's own actions [10].

2.2. DIGITAL TRUST AND ITS IMPORTANCE

Some of the most important elements in our lives, such as education, work, health, and communication, have gone through great transformations thanks to rapid development of new technologies. The hyper-connected world we live in today offers instant data sharing and limitless business opportunities. Nowadays, in order to succeed in this emerging environment, enterprises must be creative, respond quickly, and grasp the opportunities for digital growth.

Traditional economy got its counterpart – a digital economy which is sometimes also called the New economy, the Internet economy or Web economy. Its first manifestation is e-

commerce which enabled trade between companies (B2B), between companies and consumers (B2C) and between private individuals or peers (peer-to-peer: P2P).

Trust, too, received its online version. This transition offered us choice to buy and sell globally and influenced new ways of building and receiving trust.

Suppliers want to be confident the seller's IT system is resilient, whereas customers want to be sure their personal information is safe. The company/seller is considered trustworthy if the customers buy products on their website or platform. If the purchase ends positively for the consumer, he will probably buy again from the same provider. This is one way of building trust between suppliers and sellers, or sellers and buyers.

Trust includes subjectivity and uncertainty, and it is very hard to measure it even though its calculation is highly desirable. Today trust presents the most important company value. Technology is crucial to create and build trust but technology alone is not enough, it is the suppliers-providers-buyers collaboration and participation that is responsible for generating digital trust.

One way of generating trust is online reviews or ratings on bought products that buyers leave on the e-commerce websites. After seeing reviews, potential buyers can make decisions whether to buy the product or not. Here the process of decision-making is influenced by their peers' experience and recommendations. People usually rely on their peers' word of mouth. Recently sellers have started to manipulate these reviews in order to increase sales by paying people to post false reviews of their products [11-12].

E-commerce needs certain improvements that include trustworthy recommendations, safe personal data and money transactions. The solution for these issues might be the blockchain technology.

Blockchain networks are decentralized which means that data are stored on multiple computers and servers worldwide. To control this network and violate stored data is almost impossible. This technology eliminated the need for banks to act as a transaction third party, meaning that banking fees are eliminated and only those parties that are actually doing transactions are present. It is a completely new way to transmit money from one person/organization to the next without using the traditional banking system. Due to its transparency and cost-effectiveness, blockchain offers more opportunity for building digital trust. If companies want to gain competitive advantage or improve their own financial performance, they should probably invest in blockchain technology because it has already reshaped doing business in today's dynamic environment.

3. MODELLING TRUST - SCENARIO

The measurement of trust is a key feature upon which all business interaction scenarios rely.

Literature shows that that this topic is being exhaustingly investigated by many researchers who offer various models for trust assessment [13-17].

Bayesian nets enable and facilitate modelling of complex decision problems in digital economy under uncertainty. It is a compact graphical framework representing interrelationships between the variables included in the considered problem. At the topological level, Bayesian net represents an acyclic directed network with nodes representing critical variables and the arcs representing their interrelationships.

In this paper, we propose a trust model based on Bayesian Network for calculating the overall trust that comes from two different sources – a provider/seller and peers/ratings. Let us suppose we want to buy a software from a big e-commerce platform which offers us

multiple providers/sellers of the software. Using Bayesian nets, we can evaluate trust which will help us making a decision on the best provider to buy the software from.

Figure 1 shows that an agent, in this case a buyer, builds two different kinds of trust in different agents - providers and peers. One is the trust in provider's competence to provide services. The other is the trust in peers' reliability to provide recommendations. Here the reliability includes two aspects: whether the agent, a peer, is truthful in telling its information and whether the agent, the provider, is trustworthy or not.

The provider is trustworthy if its supplier has the particular product a client wants to buy in stock, or if the product proves to be of desired quality, and it can be shipped immediately, and delivered as required; and if the provider's technology – its website or platform, is working properly and clients' personal data are safe.

Also, we can take into consideration ratings and reviews on the software our peers left on the website. The incomplete reviews were not considered reliable, only those left by registered users/buyers with detailed description or reviews on the product were taken into account. Other criteria can be set to value reliability of peers' recommendations.

For the trust assessment process, raters' credibility should be taken seriously due to possibilities of posting false ratings or other manipulative actions.

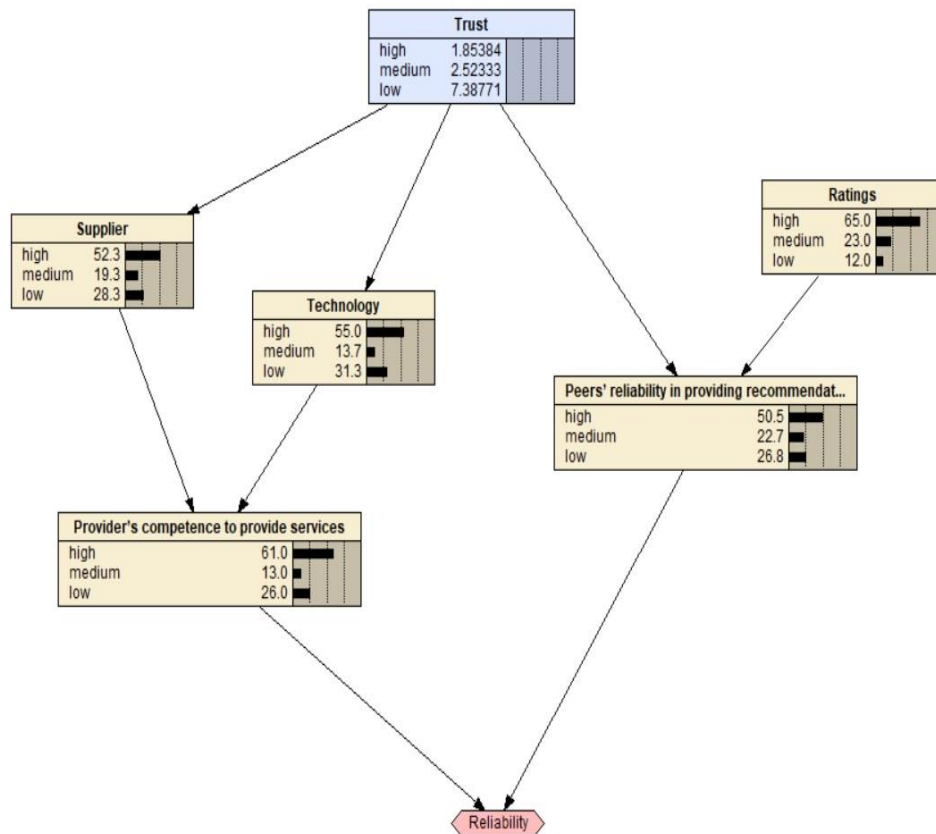


Figure 1. A Bayesian network model of trust

Figure 1 shows that we trust the provider if its supplier and technology are trustworthy, and we usually consider reliable ratings left by registered users with detailed description or experience on the product. Table 1 offers trust values from the reliability standpoint and shows that the highest trust we have in the most reliable providers and peers.

The lowest trust we have in providers with the lowest competence to provide services or in the most unreliable peers.

Table 1. Reliability values

Provider's competence to provide services	Peers' reliability in providing recommendations	Reliability
high	High	1
high	Medium	2
high	low	5
medium	High	3
medium	Medium	4
medium	Low	7
low	High	6
low	Medium	8
low	Low	10

4. CONCLUSION

This paper deals with the concept of trust in the context of electronic commerce. Having in mind that e-commerce is the growing industry worldwide, trust becomes dominant factor when making decisions on buying products online. We employed Bayesian networks method and included two different sources of trust – the provider's competence to provide services and peers' reliability to offer recommendations on the product.

Future research may include using others methods and more sources to assess trust in the online setting, as well as examining peers' credibility in more detailed way.

ACKNOWLEDGMENT

This work was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia through Mathematical Institute SASA under Grant III 42006 and Grant III44006.

REFERENCES

1. Grabner-Krauter, S., Kaluscha, E. A., Empirical research in online trust: A review and critical assessment, *International Journal of Human-Computer Studies*, 58, (2003). 783-812.
2. Lewicki, R. J., Bunker, B. B., Developing and Maintaining Trust in Working Relationships, In R. M. Kramer and T. Tyler (Eds.), *Trust in organizations*, Thousand Oaks, CA: Sage, (1996), 114–139.
3. Matthew, K.O., Turban, E., A Trust Model for Consumer Internet Shopping, *International Journal of Electronic Commerce*, 6(1), (2001), 75–91.

4. Zheng, Y., Silke H., Trust Modeling and Management: from Social Trust to Digital Trust, book chapter of Computer Security, Privacy and Politics: Current Issues, Challenges and Solutions, IGI Global, (2007).
5. Kim, D. J., Ferrin, D. L., Rao, H. R., A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents, *Decision Support Systems*, 44(2), (2008), 544–564.
6. Chang, W.-L., Diaz, A. N., Hung, P. C. K., Estimating trust value: A social network perspective. New York: Springer Science Media Mass, (2014).
7. Gambetta, D., Can We Trust Trust?, In *Trust: Making and Breaking Cooperative Relations*, D. Gambetta (ed.). Basil Blackwell. Oxford, (1990), 213-237.
8. Beldad, A., Jong, M., Steehouder, M., How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust, *Computers in Human Behavior*, 26, (2010), 857-869.
9. Thatcher, J. B., Carter, M., Li, X., Rong, G. A classification and investigation of trustees in B-to-C e-commerce: General vs. specific trust. *Communications of the Association for Information Systems*, 32, (2013), 107–134.
10. Stephen S. Y., Yang, L.T., et al., *Managing Trust in Distributed Agent Systems*, (Eds.): ATC 2006, LNCS 4158, (2006), 17 – 25.
11. Dellarocas, C., The digitization of word-of-mouth: promise and challenges of online reputation mechanism. *Management Science*, 49(10), (2003).
12. Lindgreen, A., Vanhamme, J., Viral marketing: The use of surprise, *Advances in electronic marketing*, (2006), 122-138.
13. Tan, L., Chi, C-H., Deng, J., Quantifying trust based on service level agreement for software as a service, In *Proceedings of IEEE International Computer Software and Applications Conference*, (2008).
14. Kalepu, S., Krishnaswamy, S., Loke, S. W., Reputation = f(User Ranking, Compliance, Verity), In *Proceedings of the IEEE International Conference on Web Services (ICWS'04)*, (2004).
15. Spanoudakis, G., LoPresti, S., Web service trust: Towards a dynamic assessment framework, In *Proceedings of the International Conference on Availability, Reliability and Security*, (2009).
16. Sherchan, W., Loke, S. W., Krishnaswamy, S., A fuzzy model for reasoning about reputation in web services, In *Proceedings of ACM Symposium on Applied Computing*, New York, ACM Press, (2006).
17. Wang Y., Vassileva, J., Bayesian network-based trust model, In *Proceedings of the IEEE International Conference on Web Intelligence (WI'03)*, (2003).



THE INFLUENCE OF ENTERPRISE RISK MANAGEMENT ON THE PERFORMANCE OF THE COMPANIES IN SERBIA

Marija Panić, Milica Arsić, Danijela Voza, Živan Živković

University of Belgrade, Technical Faculty in Bor, Engineering Management Department, Serbia

Abstract: Market position of the company has influence on its performances. In hazard conditions, all factors that determine companies' market position and business are exposed to risk. Effective program of enterprise risk management (ERM) decreases level of risk and improves companies' performances. Enterprise risk management (ERM) is a process that identifies and evaluates all potential losses than can occur in business organizations and selects techniques that are adequate to handle and prevent such losses, in accordance with the requirements of ISO 31 000. In this paper, seven hypotheses on the basis of which a theoretical model have been developed are defined, with the aim of examining how different sources of enterprise risk affect the operational performance of Serbian companies and the risk of losing market position. Statistical data processing was performed using the software packages SPSS v. 17 and LISREL v. 8.8.

Keywords: risk, performance of the company, ERM, ISO 31 000

1. UVOD

Efektivno upravljanje rizikom se smatra glavnom konkurentskom prednošću koja garantuje opstanak i uspeh kompanije u sve neizvesnijem poslovnom okruženju [1]. S obzirom da je neadekvatan sistem upravljanja rizikom postao problem od šireg socijalnog značaja, što je pokazala i globalna finansijska kriza 2008. godine, to je rezultovalo preporukama OECD i Evropske komisije da se uvedu neophodne promene u postojeće sisteme [2]. Kao rezultat svega toga mnoge organizacije su prešle sa tradicionalnog upravljanja rizikom, koji podrazumeva individualno tretiranje faktora rizika ne uzimajući u obzir njihovu moguću korelaciju, na korporativno upravljanje rizikom (u daljem tekstu: ERM – *Enterprise Risk Management*) koji sagledava sve rizike odjednom i ocenjuje ukupnu izloženost organizacije svim mogućim rizicima [3]. Nažalost, mali broj organizacija je prepoznalo značaj ERM pristupa na početku 21. veka i odbile su da ga uvedu. Sa druge strane, većina onih kompanija koje su uvele ERM proces učinile su to zato što su bile primorane od strane revizora, agencija za kreditni rejting ili nadležnih organa. Kakvu će poziciju imati ERM u okviru organizacije zavisi od stava top menadžera po tom pitanju. Ukoliko on ERM vidi kao stratešku funkciju, onda će na njenom čelu biti menadžer za upravljanje rizikom (CRO – *Chief Risk Officer*), koji će dalje biti odgovoran top menadžmentu.

Svrha uvođenja ERM postaje još očiglednija u kontekstu ukupne strategije organizacije: to je proces i alat koji pruža veću sigurnost top menadžmentu da će njihovi,

kako dugoročni, tako i kratkoročni planovi biti ispunjeni. Veza između ERM i strateškog planiranja je pravolinijska. Rezultati dugoročnog planiranja su sami po sebi neizvesni. Ti planovi su vrlo često predmet promena koje nastaju kao rezultat delovanja spoljnih faktora (političkih, ekonomskih, društvenih) u kombinaciji sa internim mogućnostima organizacije da se uspešno odupre njima.

2. LITERATURNI PREGLED I ISTRAŽIVAČKI MODEL

Uprkos tome što su članci o ERM objavljeni u brojnim biznis časopisima, naučna istraživanja na tu temu su još uvek malobrojna. Štaviše, ova naučna istraživanja su se uglavnom pojavljivala u časopisima o računovodstvu i finansijama, a retko u časopisima o menadžmentu. Osim radova autora Miller [4, 5] i Miller and Waller [6], integrisani pristup upravljanju rizikom od strane istraživača iz oblasti menadžmenta je veoma redak. Dok su se Colquitt i dr. [7] pozivali na „integrisano upravljanje rizikom“, prvi naučni radovi u kojima se pojavio termin ERM su se pojavili tek 2001. Empirijska istraživanja na temu ERM su bila isuviše spora da bi mogla da prouče mnoge koncepte koji se koriste u praksi. Većina literature se uglavnom bavi razmatranjem četiri tipa rizika: finansijski rizik, rizik hazarda, operativni rizik i strateški rizik [8, 9].

Istraživanje Kleffner-a i saradnika [10] se može smatrati pionirskom ERM-a. Istraživanje je fokusirano na javne kompanije u Kanadi u 2001. godini, i obuhvatilo je 336 ispitanika, koji su uglavnom bili zaduženi za upravljanje rizikom u tim kompanijama. Od ukupnog broja ispitanika, 118 kompanija (35%) je odgovorilo na upitnik, od toga 31% ili 37 bile su kompanije koje su usvojile ERM, 29% (34 kompanije) koje su razmišljale o mogućnosti uvođenja ERM i 40% (47 kompanija) koje ne primenjuju.

Neke studije su istraživale šta određuje aktivnosti preduzeća u pogledu upravljanja rizikom. Lienberg and Hoyt [11] su otkrili da snažne organizacije postavljaju *Chief Risk Officers* (CROs), što predstavlja indikator njihovog napora u upravljanju rizikom. Isti istraživači su se dalje bavili određivanjem faktora koji utiču na kompanije da se bave ERM. Uspeli su da identifikuju dve grupe faktora: interni faktori, kao što je maksimizacija bogatstva akcionara, i eksterni faktori, kao što su globalizacija, korporativno upravljanje i tehnološki progres. Rezultati njihovog istraživanja su pokazali značaj koji postojanje funkcije menadžera za upravljanje rizikom u organizaciji ima na potpunu implementaciju ERM. Autori su se i u svojim narednim istraživanjima intenzivno bavili problematikom ERM ispitujući determinante ERM-a i poboljšavanjem postojećih modela za njegovu implementaciju.

Hrvatski istraživači, Sprcic sa svojim saradnicima [12] pokušali su da razviju ERM indeks koji meri nivo kvaliteta ERM procesa u okviru kompanije, kao nivo razvoja ERM u posmatranim hrvatskim kompanijama. Rezultati su otkrili vrlo nizak nivo razvoja ERM procesa i to da su menadžeri u tim kompanijama pretežno orijentisani na identifikaciju i otklanjanje finansijskih i operativnih rizika, dok se mala pažnja posvećuje strateškim i drugim rizicima..

Quon i dr. [13] su istraživali vezu između ERM i performansi firme u 156 nefinansijskih kompanija tokom 2007. i 2008. godine. Ovaj period su analizirali, pre svega, zbog finansijske krize u 2008. i ekonomske recesije koja je usledila. Ispitivano je četrnaest različitih tipova rizika pod opštim kategorijama finansijskih, poslovnih i operativnih rizika. Rezultati njihove studije pokazali su da procenjeni nivo ekonomskog ili tržišnog rizika u organizaciji ne može da se dovede u vezu sa njenim performansama.

Dosadašnja istraživanja su se takođe slabo fokusirala na ERM razlike među preduzećima. Mikes [14] je ustanovio postojanje heterogenosti u razumevanju i

implementaciji ERM-a u zavisnosti od toga da li organizacija formalno kvantifikuje rizike ili koristi kvalitativne mere rizika.

Studija autora Yusuwan sa saradnicima [15] se fokusirala na praksu upravljanja rizikom u kompanijama u Maleziji. Sprovedenom studijom se došlo do zaključaka da upravljanje rizikom utiče na produktivnost, performanse, kvalitet i budžet projekata i da je upravljanje rizikom korisno primeniti za projekte za određenim karakteristikama kao što su nove tehnologije i da je pogodno za kompanije koje posluju u nestabilnom političkom okruženju.

Kako je već u prethodnom delu opisano učinjeni su značajni naponi da se identifikuju glavni faktori koji utiču na uspešnu implementaciju ERM u organizacijama, ali se većina tih istraživanja odnosi pretežno na razvijene zemlje, dok postoji vrlo malo podataka o primeni ERM u ovom delu sveta. Motiv za pisanje rada bio je upravo nedostatak istraživanja iz oblasti ERM u Srbiji, kao i nedovoljna zastupljenost i primena ovog koncepta u srpskim preduzećima. U radu je razmatrano koji su to faktori poslovnog rizika i kakav je njihov uticaj na operativno poslovanje i rizik gubitka tržišne pozicije srpskih kompanija. Sa ciljem da se odgovori na ovo pitanje, sprovedeno je istraživanje na temu rizika u srpskim preduzećima, koje je obuhvatilo ukupno 322 ispitanika.

Na osnovu napred navedenih činjenica, a u skladu sa pitanjima iz upitnika koji je korišćen za istraživanje u ovom radu, definisane su sledeće hipoteze:

H₁ – Ekonomski uslovi poslovanja pozitivno utiču na operativno poslovanje.

H₂ – Finansijski rezultati poslovanja pozitivno utiču na operativno poslovanje.

H₃ – Strukturne karakteristike zaposlenih pozitivno utiču na operativno poslovanje.

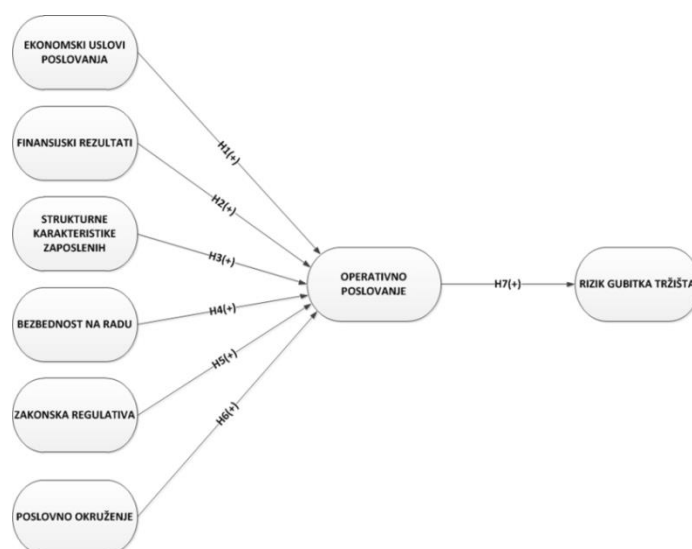
H₄ – Bezbednost na radu zaposlenih pozitivno utiče na operativno poslovanje.

H₅ – Zakonska regulativa pozitivno utiče na operativno poslovanje.

H₆ – poslovno okruženje pozitivno utiče na operativno poslovanje.

H₇ – Operativno poslovanje pozitivno utiče na rizik gubitka tržišta.

Zajedničkim razmatranjem ovih hipoteza, formiran je teorijski, strukturni model za ispitivanje uticaja različitih izvora poslovnog rizika na operativno poslovanje i rizik gubitka tržišne pozicije srpskih kompanija (Slika 1).



Slika 1. Teorijski model za ispitivanje uticaja različitih izvora poslovnog rizika na operativno poslovanje i rizik gubitka tržišne pozicije srpskih kompanija

3. METODOLOGIJA ISTRAŽIVANJA

Istraživanje koje je sprovedeno u ovom radu, vršeno je na osnovu podataka koji su prikupljeni metodom upitnika. Osnovni cilj je bio da se analizira trenutno stanje u oblasti upravljanja rizikom u malim i srednjim preduzećima u Srbiji, kako bi se istakao značaj upravljanja rizikom u savremenom i turbulentnom okruženju. Upitnik se sastoji iz 26 pitanja. U prvom delu se nalazi 8 pitanja demografskog karaktera, dok se preostala pitanja odnose na proces upravljanja rizikom u kompaniji i proces identifikacije najvažnijih poslovnih rizika i izvora (uzroka) njihovog nastanka. Formiranje strukturnog modela izvršeno je na osnovu 11. pitanja, gde su ispitanici ocenjivali izvore (uzroke) nastanka poslovnih rizika. Ocenjivanje je vršeno na Likert-ovoj skali od 1 do 5 [16], gde 1 označava najniži, a 5 najviši stepen uticaja određenog rizika na poslovanje.

Prikupljanje podataka je vršeno pomoću upitnika u periodu 01.09.2016 – 30.06.2017. na teritoriji Srbije. Anketirano je ukupno 332 ispitanika. Autori su lično sprovedli istraživanje, trudeći se da svakom ispitaniku bliže objasne značenje pitanja. Na taj način izbegnute su nejasnoće koje su se mogle javiti, pri čemu su svi anketni listići bili ispravno popunjeni. Može se zaključiti da je upitnik bio reprezentativan za izvršeno ispitivanje, imajući u vidu činjenicu da je istraživanje vršeno u maloj zemlji. Odnos veličine samog uzorka (322 ispitanika) i broja pitanja u upitniku (26) iznosi 12.38, čime je zadovoljen uslov da ovaj pokazatelj treba da bude veći od 5 [17]. Obrada prikupljenih podataka vršena je primenom softverskih paketa SPSS 17.0 i LISREL v.8.80.

4. REZULTATI ISTRAŽIVANJA

4.1. DEMOGRAFSKE KARAKTERISTIKE ISPITIVANOG UZORKA

Na osnovu rezultata dobijenih deskriptivnom statistikom za grupu pitanja koja se odnose na demografske karakteristike ispitanika, uočeno je da je u anketiranju učestvovalo više pripadnika muškog pola (55.3%). Najviše je bilo ispitanika između 31 i 50 godina starosti (59.9%), kao i ispitanika sa završenom višom ili visokom školom (52.6%). Većina preduzeća u kojima je ispitivanje vršeno posluje u regionu Istočne Srbije (80.2%). Kada je u pitanju veličina ispitivanih preduzeća, 52% ukupnog broja čine mikropreduzeća, 27.4% mala preduzeća i 20.1% srednja preduzeća. Najveći broj njih posluje u oblasti trgovine (30.1%), dok se preostala bave pružanjem drugih usluga (19.5%), ugostiteljstvom (16.1%) i industrijom (14.6%). Što se tiče dužine poslovanja ispitivanih preduzeća, čak 47.4% posluje duže od 10 godina, dok samo 2,4% preduzeća posluje manje od godinu dana. Na osnovu prikupljenih odgovora ispitanika, utvrđeno je da se 43 (13.1%) preduzeća bave upravljanjem rizikom manje od godinu dana, 73 (22.2%) između 1 i 5 godina, 36 (10.9%) između 5 i 10 godina, a da čak 133 (40.4%) preduzeća uopšte ne primenjuje upravljanje rizikom u svom poslovanju.

4.2. DESKRIPTIVNA STATISTIKA

Kako bi se definisali osnovni elementi statističkog skupa koji je korišćen za istraživanje u ovom radu, izračunati su standardni statistički parametri za svih 8 grupa pitanja (srednja vrednost, standardna devijacija, frekvencija), što je prikazano u Tabeli 1.

Tabela 1. Sumarna deskriptivna statistika

Grupa pitanja		Varijabla	Mean	St. dev.	Minimum freq.		Maximum freq.	
1.	RIZIK GUBITKA TRŽIŠTA	Gubitak potrošača	3.470	1.355	1.00	34	5.00	101
		Brojni konkurenti	3.304	1.197	1.00	26	5.00	58
		Stagnacija tržišta	3.047	1.133	1.00	33	5.00	36
		Nepouzdana dobavljači	2.740	1.312	1.00	74	5.00	38
2.	EKONOMSKI USLOVI POSLOVANJA	Rast poreza i doprinosa	3.520	1.215	1.00	23	5.00	86
		Slaba dostupnost pozajmica, subvencija	3.047	1.206	1.00	34	5.00	47
		Rast kamatnih stopa	3.147	1.171	1.00	35	5.00	45
		Poskupljenje energije	3.408	1.235	1.00	29	5.00	76
3.	FINANSIJSKI REZULTATI	Nedovoljan profit	3.138	1.343	1.00	44	5.00	66
		Korporativni dug	2.583	1.233	1.00	80	5.00	26
		Neisplaćena potraživanja	2.878	1.323	1.00	66	5.00	46
		Nelikvidnost	2.803	1.347	1.00	74	5.00	42
4.	OPERATIVNO POSLOVANJE	Nedovoljna iskorišćenost kapaciteta	2.545	1.280	1.00	88	5.00	27
		Zastareli proizvodni pogoni	2.633	1.387	1.00	95	5.00	42
		Nizak stepen inovacija	2.687	1.333	1.00	85	5.00	37
		Povećanje broja reklamacija	2.552	1.349	1.00	95	5.00	35
5.	STRUKTURNE KARAKTERISTIKE ZAPOSLENIH	Česte promene radnih mesta	2.467	1.319	1.00	95	5.00	35
		Nedovoljne kvalifikacije	2.771	1.279	1.00	66	5.00	36
		Greške zaposlenih (povrede)	2.730	1.275	1.00	68	5.00	32
		Pad morala i discipline	2.777	1.290	1.00	69	5.00	35
6.	BEZBEDNOST NA RADU	Nesreće i pretnje iz okruženja (poplave, požari)	2.658	1.380	1.00	88	5.00	45
		Zloupotreba informacija	2.408	1.186	1.00	89	5.00	19
		Neadekvatna zaštita	2.429	1.247	1.00	95	5.00	25
		Imovinski kriminal (krađa)	2.878	1.344	1.00	66	5.00	48
7.	ZAKONSKA REGULATIVA	Slaba primena zakona	2.865	1.361	1.00	66	5.00	54
		Česte promene u zakonodavstvu	3.097	1.264	1.00	47	5.00	49
		Nedovoljno nezavisno pravosuđe	2.972	1.351	1.00	62	5.00	52
		Sporo rešavanje sudskih sporova	3.091	1.454	1.00	66	5.00	75
8.	POSLOVNO OKRUŽENJE	Korupcija	3.085	1.461	1.00	68	5.00	72
		Favorizovanost na osnovu političke opredeljenosti	3.219	1.426	1.00	55	5.00	78
		Loš kvalitet javnih usluga	3.050	1.238	1.00	40	5.00	49
		Visoki administrativni zahtevi	3.307	1.341	1.00	43	5.00	81

4.3. MERA ADEKVATNOSTI UZORKA I VALIDACIJA STRUKTURE

Merenje adekvatnosti uzorkovanja – MSA analiza (*Measure of Sampling Adequacy*) izvršeno je pomoću Kaiser-Meyer-Olkin (KMO) testa. Vrednost ovog indikatora za razmatrani uzorak iznosi 0.904, a minimalna prihvatljiva vrednost KMO indikatora je 0.60. Na ovaj način je potvrđeno da je uzorak koji je korišćen za istraživanje u ovom radu adekvatan i pogodan za primenu faktorske analize [18], [19].

Pored toga, Bartlett-ov test sferičnosti pokazuje da postoje značajne korelacije među grupama pitanja u okviru upitnika [17]. Dobijene vrednosti ovog testa su $\chi^2 = 151.601$, $df = 6$, $p = 0.000$.

4.4. VALIDACIJA TEORIJSKOG MODELA

Validacija teorijskog modela za ispitivanje uticaja različitih izvora poslovnog rizika na operativno poslovanje i rizik gubitka tržišne pozicije srpskih kompanija, koji je prikazan na Slici 1, izvršena je pomoću softverskih paketa SPSS 17.0 i LISREL v.8.80 primenom statističke faktorske analize. Faktorskom analizom je potvrđena jednodimenzionalnost svih osam grupa latentnih varijabli u posmatranom modelu, na osnovu PCA analize (*Principal Component Analysis*) [20]. Rezultati faktorske analize prikazani su u Tabeli 2, odakle se mogu videti dobijene vrednosti za procenat varijanse koji je objašnjen faktorom jednodimenzionalnosti za svaku grupu pitanja i dobijene vrednosti loading faktora. Minimalna prihvatljiva vrednost loading faktora je 0.3, a dobijene vrednosti loading faktora potvrđuju da postoji visok stepen interne konzistentnosti između grupa pitanja u postavljenom modelu [21], [22].

Kako bi se osigurala pouzdanost i validnost ispitivanog modela izvršena je i CFA analiza (*Confirmatory Factor Analysis*). Provera interne konzistentnosti instrumenata za prikupljanje podataka izvršena je pomoću Cronbach's alpha testa [23]. Na ovaj način, dobijaju se vrednosti Cronbach's alpha koeficijenata (α), koje označavaju prosečne vrednosti korelacija među stavkama, onda kada se ocenjivanje vrši na osnovu zadatih skala. U ovom slučaju je to bila petostepena Likertova skala. Ukoliko su vrednosti α koeficijenata veće od 0.70, postoji visok stepen interne konzistentnosti među pitanjima i dobre mogućnosti za modelovanje na osnovu prikupljenih podataka iz ispitivanog uzorka [24], dok se vrednosti oko 0.60 smatraju prihvatljivim [25], [26]. Dobijene vrednosti α koeficijenata prikazane su takođe u Tabeli 2. Na osnovu dobijenih vrednosti α koeficijenata za grupe pitanja, može se zaključiti da je dokazana validnost i pouzdanost upitnika o upravljanju rizikom u malim i srednjim preduzećima, i da se mogu očekivati i pouzdani rezultati modelovanja na osnovu prikupljenih podataka.

Dobijene t -vrednosti, koje su takođe prikazane u Tabeli 2, su u skoro svim slučajevima veoma visoke, sa nivoom značajnosti $p < 0.1$, čime se potvrđuje validnost ispitivanog modela. Prema tome, sve 32 varijable (definisane unutar 8 latentnih grupa varijabli) mogu biti iskorišćene za definisanje teorijskog modela, koji je prikazan na Slici 1 [27].

Tabela 2. Rezultati faktorske analize (EFA) i konfirmatorne faktorske analize (CFA) mernog modela

Grupa pitanja	Posmatrana varijabla	EFA		CFA			
		PCA		Pouzdanost	Validnost		
		% varijanse objašnjen faktorom jednodimenzionalnosti	Factor loading	Cronbach's alpha	Factor loading	t-statistika	
1.	RIZIK GUBITKA TRŽIŠTA	Gubitak potrošača Brojni konkurenti Stagnacija tržišta Nepouzdana dobavljači	47.067	0.714 0.708 0.684 0.635	0.622	0.66 0.54 0.65 0.80	5.08 5.67 5.77
2.	EKONOMSKI USLOVI POSLOVANJA	Rast poreza i doprinosa Slaba dostupnost pozajmica, subvencija Rast kamatnih stopa Poskupljenje energije	58.170	0.747 0.812 0.808 0.676	0.757	0.78 0.90 0.85 0.68	11.51* 13.87* 13.53* 9.58*
3.	FINANSIJSKI REZULTATI	Nedovoljan profit Korporativni dug Neisplaćena potraživanja Nelikvidnost	63.506	0.713 0.813 0.818 0.837	0.806	0.83 0.91 0.96 1.06	11.44* 14.30* 14.16* 15.73*
4.	OPERATIVNO POSLOVANJE	Nedovoljna iskorišćenost kapaciteta Zastareli proizvodni pogoni Nizak stepen inovacija Povećanje broja reklamacija	59.449	0.790 0.873 0.832 0.548	0.762	0.90 1.14 0.99 0.64	12.46* 11.63* 7.65*
5.	STRUKTURNE KARAKTERISTIKE ZAPOSLENIH	Česte promene radnih mesta Nedovoljne kvalifikacije Greške zaposlenih (povrede) Pad morala i discipline	57.395	0.728 0.828 0.760 0.708	0.750	0.78 0.97 0.88 0.75	10.74* 14.74* 12.92* 10.53*
6.	BEZBEDNOST NA RADU	Nesreće i pretnje iz okruženja (poplave, požari) Zloupotreba informacija Neadekvatna zaštita Imovinski kriminal (krađa)	59.769	0.730 0.772 0.827 0.760	0.772	0.82 0.82 0.95 0.91	11.00* 13.05* 14.91* 12.71*
7.	ZAKONSKA REGULATIVA	Slaba primena zakona Česte promene u zakonodavstvu Nedovoljno nezavisno pravosuđe Sporo rešavanje sudskih sporova	69.429	0.779 0.838 0.882 0.831	0.851	0.94 0.95 1.16 1.14	13.49* 15.13* 18.34* 16.18*
8.	POSLOVNO OKRUŽENJE	Korupcija Favorizovanost na osnovu političke opredeljenosti Loš kvalitet javnih usluga Visoki administrativni zahtevi	67.419	0.824 0.868 0.830 0.758	0.837	1.19 1.22 0.88 0.82	16.93* 18.16* 14.09* 11.58*

Napomena: * statistička značajnost $p < 0.1$

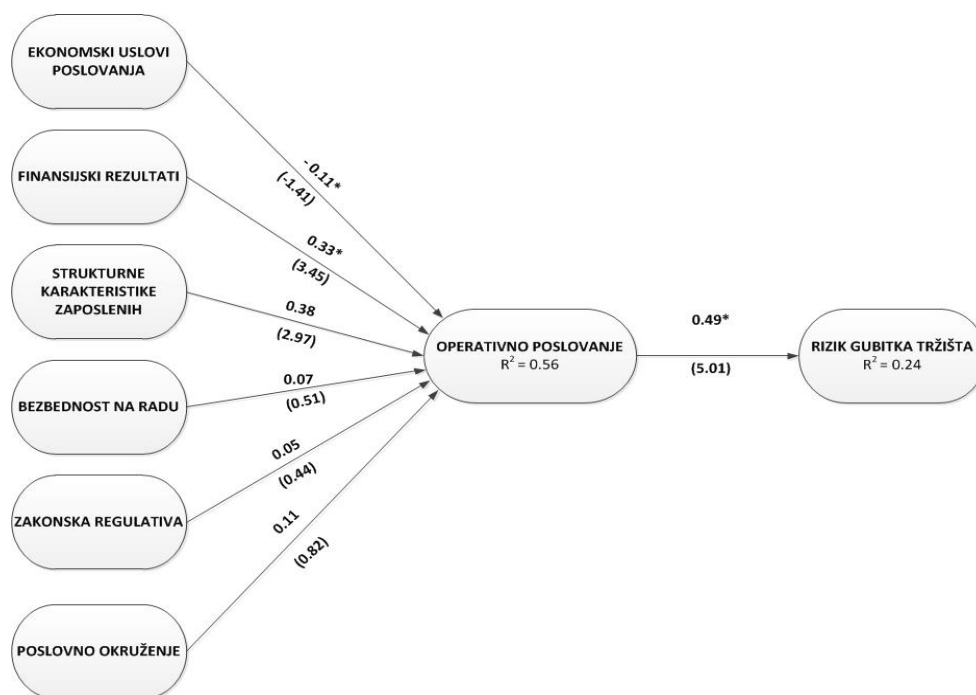
Dalje testiranje validnosti teorijskog modela (Slika 1) izvršeno je pomoću softverskog paketa LISREL v.8.8. Na ovaj način izvršena je dublja statistička analiza pomoću modelovanja strukturnih jednačina [28]. Dobijene vrednosti indikatora fitovanja prikazane su u Tabeli 3 i pokazuju zadovoljavajući stepen fitovanja u ispitivanom modelu.

Tabela 3. Vrednosti indikatora fitovanja ispitivanog modela

Indikatori fitovanja	Dobijene vrednosti u mernom modelu	Preporučene vrednosti
Chi-Square (χ^2)	991.01	-
Degrees of freedom (df)	442	-
Relative Chi-Square (χ^2/df)	2.24	< 3.0
Root Mean Square Error of Approximation (RMSEA)	0.062	0.08 – 1.0

Dobijena vrednost relativnog χ^2 od 2.24 se može smatrati značajnom, zbog toga što je ispunjen zahtev da bude manja od 3. Na ovaj način, idikatori fitovanja su pokazali značajan nivo fitovanja u ispitivanom modelu, što omogućava da se izračunaju koeficijenti strukturnih putanja za definisani teorijski model, sa značajnim stepenom pouzdanosti.

Koeficijenti strukturnih putanja između definisanih grupa varijabli u ispitivanom modelu izračunati su primenom softverskog paketa LISREL v.8.8. Koeficijenti putanja označavaju isto što i koeficijenti regresije, jer ukazuju na jačinu veze i uticaja između nezavisnih i zavisnih varijabli. Takođe, proračunati su i koeficijenti determinacije (R^2) za zavisne grupe varijabli, koji pokazuju procenat varijanse u zavisnoj varijabli, koji je objašnjen nezavisnom varijablom [29]. Dobijene vrednosti koeficijenata putanje i koeficijenata determinacije u strukturnom modelu prikazane su na Slici 2.



Slika 2. Strukturni model za ispitivanje uticaja različitih izvora poslovnog rizika na operativno poslovanje i rizik gubitka tržišne pozicije srpskih kompanija

U cilju donošenja konačne odluke o prihvatanju definisanog teorijskog modela, bilo je neophodno utvrditi t -vrednosti za svaku od 7 definisanih hipoteza. Dobijene t -vrednosti prikazane su u zgradama na Slici 2. Jedino kod hipoteza H_2 , H_3 i H_7 t -vrednosti su veće od 2, što potvrđuje jaču pozitivnu korelaciju između nezavisnih varijabli „Finansijski rezultati“ i „Strukturne karakteristike zaposlenih“ i zavisne varijable „Operativno poslovanje“. Kod hipoteza H_4 , H_5 i H_6 t -vrednosti su niže od 1, što pokazuje da postoji vrlo slaba korelacija između nezavisnih i zavisne varijable, dok je za hipotezu H_1 t -vrednost negativna (-1.41) i ukazuje da između nezavisne varijable „Ekonomski uslovi poslovanja“ i zavisne varijable „Operativno poslovanje“ postoji negativna korelacija. Ovo i jeste logično, s obzirom da je grupa pitanja „Ekonomski uslovi poslovanja“ podrazumevala rast poreza i doprinosa, slabu dostupnost finansijskih resursa (pozajmice, subvencije), rast kamatnih stopa i poskupljenje svih vrsta energije, što svakako da negativno utiče na operativno poslovanje srpskih kompanija.

Sa Slike 2 se može videti da sve definisane hipoteze u modelu imaju pozitivne vrednosti koeficijenata putanje, čime je potvrđen pozitivan uticaj nezavisnih varijabli na zavisnu, osim kod hipoteze H_1 ($b = -0.11$, $p < 0.1$, $t = -1.41$), na osnovu čega se može zaključiti da ekonomski uslovi poslovanja imaju negativan uticaj na operativno poslovanje. Hipoteza H_2 pokazuje da finansijski rezultati imaju pozitivan uticaj na operativno poslovanje ($b = 0.33$, $p < 0.1$, $t = 3.45$). Hipoteze H_3 , H_4 , H_5 i H_6 nisu statistički značajne i pokazuju da strukturne karakteristike zaposlenih, bezbednost na radu, zakonska regulativa i poslovno okruženje imaju pozitivan uticaj na operativno poslovanje ($b = 0.38$ i $t = 2.97$; $b = 0.07$ i $t = 0.51$; $b = 0.05$ i $t = 0.44$; $b = 0.11$ i $t = 0.82$, respektivno). Na kraju, hipoteza H_7 ukazuje na to da operativno poslovanje pozitivno utiče na rizik gubitka tržišta ($b = 0.49$, $p < 0.1$, $t = 5.01$).

Dobijene vrednosti koeficijenata determinacije (R^2) pokazuju da je 56% varijanse u operativnom poslovanju objašnjeno prediktorima: ekonomski uslovi poslovanja, finansijski rezultati, strukturne karakteristike zaposlenih, bezbednost na radu, zakonska regulativa i poslovno okruženje; dok je 24% varijanse u riziku gubitka tržišta objašnjeno operativnim poslovanjem.

U nastavku je ispitan stepen međusobne povezanosti između šest nezavisnih grupa varijabli. Dobijene vrednosti koeficijenata korelacije prikazane su u okviru korelacione matrice u Tabeli 4.

Tabela 4. Korelaciona matrica nezavisnih grupa varijabli

	EK. USLOVI POSLOVANJA	FINANS. REZULTATI	STRUKTURNE KARAKTER. ZAPOSLENIH	BEZBEDNOST NA RADU	ZAKONSKA REGULATIVA	POSLOVNO OKRUŽENJE
EK. USLOVI POSLOVANJA	1					
FINANSIJSKI REZULTATI	0.55* (10.16)	1				
STRUKTURNE KARAKTER. ZAPOSLENIH	0.41* (6.55)	0.67** (14.48)	1			
BEZBEDNOST NA RADU	0.50* (8.63)	0.63** (12.81)	0.77** (18.70)	1		
ZAKONSKA REGULATIVA	0.45* (7.96)	0.46** (8.47)	0.44* (7.51)	0.61** (12.98)	1	
POSLOVNO OKRUŽENJE	0.52** (9.59)	0.43* (7.73)	0.46* (8.05)	0.65** (14.52)	0.84** (30.89)	1

Napomena: * statistička značajnost $p < 0.1$

** statistička značajnost $p < 0.05$

Iz Tabele 4 se može videti da najjača korelacija (međusobna povezanost) postoji između nezavisnih varijabli „Poslovno okruženje“ i „Zakonska regulativa“ (0.84; statistička značajnost $p < 0.05$) i „Bezbednost na radu“ i „Strukturne karakteristike zaposlenih“ (0.77; statistička značajnost $p < 0.05$). Ovo i jeste logično, ako uzmemo u obzir varijable koje se nalaze unutar ovih grupa pitanja. Karakteristike poslovnog okruženja (korupcija, favorizovanost na osnovu političke opredeljenosti, loš kvalitet usluga javnih ustanova, visoki administrativni zahtevi) su itekako snažno povezane sa zakonskom regulativom u našoj zemlji (slabija primena zakona, česte promene u zakonodavstvu, nedovoljno nezavisno pravosuđe, sporo rešavanje sudskih sporova). Što se tiče bezbednosti na radu u srpskim kompanijama (nesreće i pretnje iz okruženja, poplave, požari, zloupotreba informacija, neadekvatna zdravstvena i bezbedonosna zaštita zaposlenih, krađa imovine), ona u mnogome zavisi od karakteristika samih zaposlenih (nedovoljne kvalifikacije, česte promene radnih mesta, povrede zaposlenih zbog njihovih grešaka, pad morala i discipline).

5. ZAKLJUČAK

Upravljanje rizikom predstavlja važan element efektivnog korporativnog sistema. Globalna finansijska kriza skrenula je pažnju na pravovremenu identifikaciju, analizu i upravljanje ključnim poslovnim rizicima, zbog toga što je upravo neadekvatna procena rizika ocenjena kao glavni razlog propadanja ili finansijskih poteškoća velikog broja organizacija u svetu u tom periodu. U ovom radu analiziran je uticaj šest faktora rizika na operativno poslovanje kompanija u Srbiji i dalje na rizik od gubitka njihove trenutne tržišne pozicije. Definisani su konceptualni model i predloženo je sedam hipoteza. Dobijeni rezultati pokazali su da najveći uticaj na operativno poslovanje ispitanih organizacija ima varijabla Strukturne karakteristike zaposlenih, dok je jedini faktor koji ima negativan uticaj na Operativno poslovanje, Ekonomski uslovi poslovanja.

Doprinos trenutne studije ogleda se u tome što u naučnoj literaturi nema dovoljno podataka o praksi upravljanja rizikom u organizacijama koje posluju na teritoriji Srbije. Faktori koji su uključeni u teorijski model izabrani su na osnovu literaturnog pregleda i najčešće ispitivanih od strane drugih istraživača. Namera autora je da u svojim budućim istraživanjima uključe i druge faktore rizika koji mogu uticati na tržišnu poziciju i operativno poslovanje organizacija, kao i da prošire uzorak.

REFERENCE

1. Bartram S.M. Financial Markets, Institutions and Instruments 9(5), (2000), 279-324.
2. OECD, Corporate Governance and Financial Crisis: Key Findings and Main Messages, 2009.
3. Hoyt R.E., Liebenberg A.P. Journal Of Risk and Insurance 78 (4), (2011), 795-822.
4. Miller K.D. Journal of International business Studies 23 (2), (1992), 311-331.
5. Miller K.D. Journal of International business Studies 24, (1993), 693-714.
6. Miller K.D., Waller H.G. Long Range Planning 36 (1), (2003), 93-107.

7. Colquitt L.L., Hoyt R.E., Lee R.B. *Risk Management and Insurance Review* 2 (3), (1999), 43-61.
8. D'Arcy S.P., Brogan J.C. *Journal of Risk Management of Korea* 12 (1), (2001), 207-228.
9. Cassidy D. *Employee Benefit Plan Review*, (2005), 29-31.
10. Kleffner A.E., Lee R.B., McGannon B. *Risk Management and Insurance Review* 6 (1), (2003), 53-73.
11. Liebenberg A.P., Hoyt R.E. *Risk Management and Insurance Review* 6 (1), (2003), 37-52.
12. Sprcic D.M., Kozul A., Pecina E. *Procedia Economics and Finance* 30, (2015), 768-779.
13. Quon T.K., Zeghal D., Maingot M. *Procedia – Social and Behavioral Sciences* 62, (2012), 263-267.
14. Mikes A. *Management Accounting Research* 20 (1), 2009, 18-40.
15. Yusuwan N., Adnan H., Omar A. *Journal of Politics And Law* 1 (3), (2008), 121-130.
16. Likert R. *Developing patterns in management* (1955).
17. Hair J.F., Black W.C., Anderson R.E., Tatham R.L. *Multivariate data analysis* (2006).
18. Kaiser H.F. *Psychometrika*, 39, (1974), 31–36.
19. Cerny B.A., Kaiser H.F. *Multivariate Behavioral Research*, 12 (1), (1977), 43-47.
20. Kingir S., Mesci M. *Serbian Journal of Management* 5 (1), (2010), 59-76.
21. Sheppard, 1996;
22. Velicer W.F., Jackson D.N. *Multivariate Behavioral Research* 25, (1990), 97-114.
23. Cronbach L.J. *Psychometrika* 16, (1951), 297-334.
24. Nunnally J.C. *Psychometric theory* (2nd ed.). New York: McGraw-Hill (1978).
25. Boyer K.K., Pagell M. *Journal of Operations Management* 18 (3), (2000), 361-374.
26. Hair J.F., Anderson R.E., Tatham R.L., Black W.C. *Multivariate data analysis with reading*. Englewood Cliffs, NJ: Prentice-Hall (1995).
27. Ho R. *Handbook of univariate and multivariate data analysis and interpretation with SPSS*. Boca Raton, FL: Chapman & Hall/CRC, Taylor & Francis Group (2006).
28. Savic M., Djordjevic P., Milosevic I., Mihajlovic I., Zivkovic Z. *Total Quality Management & Business Excellence* 28 (11-12), (2016), 1285-1306.
29. Zivković Z., Arsic M., Nikolic Dj. 6th international working conference “Total Quality Management – Advanced and Intelligent Approaches” (2011).



POSSIBILITIES FOR DEVELOPMENT OF RURAL AREAS IN SERBIA

Danijela Voza, Sanela Arsić, Đorđe Nikolić, Živan Živković

University in Belgrade, Technical faculty in Bor, Serbia

Abstract: Rural areas in undeveloped countries are faced with problems and challenges reflected in poverty, depopulation, unemployment and environmental unsustainability. Faster economic growth can be achieved by directing towards agriculture, rural tourism and other industrial activities. Management of rural areas presents complex process which requires carefully and multidisciplinary analysis of numerous issues affecting development and implementation of clear and effective management strategy. The most outstanding problems that hinder development of rural areas in Serbia are demographic problems reflected in intensive depopulation and high unemployment rate. Experience of developed and developing countries points to the importance of integration of non-agricultural and agricultural activities. Also, serious and active state and local government support, as well as incentive measures with positive impact on agriculture and rural tourism are needed. In this paper an analysis of the current state and conditions for achieving the sustainable development of rural areas in Serbia was conducted. Also, the possibilities and potentials of these regions for development of rural tourism are presented. Based on this, guidelines for creating development strategies of these regions are defined.

Keywords: rural areas, rural tourism, sustainable development



CORPORATE IMAGE AS A STRATEGIC RESOURCE OF MARKETING COMMUNICATIONS IN ORGANIZATION

Andela Mikić, Sonja Milojević

*Belgrade Business School – Higher Education Institution for Applied Studies, Belgrade,
Serbia*

Abstract: In the modern business corporate image represents a powerful promotional resource of organization. Picture that, intended or unintended, results in public, thanks to the information emitted by business objects of the company and its staff, in today's competitive market, can not be neglected. The main benefit that can be drawn from the process-oriented design of corporate identity (as what the organization is) and corporate image (as what the public thinks about it), is that this process, if performed creatively and spontaneously adopted by the management and employees, changes in the positive direction corporate climate and corporate culture itself, operating in an organization. In order to achieve this successfully, communication activities used at building a recognizable identity and positive image of organization, should be so encoded that it accurately communicate adopted identity of the organization and its market values. Competitive strategy of market-oriented organization should focus on such positioning, which will maximize the values that customers in the gravitational field of its sales and services appreciate the most, and which the organization and its facilities make a positively different in relation to other market participants.

Keywords: corporate image, corporate identity, marketing strategy, promotion

1. INTRODUCTION

The special quality of the competitive advantage of any market-oriented organization and its business objects is a corporate identity, i.e. recognition of the organization based on a positive image. Corporate identity and corporate image are not formed spontaneously. They are usually the result of directly created communication strategy, which is part of a global corporate strategy of the company. Corporate identity, by a rule, is developed through conceivably designed and implemented corporate communication, which is - with customers and target audience - achieved in several ways and in several dimensions. It can be generated visually (through the exhibited items in the shop window and in shop), verbally (through verbal and written communication), auditory (hearing), fragrantly, tactile (through touch), and in other ways. All these forms of communication - planned or spontaneous - underline the uniqueness of the company and its facilities, goods and services, which are offered to customers, as well as the attitude of management and staff to customers. The image of a concrete business object certainly makes and ever-present culture of communication with customers, the public and other clients and culture of serving them.

The image of a business company is in fact the image that customers and other related subjects in public, by collecting information received, create about the company and its offer, i.e. image that, intended or unintended, results in public, thanks to the information emitted by objects of the company and its staff. Certain managers of business systems and facilities consider that the image is mainly created on the basis of their targeted communication - only then and in the way that they want - not realizing at the same time that in reality, this image is created through everything what they do and what they do not do, in a positive and negative sense.

2. STRATEGIC APPROACH TO CONTENT AND CREATION OF IMAGE

There are many factors of commercial presentation in business, which in turn are also the content of the image, whether it is a for-profit or non-profit organizations or their facilities. Viewed in general terms, all of the mentioned elements can be classified into the following groups: [1]

- exhibition, sales and service facilities (architecture, interior and exterior, the schedule of offer content, general tidiness and hygiene),
- supply range of commodity products and/or services (consistency, quality, fashionably, appeal and other facilities saturation),
- price,
- services that are provided to customers (financial, repairing, commuting, informative and the other),
- relationship with customers, as well as relationship between personnel (corporate culture and corporate climate), etc.

If we want a good image, all the above elements of the offer should be at an appropriate level. Poor tender presenting of only one factor, can seriously jeopardize a positive image of the whole company and all its facilities. Since the positive achievement of all the factors of the image depends on the people, we will keep up the momentum in the accentuation of the "human factor" as a factor of the image, since it is in this domain in our economy and social activities, that it is a need to work the most.

Experiencing and understanding of company in which they work, largely determines the attitude of staff towards the defined tasks and their behavior, which in turn affects the quality of their work and communication with the public, customers and other groups of interest in their daily work.

Communication experts point out that in most cases adopted corporate strategy of creating image, never fully penetrate the consciousness and imagination of all employees in the company - especially those in executive positions of sale (salesmen and support staff), who perform everyday tasks with clients. It is the staff who every day communicate with the public, customers, distributors and other corresponding groups of interest (suppliers, carriers and others) in different contexts, and that is the staff that creates a real image and reputation of the company and its service and sales facilities.

If employees do not know committed communications and business strategy of organization, or do not know how to translate it into their system of daily work, the strategy will simply remain as unfulfilled idea, conceived in the minds of top managers. To avoid such a situation in practical operation, it is necessary that business owner or top manager convey

clearly to the managers of service and sales facilities what the corporate strategy of the organization is, how it is necessary to achieve it and what in this area they should specifically do, so that this strategy, through their practical operations, could be accepted by each of operating perpetrators. Good communication with the staff is a prerequisite condition of a good communication with the clients of the company.

The owners and top managers of companies - in the development of the communication system with which the image is developed - should primarily start from themselves and follow the best. It should not be exercised only in the sense of inventiveness - to create the idea of a good image - but also in terms of communication - to convey that idea and implement it in the heads of operatives at the field that realize that idea in practice.

Practice shows that many managers believe themselves to be good communicators, but at the same time do not really know what about that think their employees. This is a major obstacle for those who work on corporate strategy which creates the image of the company, because due to inadequate or poor communication, they actually ignore the available human potential that they lead and direct. Experts in the field of management and marketing say that it is the main reason owing to which Japan achieves a stunning growth rate exactly that - that in the companies in this country, among managers at all levels and the direct perpetrators, there is an excellent communication interaction. [2]

Top managers of market-oriented organization should know the possible permutations of communication success and failure, which can occur due to adequate or inadequate communication which, on the construction of corporate strategy and corporate identity, create with their subordinate staff. There are, in this point of view, several communications options.

First option: the strategy is optimal, it is well communicated, it is compatible with the views of employees and it is feasible.

Second option: the strategy is not communicated or not communicated adequately.

Third option: a strategy is understandable, it is compatible with the interests and attitudes of employees, but they are not given any tools (means) to really operationalize it.

Fourth option: a strategy that was developed by the company management is understandable, but does not correspond to the interests of operational executives, i.e. it is incompatible with understanding of their own obligations on its implementation. [2]

From the above it follows that the success in achieving the appropriate corporate strategy and corporate identity and image based on this strategy, depends on the owner or manager of the company and of its operational executives. The owners and top managers of the company should, in that sense, constantly improve themselves, cognitively and conceptually, but they also need to continuously enrich the communication they maintain with the lower-level managers and operational carriers of created strategy.

Redesigning the attitudes and behavior of employees in order to improve them in large and complex companies, should be consistent and coordinated activity of all managers in different sectors within the company, as well as the heads of sales and service facilities. As can from previous be concluded, this activity sometimes begins with changing personal perceptions (endowment) of own company, at the preliminary enriched basics, and then the changing of perception of all employees - from managers of sectors, facilities and departments, across the operational executives, to cleaners. In this sense, it should be made clear to operational staff, that they do not work for the image, but that they are the image of the company.

3. ANALYSIS OF COMPETITORS AND OF THEIR IMAGE

In building a positive image of the company, management of organization - at all levels - should not only pay attention to their own communications performed with customers and other target audience. It should also carefully monitor and analyze communications and the moves of competitors, who are engaged in the same or similar jobs as their company. This is because the audience and buyers form their opinion on the image of a certain company not only on the basis of what this company (or another provider) offers and/or how is represented, but also based on what their competitors - who produce or sell same or similar products and services in the same market - offer and how are represented. The audience or consumers form - on the basis of these offers - its scale of evaluation, under which each company or provider has its place. Since the supply activities of most organizations do not express through one element but through more of them (the contents of offers, quality, timeliness, delivery conditions, price and/or something else), this indicates that the corporate identity of the company usually consists of several different elements. The image of the company is by the customers seen as a mixture of (a combination) of these elements. [3]

All elements of the image certainly are not of the same character. In some areas of the market business some are more appreciated, and in other areas other elements of the image. Also, some customers and consumers more appreciate one and the other the other elements of the image. Each customer form in his head, his "scale of preference," according to which identifies his purchases. In content and quality oriented customers appreciate the most content and quality of products. Price-oriented customers in particular are attracted to the price (high or low) of the product, while the promotionally oriented customers primarily trigger for advertising or other forms of promotion. In the field of sports or the arts, customers (the audience) are most attracted by performers (displays), and/or rank of organized spectacle.

In trade, the most attractive element of offer is the name and reputation of the company, as well as the range, quality and price of products. This statement is, however, principled and very conditional. Because when, for example, comes to self-service stores of food and related products, it must be borne in mind that the location can be the strongest factor and real competitive advantage. Stores, located in the right place, regardless of the name of the company carrying the assortment and prices, have undoubted advantages, comparing to the shops of the same type that are found in inferior locations. Of course, it is understood that a bad location represents poor communication.

We should also keep in mind this: that deep psychological analysis revealed (often more registered by subconscious, then the conscious of customers), that each business object expresses and transmittes some of its characteristics, which make it a special and characteristic, and also attractive or unattractive for individual customers. If these specificities and characteristics are in the spirit of nature, culture, motivation and demands of the majority of customers in the catchment area, in this case can be considered that the conditions for building a recognizable identity are created, from which derives the positive image, that certainly represents a powerful tool of focused marketing for achieving a competitive advantage.

Competitive strategy in market oriented company should focus on such positioning, which will maximize the value of those that customers in the gravitational field of its sales and service facility specially appreciate, and that the company and its facilities make a positive different in relation to other market competitors. It should at the same time bear in mind that the way consumers make a distinction between one and another company, or

between the two sales facility, often is more based on emotional than on rational criteria. Especially if rational criteria are less comparable and less expressive. [4]

4. CHOICE OF IMAGE AND PROFILING OF IDENTITY

A good image is first of all noticeable, positively distinctive, and memorable. Marketing experts point out that in the unified and assembled systems of mass production and mass transport, it is very difficult to find a way to be one market-oriented organization and its sales and service facilities noticeable differentiate from the competition. [5] They also argue that, if this succeed, this difference is even more difficult to maintain, since all then try to imitate a successful leader. That is noticeable especially in trade, if the majority of organizations get their supplies by the same supplier. The problem of choosing a recognizable image sometimes is in the management of the company. Certain number of responsible leaders in business have a tendency to follow, by any means, someone who is successful, and not to make a creative effort on designing and deploying their own uniqueness and creativity.

The analyzes show that the best operating companies are those that have managed to resist the inertia of this type. A number of strategic measures that can be undertaken, which are aimed at developing positive peculiarities, which will differentiate firm in an attractive way from other competitors. If you want real success in market business, it must be precisely define with what assets and how they will achieve positive differentiation relating existing competitors. [6]

The global activities of the strategic and promotional positioning, for the management of each market-oriented company, always open two opposite directions, which are conceptually and structurally different:

- the leadership in quality (the richness and quality of offer content), or
- the leadership in price (low price).

We already know that the classical theory of marketing both turn off, because the mixing of the two options is losing essential identity of the company and/or store (exclusive sales - discount sales), which is especially important in the services and retail. The specificity and recognition in this domain should clearly be defined and expressed - in a first (exclusivity), or second (mass) direction.

5. CREATION OF MARKET POSITION

The basic definition, which should be taken into account when creating the market position of certain company on positive recognizable basis, should be based on the identified criteria and development trends of the most successful organization of the specified type in the country and the world. It is as follows: [7]

1. Corporate (organizational) strategy of successful companies in the world is based on long-term defined mission of satisfying consumers, and goals of management and employees which arise from this mission.

2. Each business organization is unique (different, specific) according to certain definitions, which may be positive or negative, with respect to the expectations of the customers and the audience and the offer of the competitors. You need to develop a positive and eliminate the negative determinations.

3. The successful business strategy in successful companies is built on an understanding of the position of the organization in the environment in which it operates.

That definition should certainly be kept in mind when creating the corporate strategy and the strategy of building the image in their own companies. A key component of the company's image is corporate structure. In fact, in every business organization, there are actually two structures: [8]

- the organizational, ie. sector structure, as well as the structure according to the objects, with its communication lines and responsibilities, and
- the visual structure, which refers to the architecture of buildings, exterior and interior, created climate of behavior and other visual determinations.

The key to success in creating the image of a concrete company represents skillfully combining of this structures in order to create and maintain attractive package, and common values among employees, customers and other target groups of the company. Two basic factors that have a significant impact on building and fostering a positive image of market-oriented company are:

- the customer (the audience) orientation, and
- the genuine concern for employees.

And most imaginative program of offer will be unsuccessful, unless is directly positioned according to the available customers, who make basic company clientele. Certainly, it is about a communication compatibility between the company (its facilities, goods and personnel) and customers.

Likewise, the best facility and techniques of working with the most attractive goods, will not bring satisfactory results, if it is not in the hands of well-trained and motivated staff. Observations and experience of the company in which they work, to the greatest extent determines the attitude and behavior of staff, which in turn affects their communication with customers and other target groups in their daily operations. It is known that dissatisfied staff cannot create satisfied customers.

5.1. PLAN OF ACTION IN PROFILING IMAGE

While creating various models of communication interaction aimed at customers and other target groups in public, top managers of market-oriented companies and managers of some service and sales objects, should always ask themselves the question: “Is created communication clearly reflects and gives a clear picture of my company in the eyes of the target public?” For example, if the management of the company defined the strategy of focusing the differences (strategy of differentiation relative to competitors) - built on the content and quality of additional services provided to customers – it must be accurately determined whether established communication with customers and their perceptions (endowments) confirm this positioning, or it may disorient it. Are, in other words, buyers and other clients of the company aware of these difference (in content and quality of services) and that on this basis accept its superior image compared to other market competitors.

The management of market-oriented company - at all levels - should follow the movement of the image of the company, in order to determine whether the image generated contributes to or impedes the attainment of the goals of the company. If the image is better

than reality, this indicates the operational problem; if the reality is better than the image, this indicates the communication problem. Typically Balkan company is often a mixture of both of these definitions, and this must be counted when determining the ultimate goals of the identity of programming.

Bearing in mind that sometimes a different image is formed in the mind of different audiences, it is important to adjust the strategy of image to a specific groups of audience and other recipients, so that each of these groups can adopt such image of the company, which is the most convenient to the organization. Also, before of choosing a concept of image, with which the company will present to the public, it is necessary to make correct market segmentation and select target customers. The strategy of superior image assumes definitely engaging in several courses of action.

We will refer to an example of different recipients typical for commercial organization and possible types of messages that can be communicated to them: [9]

Buyers - to increase awareness of the company as a synonym of: quality, favorable prices, rich services, sincere and friendly attitude towards them.

Other customers - communicate its business volume - point out to them the importance of cooperation with the company.

Suppliers - announce company's commitment to the quality and just in time delivery.

Employees - improve internal communication within the company.

Financial institutions - announce a new strategy and financial result.

Government - influence on decisions and positive regulations from the domain of trade.

Media - introduce them to new strategy, innovation in business and achieved positive results.

5.2. IMPLEMENTATION OF THE IMAGE PLAN IN PRACTICE

The basic tool for creating exemplary image in business is certainly a plan of communication. The plan should define the communication models, media and means of communication, which will achieve a desirable results in the creation of a positive image of the company. In addition to other content, communication plan - which is essentially a plan of image - should include the following elements: [10]

1. Model and plan of design. Customers and other audiences should be able to connect claims with descriptions, and not only in the practical operational, but also the visual level. Clarity in explications, should be the main target of the projected design.

2. Constants of marketing communications, which imprint public awareness of the existence and operations of the company, should be skillfully designed and used. The constants of marketing communications include: name of the company, symbol (trademark), logo, official letter, mascot, home colors, name of the product. These adopted standards of visual identity, make a recognizable promotion of the firm and create her propaganda style.

3. Methods and ways of establishing communication interaction, etc. Communication plan should certainly provide a clear answer to the following questions: who? what? why? how? when? how much? Nothing in it should be left to chance, because it is the precision of expression and the "little things" that can be incorporated in the concept of communication, base of the communication success.

6. CONTROL OF IMAGE CREATION

Control of building and nurturing a recognizable identity and positive image should include all aspects of the business, through which the company presents itself to its customers and other target audience. It should also refer to the unofficial, spontaneous and less obvious methods of communication. In this control, in terms of positive redesign, should be involved not only the strategic moves of the organization, but all the details of daily life of the company and its service and sales points - from the way how it is arranged sales and exhibition space; how executive officers, vendors and other staff speak to customers and how they handle them; how sales representatives respond to letters and phone calls; to the way how people dress and how they aesthetically look - all these and other details are of paramount importance, because they reflect the corporate value system of the company and its image. [11]

7. CONCLUSION

Creating a market position of organization based on distinctive identity and attractive image, cannot be built in undeveloped and improvised manner. It must, first of all, be strategically identified in all relevant determinations, to the level of expressed details. Recognition and attractive image are sometimes expressed in the details. As defined business strategy, the strategy of the image from the beginning should be clear and should be openly communicated to employees, shareholders, customers and suppliers of the company. Without a clear corporate strategy of business, uncertainty can occur, because the adopted values of the company would not be known, or what is the profiling strategy of the corporate identity of the organization.

Creation of positive image of successful organization is not a right way, if exposed, supply, trade and service facilities are not enough interesting for buyers. It's not good to create the image of an attractive, well-supplied company and its objects, if it does not correspond to reality. Then it is a "cosmetic beautification" in goal of seduction, which may not be based on good content and promotional basis, on which a promising future is build.

The basic idea, which should permeate all strategic and operational features of the management of company and the managers of individual sales units, is that in all that company as a whole performs, possesses, purchases and sales, there must be a clear idea of what the company represents in the environment in which it operates and what its goals are. This idea must be based on certain factors of differentiation (distinction) of firm, from the company's direct competitors, as well as the social utility of its business. Differentiation factors referred to, must have the power of discriminator (pusher of competitors), and not only motivators for managers and employees. If the profiling of corporate image is accessed successfully, it can be an important resource of marketing communications in organization and a powerful tool of positioning in the contemporary market.

REFERENCES

- [1] Kotler, P. & Keller, K: *Marketing Management*, Prentice Hall, Upper Saddle River, New York, 2008.

- [2] West, Douglas: *Strategic Marketing: Creating Competitive Advantage*, OUP Oxford, Oxford, 2010.
- [3] Rouse, M.J. & Rouse, S.: *Business Communications: A Cultural and Strategic Approach*, Thomson Learning, London, 2002.
- [4] Packard, V.: *Hidden Persuaders*, IG Publishing, London, 2007.
- [5] Jenkins, N.: *The Business of Image: Visualising the Corporative Message*, Kogan Page, London, 1991.
- [6] Varey, R. J.: *Marketing Communication: Principles and Practice*, Routledge, New York, 2002.
- [7] Belch, G. E. & Belch, M. A.: *Advertising and Promotion: An Integrated Marketing Communications Perspective*, McGraw-Hill, New York, 2014.
- [8] Egan, J.: *Marketing Communications*, SAGE Publications Ltd, London, 2015.
- [9] Gladwell, M.: *Blink*, BackBay Books/Little Brown, New York, 2007.
- [10] Bovee, C.L. & Thill, J.V. & Schatzman, B.E.: *Business Communication Today*, Prentice Hall, New York, 2003.
- [11] Cope, K.: *Seeing the Big Picture: Business Acumen to Build Your Credibility, Career, and Company*, Greenleaf Book Group Press, Austin, Texas, 2012.



MANAGING DECISION-MAKING PROCESS IN "RADEMO-TRANS" LTD.

Radostina Emilova Yuleva

Faculty of Economics, South - West University "Neofit Rilski" Blagoevgrad, Bulgaria

Abstract: Managers of modern companies take decisions in the conditions of constant changes, incomplete information and opposing views on the problems that have arisen. The decision-making process is at the heart of strategic, tactical and operational planning. The decision-making process is a process of identifying the problem of the possibilities to overcome it and of choosing a decision about the removal or use of these options. The main objective of the present study is to clarify the essence of the managerial decisions and the process itself, to establish the efficiency of the managerial decisions in the company "Rademo - Trans" Ltd. and to offer a system for support of the decision - making process. The main research methods used in the development are content analysis, method of analysis and synthesis, intuitive and systematic approach.

Keywords: managerial decisions, company, manager, company "Rademo - Trans" LTD, process

1. INTRODUCTION

In the past senior executives were able to take and implement in practice solutions which would allow them to maintain leading positions on the market. But changes within the environment in which they work today, require much more important decisions that determine the future of the company. The growth, success and failures of each organization are defined by decisions taken by the management. It is not required for the important managerial decisions to have a strategic character. They can affect all aspects of company activities (structure, control system, external environment reaction, and human resources). When faced with an unexpected problem, the manager is required to take a management decision to solve the problem, implement it and control its consequences. The decision-making process determines the efficiency of overcoming difficulties, allocation of resources and achievement of the company goals.

One aspect of managing governance is as a process of continuous decision-making. [19] Further, we can point out that the objective of management is to maximize the number of managerial decisions that lead to quantified results, thereby reducing subjectivity. And as Peter Drucer notes, "the managerial decisions made concern the future existence of the enterprise and require continued and systematic work" [8]. Therefore, management is a perpetual decision - making process.

2. RESULTS AND DISCUSSION

2.1. ESSENCE OF MANAGERIAL DECISIONS

Managerial decisions express the conscious will of managers and are a result of their actions. "They contain the necessary impacts to influence the operations of the company. The need to develop a management solution arises when there is a discrepancy between the organizational goals and the actual situation [24]. "Taking a management decisions is a persistent part of the manager's daily work. Generally speaking, it can be described as a voluntary act by the subject of management with a subsequent impact on the object of management, in order to achieve certain goals. The management decision implies choice and is taken in the context of choice. It provokes various actions, operations and tasks by combination and employment of diverse resources - material, financial, human, intellectual, informational, etc. A review of the scientific literature regarding the nature of management decision gives reason to draw the following features of management decision: [24, 19, 9, 23, 11, 4, 14, 18]

- affects the management object and leads to changes in team behavior, activity, organization;
- it is inherent to the subject of management a willful and purposeful act;
- it is taken as a choice while subjected to different restrictions;
- it is a permanent part of management and fundamental for management actions;
- depends on the experience and style of the manager;
- it is a sequence of logically arranged stages, which in their implementation solve a given problem ;
- it is a process and a result of a process;
- takes place at different levels of the organization.

For the purposes of the study, it is necessary to clarify the specificities and criteria that management decisions should take into account: [8, 24, 5, 18]

- ✓ Timely setting and implementation - the decision should be taken within a time frame that does not aggravate the problem situation. This does not mean that the time between the occurrence of the problem and its solution must be minimized. It is good that the deadline is as short as possible, but this is not always possible. Its duration depends on the specifics of the problem itself;
- ✓ Rationality, including scientific, should only be taken when there is sufficient information on the problem situation and the possible implications for the system and its objectives, it is advisable to make a risk assessment if possible;
- ✓ Adaptability - the solution must be formulated so that adjustments can be made if there are difficulties in its implementation or environmental requirements are not met by it;
- ✓ Concreteness and complexity - it must be aimed precisely at the problem and at the same time describe and foresee all additional accompanying changes;
- ✓ Compatibility of the objectives set - the decision must be consistent not only with specific objectives at the level or structural features to which it relates, but also with the other goals of the organization, both horizontally and vertically;

- ✓ Clarity of the actions required by all those involved in its implementation;
- ✓ Legality - the management decision must be taken only by authorized persons;
- ✓ Assurance with resources.

Management is a conscious human activity. It is one of the most responsible and creative activities of man. For its part, "the management decision is a permanent link between the subject and the object of management, providing, on the one hand, an impact on the executive mechanism of the management system. It, in turn, generates the controlling influence upon the managed object. On the other hand, control as a feedback component, provides information about the discrepancy between the actual and desired state of the controlled object to the control system [3]. In this respect, M. Filipova states that "decision-making, as well as the collection and exchange of information, are an integral part of any managerial function" [24]. The demand of solutions permeates the whole activity of the leader - from the formation of the goals to their realization. Therefore, we can summarize that the management decision is a choice of alternatives, a choice of a certain approach, an action plan from the possible alternatives for solving a problem or situation.

We can conclude on the basis of the above, that one of the important aspects of the activity of the manager is to take and implement elaborate decisions. The effectiveness of each action depends on the accuracy and promptitude of managerial decisions. Management must ensure that the company goals are achieved. The management decision is a prescription of action, identifying measures to transpose the system from one state to another, or alter the state itself.

2.2 ANALYSIS OF THE DECISION – MAKING PROCESS IN “RADEMO – TRANS” LTD., BANSKO, BULGARIA

In order to establish the effectiveness of the decision-making process in the company "Rademo - Trans" Ltd., the author conducted a survey among the clients of the research company, monitoring and analyzing the decision making process in the company. The research was conducted using the following methods: method of analysis and synthesis, method of observation, content analysis, survey, statistical methods, intuitive and systematic approach. Microsoft EXCEL software product was used to create a database and process the information. The object of the survey is the company "Rademo - Trans" LTD., which specializes in transport and freight of goods for private customers and large production companies. Figures 1, 2, 3 and 4 present the results of the survey.

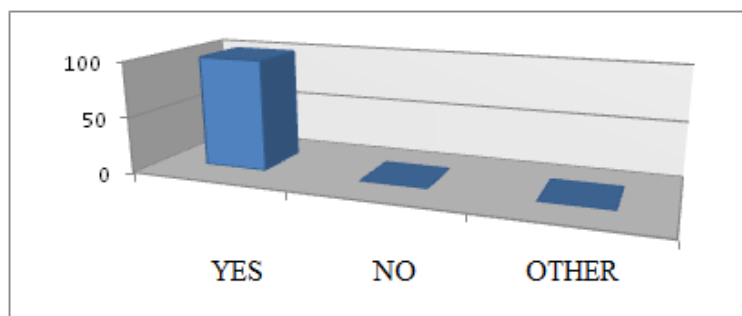


Figure 1. Opinion of respondents whether they would recommend the company to other clients

Source: own research

Chart 1 presents the opinion of respondents regarding whether they would recommend the company "Rademo - Trans" to other customers. It is clear from the data in the graph that 100% of respondents have answered the question positively. There are no other opinions registered in the polls on this issue, which leads to the conclusion that the company is a leader among its clients and it is a favorite choice.

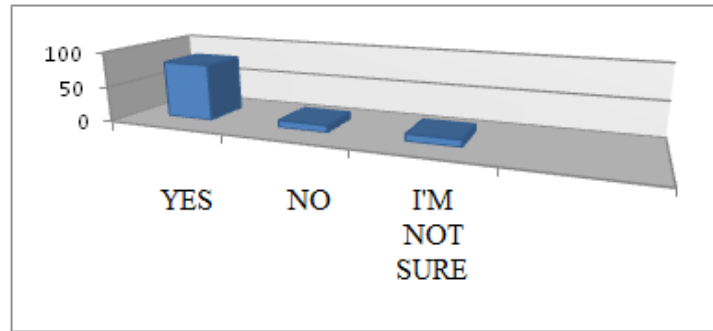


Figure 2. Customer feedback on the success of the company management

Source: own research

Figure 2 presents the respondents' answers to the question whether Rademo-Trans LTD is managed successfully. It is clear from the presented data that 80% of respondents have responded positively and believe the company is managed successfully and effectively, with only 10 % responding negatively, pointing out that some approaches of the company management should be changed. 10 % of survey respondents noted that they could not judge because they did not have enough information to answer the question asked in the survey.

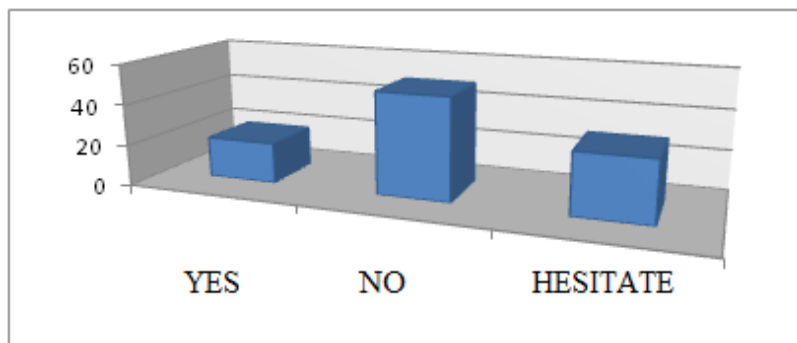


Figure 3. Respondents' opinion on the adequacy of the decisions taken in case of a customer problem

Source: own research

Figure 3 presents the assessment given by respondents about the adequacy of the decisions made and whether the manager responds quickly and adequately to a customer problem. The data shows that 50% of the respondents answered the problem negatively because they believe that the decision taken by the company manager is not fast enough and adequate to resolve the problem with the company's clients. 20% of respondents gave a

positive assessment and the remaining 30% hesitated and could not accurately determine their response due to insufficient awareness.

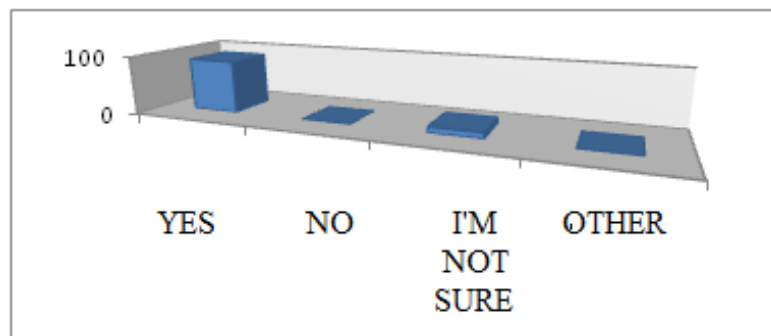


Figure 4. Opinion of the respondents on the activity of the manager of "Rademo - Trans" LTD

Source: own research

The opinion of the respondents in the survey on the evaluation of the activity of the manager of "Rademo - Trans" Ltd is visualized on figure 4. It is clear from the data presented in the chart that 90% of respondents have given positive answers believing that the manager is doing well with his activity and manages to bring the company to a high level. Only 10% said they could not judge because their awareness of this issue was not enough.

We can conclude, based on the presented results of the survey that "Rademo - Trans" Ltd. has built a high level of trust with its customers and is a leading company. The manager is doing well with his work and the success rate of the decisions made is high. After a detailed examination of the graphs of the study the we come to a conclusion that the effectiveness of the decisions and the process of taking management decisions the company are satisfactory. The survey found the problems with the agility and adequacy of decision-making when confronted with customer issues. This imposes the manager of "Rademo -Trans" Ltd. to improve the swiftness and the adequacy of decision-making, which will bring the company to a higher customer satisfaction. This can be achieved through implementation of a decision support system.

2.2.SYSTEM FOR ASSISTING THE DECISION MAKING PROCESS

Decision - making is a constant and continuous activity performed by managers. Apart from the main management functions, they are constantly taking managerial decisions related to various problems of a different nature. According to Madgerova, in the current conditions of rapid changes in the market environment, the existence and the development of the business are impossible without its multilateral information supply, which is an important basis for improving the quality and effectiveness of the taken managerial decisions. Information as a factor of effective management is a leading position and is becoming one of the most important and useful resources of the business. [15]

In the recent years, large amounts of operational data have been accumulated - information for customers, suppliers and competitors. Businesses require the use of information at a very detailed level. Businesses often need a quick establishment and instant deployment of a database which provides accurate and exact information. The decision

support system within the database is an extremely important factor for optimizing the return of investment for making the database that provides System users at all levels of the organization access to various information. [4]

The DSS - Decision Support System [5] can be easily interpreted as a system, as interconnected elements. For the purpose of the study, it is appropriate to present some more detailed interpretations of this concept:

- "DSS is an interactive computer-based system that assists managers in making unstructured decisions-solutions that do not have procedures or a structured way of action." [6]
- "DSS is an interactive computer-aided tool designed to assist managers in complex tasks requiring a human solution. The purpose of this system is to maintain and improve the decision-making process." [7]
- "DSS aims to provide access to information systems and analytical models directly to managers and takes on the challenge of adopting computing as the primary focus of information-related operations." [11]
- "DSS is the use of intellectual, analytical, financial and computer technology to help improve creativity in decisions that really matter" [10]

The main components of DSS are:

1. The database that is most useful for DSS may in turn be made up of internal and external data. In the company, a typical database of accounting and financial operations may need to be substantially supplemented by internal data on production, personnel, marketing, etc., as well as external data on competition, consumers, market conditions and the economy as a whole.
2. Base models. In case of need for decision support it is necessary: to have a computer for processing the information, to have access to a database in the company or to external sources and to simulate the effect of changes in the data or the effect of new information. It is necessary for this purpose to create a model that presents a real physical, economic, financial or other situation. The model is a simplified version of reality that describes the relations between essential variables in a particular environment.
3. The primary user of DSS is the decision maker. The other two types of users are analysts and advisors. Analysts are professionals in various decision-making areas (finance, marketing, production). As members of the management staff, they are very close to DSS, they spend a lot of time developing alternative solutions to problems.

Considering the above, we can summarize that strengthening the role of information is a prerequisite for making better use of the intellectual capabilities of managers who make managerial decisions. Information allows for new ideas to emerge, accumulate new knowledge and generate knowledge that is used in the decision-making process and supply new management information requirements.

3. CONCLUSION

In today's conditions, the importance of managerial decisions is immense and undisputed. The management decision must consider the interests of the entire system being managed, therefore be coherent, formulated, justified and precise. This means to indicate the specific place, time and manner of its execution, as well as the performers. It is also important

that it is taken at the necessary level and management, as well as prompt, because only a timely decision is effective. Information becomes one of the most important and useful resources of the modern company and an important factor for effective management. Increasing the effectiveness of the decision-making process can be achieved through the implementation of the DSS.

REFERENCES

1. Aleksandrov K., Management of Organizations and Enterprises, Lia Publishing House, 1995.
2. Andreeva M., Fundamentals of Management, Wall, Varna, 2003.
3. Angelov A., Fundamentals of Management, Thrace -M, Sofia, 2008.
4. Ganchev D., Development of a Management Decision, G., 2001.
5. Georgiev R., Business Solutions: Methodology and Organization, S., 2005.
6. Golubkov E., Kakoje print decision, M, 1990.
7. Darf R., Management, Pieter, 2006.
8. Drucer, P. "A New Discipline", Success! January - February 1997, p. 18.
9. Drucer P. The Practice of Management, Heinemann Profession Publishing, 1989.
10. Iliiev Joseph. The ability to motivate. Ed. New Star, Sofia, 2001, p.33.
11. Ivanovich D., D. Gibson, Fundamentals of Management, S., 1997
12. Kalvachev Iv., Management of the enterprise, Varna, 1989.
13. Leonidov, A. New Trends in EU and US Economic Growth: Comprehensive Analysis. Sp. Economic research. XIII, 2004, p. 2-3.
14. Litva B., Development of Managerial Decisions, M., 2004.
15. Madgerova R., Information Security of Small Businesses - Foundations of Effective Management, International Scientific Conference "50th University of Forestry", Sofia, 2005.
16. Micheva, G., Kurtova G., Slavyanska V., Fundamentals of Management, Gabrovo Express 2008.
17. Neykova R., Fundamentals of Management, Sofia, 2007.
18. Nutt P., Types of Organizational Decision Processes, Administrative Science Quarterly, 1984.
19. Paleshoutski K., Management of Small and Medium Enterprises, 2011.
20. Panayotov D. and P. Bodurova Fundamentals of Management. Compilation and general editing of. Varna Free University "Chernorizets Hrabar", Varna, 2004, p. 13.
21. Petrov S., Fundamentals of Management - Lecture Course, 2016.

22. Savov V. Basics of Governance. University Publishing House "Holding", Sofia, 2003, pp. 168-169.
23. Stancheva A., Fundamentals of Management, V., 2000.
24. Filipova M., Management Solutions, Blagoevgrad, 2008.
25. www1.ecs.ru.acad.bg/fbm/uis_m/uis-3.pdf, c.6



EVALUATION OF SUPPLIERS CRITERIA IN TEXTILE COMPANY USING ROUGH SWARA APPROACH

Marko Vasiljević¹, Željko Stević¹, Dragan Pamučar², Gordan Stojić³

¹University of East Sarajevo, Faculty of Transport and Traffic Engineering, Doboje, Bosnia and Herzegovina; ²University of Defence in Belgrade, Military Academy, Department of Logistics, Belgrade, Serbia; ³University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia

Abstract: Making decisions in which included uncertainty, subjectivity and vagueness are an integral part of the supply chain. The aim is to modeling the supply chain that will satisfy the requests of all stakeholders. As a first step of an adequate supply chain is a supplier selection that influences its further flow. The aim of this paper is to determine the relative weights of the criteria for the supplier selection in the textile company. In order to minimize uncertainty, subjectivity and vagueness, it is recommended to apply the rough sets theory. A new approach developed this year by Rough SWARA was used to determine the weight of the criteria. The company in which the research was conducted is located in the territory of Bosnia and Herzegovina. The results show that the quality of the materials, price of the material and delivery time are the most important criteria for supplier selection in the aforementioned textile company.

Keywords: Rough SWARA, supplier criteria, textile company, quality, delivery time

1. INTRODUCTION

Constant market changes require manufacturing companies to focus on suppliers that can provide them with a full and timely service. In order to satisfy the specific requirements of customers, the manufacturing companies must constantly search for an adequate supplier. In order to be sure of their adequacy it is necessary to evaluate them. For this purpose, the most common used methods are MCDM methods, because the supplier selection or the evaluation of the suppliers criteria represents a multi-criteria problem.

The textile industry can be said to be neglected in terms of supply chain management research. Recently, the industry has undergone a major change, especially with global sources and a high level of price competitiveness. In addition, textile have market characteristics, such as a short product life cycle, low predictability and a high degree of impulse buying, and these problems require the quickest answers because they are of the highest importance.

In the recent rapid advancement of information technology and economic globalization, the modern industry pays attention to a more precise division of labor. Accordingly, individual companies focus on the development of their core competencies and outsource inconsistent jobs with other partners or suppliers with different professional abilities to upgrade their competitive advantage by applying external and specific resources

and technological know-how. On the other hand, consumer behavior has been widely changed due to the increasing consumer ideology.

Therefore, the product life cycle of the product becomes shorter and each company has to offer a variety of customized products in order to satisfy the needs of consumers immediately. These pressures encourage businesses to actively invest in the supply chain management (SCM) and establish strategic alliances. Active investment in supply chains implies an adequate supplier selection that influences the complete flow of the efficiency of the transformation of the material into the finished product.

2. LITERATURE REVIEW

For the purpose of the supplier selection in the textile company in Istanbul [6], six criteria have been applied: quality, cost, on-time delivery, relationship closeness and conflict resolution. Applying the AHP method in [11] three different suppliers were valued on the basis of the criteria: cost, quality, delivery, flexibility, innovation, trust. The results showed that quality and delivery are the most important criteria in the SCM textile industry. Gurel et al. in [8] their research used eight main criteria: cost, delivery, quality, service, strategic alliance, pollution control, green product, environmental management divided into a total of 31 sub-criteria for the supplier selection in the green supply chain. Study [3] presents an example on solving the supplier selection problem in the apparel industry by using the Analytical Hierarchy Process (AHP), which takes the operational performance (for example, flexibility, cost, and delivery) into account for supporting supply chain strategies. Fuzzy TOPSIS was applied in [9] for the supplier selection based on 12 criteria divided into three main groups, while in [1] for evaluation suppliers within the textile and clothing industry using sustainability criteria is used grey theory. The combination of DEA and TOPSIS methods for evaluating 12 suppliers in a company in Taiwan was carried out in [4]. All nine criteria that have been evaluated in this study can be found in [5;7].

3. METHODS

3.1. ROUGH SET THEORY

In rough set theory, any vague idea can be represented as a couple of exact concepts based on the lower and upper approximations. That is shown in Figure 1.

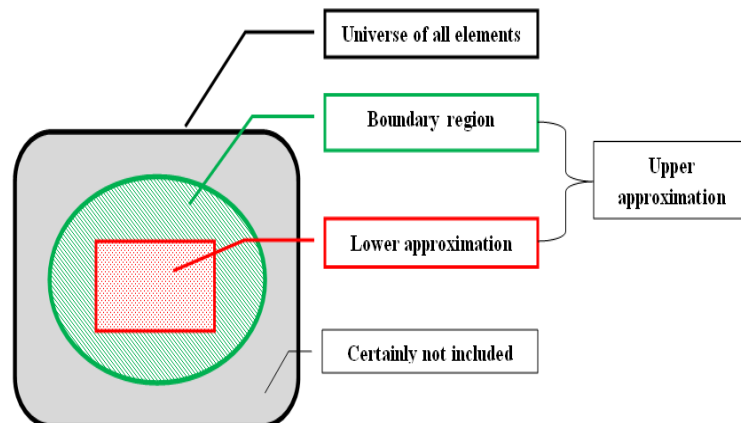


Figure 1. Elementary concept of rough set theory [14]

Suppose U is the universe which contains all the objects, Y is an arbitrary object of U , R is a set of t classes $\{G_1, G_2, \dots, G_t\}$ that cover all the objects in U , $R = \{G_1, G_2, \dots, G_t\}$. If these classes are ordered as $G_1 < G_2 < \dots < G_t$, then $\forall Y \in U, G_q \in R, 1 \leq q \leq t$, by $R(Y)$ we mean the class to which the object belongs, the lower approximation ($\underline{Apr}(G_q)$), upper approximation ($\overline{Apr}(G_q)$) and boundary region ($\overline{Bnd}(G_q)$) of class G_q are, defined as:

$$\underline{Apr}(G_q) = \{Y \in U / R(Y) \leq G_q\}, \quad (1)$$

$$\overline{Apr}(G_q) = \{Y \in U / R(Y) \geq G_q\}, \quad (2)$$

$$\begin{aligned} Bnd(G_q) &= \{Y \in U / R(Y) \neq G_q\} = \\ &= \{Y \in U / R(Y) > G_q\} \cup \{Y \in U / R(Y) < G_q\}, \end{aligned} \quad (3)$$

Then G_q can be shown as a rough number ($RN(G_q)$), which is determined by its corresponding lower limit ($\underline{Lim}(G_q)$) and upper limit ($\overline{Lim}(G_q)$) where:

$$\underline{Lim}(G_q) = \frac{1}{M_L} \sum \{Y \in \underline{Apr}(G_q)\} R(Y), \quad (4)$$

$$\overline{Lim}(G_q) = \frac{1}{M_U} \sum \{Y \in \overline{Apr}(G_q)\} R(Y), \quad (5)$$

$$RN(G_q) = [\underline{Lim}(G_q), \overline{Lim}(G_q)], \quad (6)$$

where M_L, M_U are the numbers of objects contained in $\underline{Apr}(G_q)$ and $\overline{Apr}(G_q)$, respectively.

The difference between them is expressed as a rough boundary interval ($IRBnd(G_q)$):

$$IRBnd(G_q) = \overline{Lim}(G_q) - \underline{Lim}(G_q), \quad (7)$$

The operations for two rough numbers $RN(\alpha) = [\underline{Lim}(\alpha), \overline{Lim}(\alpha)]$ and $RN(\beta) = [\underline{Lim}(\beta), \overline{Lim}(\beta)]$ are:

Addition (+) of two rough numbers $RN(\alpha)$ and $RN(\beta)$:

$$RN(\alpha) + RN(\beta) = \left[\frac{\underline{Lim}(\alpha) + \underline{Lim}(\beta)}{\overline{Lim}(\alpha) + \overline{Lim}(\beta)}, \right], \quad (8)$$

Subtraction (-) of two rough numbers $RN(\alpha)$ and $RN(\beta)$:

$$RN(\alpha) - RN(\beta) = \left[\frac{\underline{Lim}(\alpha) - \overline{Lim}(\beta)}{\overline{Lim}(\alpha) - \underline{Lim}(\beta)}, \right], \quad (9)$$

Multiplication (\times) of two rough numbers $RN(\alpha)$ and $RN(\beta)$:

$$RN(\alpha) \times RN(\beta) = \left[\frac{\underline{Lim}(\alpha) \times \underline{Lim}(\beta)}{\overline{Lim}(\alpha) \times \overline{Lim}(\beta)}, \right], \quad (10)$$

Division (/) of two rough numbers $RN(\alpha)$ and $RN(\beta)$:

$$RN(\alpha) / RN(\beta) = \left[\frac{\underline{Lim}(\alpha) / \overline{Lim}(\beta)}{\overline{Lim}(\alpha) / \underline{Lim}(\beta)}, \right], \quad (11)$$

Scalar multiplication of rough number $RN(\alpha)$, where μ is a nonzero constant:

$$\mu \times RN(\alpha) = [\mu \times \underline{Lim}(\alpha), \mu \times \overline{Lim}(\alpha)], \quad (12)$$

3.2. ROUGH SWARA APPROACH

SWARA (Step-wise Weight Assessment Ratio Analysis) method is one of the methods for determining weight values that play an important role in a decision-making process. The method was developed by Kersulienė et al. [10] and, according to them, its basic characteristic is the possibility of assessing the opinion of experts on the significance of criteria in the process of determining their weights.

Zavadskas et al. [15] in this year developed a Rough SWARA method which consists of the following steps:

Step 1: Define a set of criteria that participate in a decision-making process.

Step 2: Form a team of k experts who will assess the significance of criteria. First, it is necessary to rank the criteria according to their importance, from the most significant to the least significant. Subsequently, s_j - is determined in such a way, starting from the second criterion, to determine significances of how much the criterion c_1 is more important than the criteria c_{1-n} .

Step 3: Converting individual responses of experts into a group rough matrix c_j . Each individual response of the experts k_1, k_2, \dots, k_n should be converted into a rough group matrix using the equations (1)-(6):

$$RN(C_j) = [c_j^L, c_j^U]_{1 \times m} \quad (16)$$

Step 4: Normalization of the matrix $RN(C_j)$ in order to obtain the matrix $RN(S_j)$ (17):

$$RN(S_j) = [s_j^L, s_j^U]_{1 \times m} \quad (17)$$

The elements of matrix $RN(S_j)$ are obtained by applying the equation (18):

$$RN(S_j) = \frac{[c_j^L, c_j^U]}{\max[c_j^L, c_j^U]} \quad (18)$$

The first element of matrix $RN(S_j)$, i.e. $[s_j^L, s_j^U] = [1.00, 1.00]$, because $j = 1$. For other elements $j > 1$, the equation (18) can be calculated using the equation (19):

$$RN(S_j) = \left[\frac{c_j^L}{\max c_j^U}, \frac{c_j^U}{\max c_j^L} \right]_{1 \times m} \quad (19)$$

Step 5: Calculate the matrix $RN(K_j)$ (20):

$$RN(K_j) = [k_j^L, k_j^U]_{1 \times m} \quad (20)$$

by applying the equation (21):

$$RN(K_j) = [s_j^L + 1, s_j^U + 1]_{1 \times m} \quad (21)$$

Step 6: Determine the matrix of recalculated weights $RN(Q_j)$ (22):

$$RN(Q_j) = [q_j^L, q_j^U]_{1 \times m} \quad (22)$$

The elements of matrix $RN(Q_j)$ are obtained by applying the equation (23):

$$RN(Q_j) \left[q_j^L = \begin{cases} 1.00 & j=1 \\ \frac{q_{j-1}^L}{k_j^U} & j>1 \end{cases}, q_j^U = \begin{cases} 1.00 & j=1 \\ \frac{q_{j-1}^U}{k_j^L} & j>1 \end{cases} \right] \quad (23)$$

Step 7: The calculation of the matrix of relative weight values $RN(W_j)$ (24):

$$RN(W_j) = [w_j^L, w_j^U]_{1 \times m} \quad (24)$$

Individual weight values of criteria are obtained by applying the equation (25):

$$[w_j^L, w_j^U] = \left[\frac{[q_j^L, q_j^U]}{\sum_{j=1}^m [q_j^L, q_j^U]} \right] \quad (25)$$

4. EVALUATION OF SUPPLIERS CRITERIA IN TEXTILE COMPANY

Bosnia and Herzegovina has a long tradition and a good international reputation in the textile and clothing sector. About 100 companies operate in this sector in B&H, employing around 20,000 workers. The experienced and qualified labor force, the proximity of the markets of Western and Eastern Europe, the short delivery time to European traders, long tradition and know how - are all potentials attracted by international companies and investors.

Fashion industry affecting the problems of instability, it is difficult to anticipate fashion trends and consumer demands. In spite of recent improvements, traditional forecasting techniques can not bring the accuracy of the need for logistics management in the fashion market. Therefore, foreseeable risks can be reduced and this can be achieved by shortening the lead time, as this allows a better response to consumer demand. Speed on market has become a fundamentally important way to cope with the growing demand for fashionable types [2].

The quality of the final product that is reaching and proving to the customer is obviously the result of successive, interconnected phases: weaving, clothing and distribution. In this new competitive environment, quality must be a feature of all market segments - basic and fashion - in order to meet the specific requirements and tastes of all types of customers. Moreover, the quality can not be limited to the area of the quality of the goods themselves, but even more operational aspects must be taken into account [12].

The criteria evaluated in this paper are the result of a developed model in [13] based on a two-year research in the supply chain parts. The company in which the criteria for the supplier selection has been evaluated is located in the territory of Bosnia and Herzegovina, in the small city of Modriča. The following criteria were evaluated:

- K_1 – Quality of the materila,
- K_2 – Price of the material,
- K_3 – Certification of the products,

- K_4 – Delivery time,
- K_5 – Reputation,
- K_6 – Volume discounts,
- K_7 – Warranty period,
- K_8 – Reliability,
- K_9 – Method of payments.

Evaluation of the criteria is performed by three decision makers (DM), among which one is the owner of the company, another expert in the field of textile and the third is manager of a company that is employed in finance-related affairs.

Table 1. Comparison of the criteria by three DM

	E_1	E_2	E_3
C_1	1	1	2
C_2	2	2	1
C_3	9	8	7
C_4	3	2	2
C_5	7	7	6
C_6	5	5	3
C_7	8	6	7
C_8	6	4	4

Using the equations (1)-(6), a group rough matrix c_j is obtained as follows:

$$\tilde{c}_3 = \{9, 8, 7\}$$

$$\underline{Lim}(7) = 7, \overline{Lim}(7) = \frac{1}{3}(9 + 8 + 7) = 8.00$$

$$\underline{Lim}(8) = \frac{1}{2}(8 + 7) = 7.50, \overline{Lim}(8) = \frac{1}{2}(9 + 8) = 8.50$$

$$\underline{Lim}(9) = \frac{1}{3}(9 + 8 + 7) = 8.00, \overline{Lim}(9) = 9.00$$

$$RN(c_3^1) = [8.00, 9.00]; RN(c_3^2) = [7.50, 8.50]; RN(c_3^3) = [7.00, 8.00]$$

$$c_3^L = \frac{c_3^1 + c_3^2 + c_3^3}{n} = \frac{8.00 + 7.50 + 7.00}{3} = 7.50$$

$$c_3^U = \frac{c_3^1 + c_3^2 + c_3^3}{n} = \frac{9.00 + 8.50 + 8.00}{3} = 8.50$$

The complete matrix c_j obtained on the basis of previous calculations is:

$$\begin{aligned}
 RN(c_1) &= [1.11, 1.55], \\
 RN(c_2) &= [1.45, 1.89], \\
 RN(c_4) &= [2.11, 2.55], \\
 RN(c_9) &= [3.50, 4.50], \\
 RN(c_6) &= [3.89, 4.78], \\
 RN(c_8) &= [4.22, 5.11], \\
 RN(c_5) &= [6.45, 6.89], \\
 RN(c_7) &= [6.50, 7.50], \\
 RN(c_3) &= [7.50, 8.50].
 \end{aligned}$$

In the fourth step, it is necessary to normalize the previous matrix by applying the equations (17)-(19) in the following way.

The worst ranked criterion has the maximum value, which is the third criterion in this case. It has been said that the first element $RN(s_j)$ is equal to one, while the other elements of the same matrix are obtained by dividing them with the maximum values, in this case, with the values of c_3 criterion.

$$\begin{aligned}
 RN(s_2) &= \left[\frac{c_2^L}{c_3^L}, \frac{c_2^U}{c_3^U} \right] = \left[\frac{1.45}{8.50}, \frac{1.89}{7.50} \right] = [0.171, 0.252] \\
 RN(s_4) &= \left[\frac{c_4^L}{c_3^L}, \frac{c_4^U}{c_3^U} \right] = \left[\frac{2.11}{8.50}, \frac{2.55}{7.50} \right] = [0.248, 0.340]
 \end{aligned}$$

In the same way, it is necessary to calculate the other elements in order to obtain the matrix:

$$\begin{aligned}
 RN(c_1) &= [1.000, 1.000], \\
 RN(c_2) &= [0.171, 0.252], \\
 RN(c_4) &= [0.248, 0.340], \\
 RN(c_9) &= [0.412, 0.600], \\
 RN(c_6) &= [0.458, 0.637], \\
 RN(c_8) &= [0.496, 0.681], \\
 RN(c_5) &= [0.759, 0.919], \\
 RN(c_7) &= [0.765, 1.000], \\
 RN(c_3) &= [0.882, 1.133].
 \end{aligned}$$

In the fifth step, by applying the equation (21), all the elements of the previous matrix, except the first one that does not change the value, should be added to the number one and the following matrix is obtained:

$$\begin{aligned}
 RN(c_1) &= [1.000, 1.000], \\
 RN(c_2) &= [1.171, 1.252], \\
 RN(c_4) &= [1.248, 1.340], \\
 RN(c_9) &= [1.412, 1.600], \\
 RN(c_6) &= [1.458, 1.637], \\
 RN(c_8) &= [1.496, 1.681], \\
 RN(c_5) &= [1.759, 1.919], \\
 RN(c_7) &= [1.765, 2.000], \\
 RN(c_3) &= [1.882, 2.133].
 \end{aligned}$$

In the sixth step, the elements of the matrix of recalculated weight are calculated by applying the equation (23) as follows:

$$\begin{aligned}
 q_2^L &= \frac{q_{j-1}^L}{k_j^U} = \frac{q_1^L}{k_2^U} = \frac{1.000}{1.252} = 0.799, \\
 q_2^U &= \frac{q_{j-1}^U}{k_j^L} = \frac{q_1^U}{k_2^L} = \frac{1.000}{1.171} = 0.854 \\
 q_4^L &= \frac{q_{j-1}^L}{k_j^U} = \frac{q_2^L}{k_4^U} = \frac{0.799}{1.340} = 0.596, \\
 q_4^U &= \frac{q_{j-1}^U}{k_j^L} = \frac{q_2^U}{k_4^L} = \frac{0.854}{1.248} = 0.684
 \end{aligned}$$

It is important to note that $j-1$ denotes the previous criterion in relation to j . The rank of criteria from Step 3 is taken into account, which means that if, e.g. the value of the fourth criterion is calculated, $j-1$ represents the second criterion because it is the previous one according to ranking. The complete matrix $RN(Q_j)$ is:

$$\begin{aligned}
 RN(c_1) &= [1.000, 1.000], \\
 RN(c_2) &= [0.799, 0.854], \\
 RN(c_4) &= [0.596, 0.684], \\
 RN(c_9) &= [0.373, 0.485], \\
 RN(c_6) &= [0.228, 0.333], \\
 RN(c_8) &= [0.135, 0.222], \\
 RN(c_5) &= [0.071, 0.126], \\
 RN(c_7) &= [0.035, 0.072], \\
 RN(c_3) &= [0.017, 0.038].
 \end{aligned}$$

Using the equation (25) from Step 7, relative weight values of criteria are obtained. The example of calculation w_j is:

$$[w_2^L, w_2^U] = \left[\frac{0.799}{3.814}, \frac{0.854}{3.253} \right] = [0.209, 0.263]$$

$$RN(c_1) = [0.261, 0.307],$$

$$RN(c_2) = [0.209, 0.263],$$

$$RN(c_4) = [0.156, 0.210],$$

$$RN(c_9) = [0.098, 0.149],$$

$$RN(c_6) = [0.060, 0.102],$$

$$RN(c_8) = [0.035, 0.068],$$

$$RN(c_5) = [0.018, 0.039],$$

$$RN(c_7) = [0.009, 0.022],$$

$$RN(c_3) = [0.004, 0.012].$$

Table 2. Results of Rough SWARA method

	Sj		Kj=Sj+1		qj		wj		crisp		
	low	upp	low	upp	low	upp	low	upp			
C ₁	1.00	1.00	1.000	1.000	1.000	1.000	1.000	1.000	0.262	0.307	0.285
C ₂	1.45	1.89	0.171	0.252	1.171	1.252	0.799	0.854	0.209	0.263	0.236
C ₄	2.11	2.55	0.248	0.340	1.248	1.340	0.596	0.684	0.156	0.210	0.183
C ₉	3.50	4.50	0.412	0.600	1.412	1.600	0.373	0.485	0.098	0.149	0.123
C ₆	3.89	4.78	0.458	0.637	1.458	1.637	0.228	0.333	0.060	0.102	0.081
C ₈	4.22	5.11	0.496	0.681	1.496	1.681	0.135	0.222	0.035	0.068	0.052
C ₅	6.45	6.89	0.759	0.919	1.759	1.919	0.071	0.126	0.018	0.039	0.029
C ₇	6.50	7.50	0.765	1.000	1.765	2.000	0.035	0.072	0.009	0.022	0.016
C ₃	7.50	8.50	0.882	1.133	1.882	2.133	0.017	0.038	0.004	0.012	0.008
MAX	7.50	8.50				SUM	3.253	3.814	0.853	1.173	1.013

5. CONCLUSION

The textile industry is of great importance and is one of the most important industry branches and is closely related to logistics. Nowadays, the idea is that there is on the market not competing companies only, but their supply chains. In doing so, the focus is on finding all the factors that can improve supply chains and thus positively affect the company's success. The assessment of suppliers is a management decision-making process that indicates that some organizations choose their strategic suppliers by improving their competitive advantage in the market. Therefore that the textile and clothing industry records negative results in spite of great market potential, attention has been paid to finding possible positive links between supply chains as important business capacity. The application of the Rough SWARA method shows that the quality of the material, price of the material and delivery time are the most important criteria for the supplier selection in the aforementioned textile company. Further research requires the evaluation of suppliers currently located in several European countries.

REFERENCES

1. Baskaran, V., Nachiappan, S., & Rahman, S. Indian textile suppliers' sustainability evaluation using the grey approach. *International Journal of Production Economics*, 135(2), (2012), 647-658.
2. Birtwistle, G., Fiorito, S. S., & Moore, C. M. Supplier perceptions of quick response systems. *Journal of Enterprise Information Management*, 19(3), (2006), 334-345.
3. Chan, F. T., & Chan, H. K. An AHP model for selection of suppliers in the fast changing fashion market. *The International Journal of Advanced Manufacturing Technology*, 51(9-12), (2010), 1195-1207.
4. Chen, Y. J. Structured methodology for supplier selection and evaluation in a supply chain. *Information Sciences*, 181(9), (2011), 1651-1670.
5. Gary Teng, S., & Jaramillo, H. A model for evaluation and selection of suppliers in global textile and apparel supply chains. *International Journal of Physical Distribution & Logistics Management*, 35(7), (2005), 503-523.
6. GüNeri, A. F., Ertay, T., & YüCel, A. An approach based on ANFIS input selection and modeling for supplier selection problem. *Expert Systems with Applications*, 38(12), (2011), 14907-14917.
7. Guneri, A. F., Yucel, A., & Ayyildiz, G. An integrated fuzzy-lp approach for a supplier selection problem in supply chain management. *Expert systems with Applications*, 36(5), (2009), 9223-9228.
8. Gurel, O., Acar, A. Z., Onden, I., & Gumus, I. Determinants of the green supplier selection. *Procedia-Social and Behavioral Sciences*, 181, (2015), 131-139.
9. Jia, P., Govindan, K., Choi, T. M., & Rajendran, S. Supplier selection problems in fashion business operations with sustainability considerations. *Sustainability*, 7(2), (2015), 1603-1619.
10. Keršuliene, V., Zavadskas, E. K., & Turskis, Z. Selection of rational dispute resolution method by applying new step-wise weight assessment ratio analysis (SWARA). *Journal of business economics and management*, 11(2), (2010), 243-258.
11. Koprulu, A., & Albayrakoglu, M. M. Supply chain management in the textile industry: a supplier selection model with the analytical hierarchy process. In *Proceeding of the International Symposium on the Analytic Hierarchy Process. Viã±a Del Mar, Chile*. (2007)
12. Romano, P., & Vinelli, A. Quality management in a supply chain perspective: strategic and operative choices in a textile-apparel network. *International Journal of Operations & Production Management*, 21(4), (2001), 446-460.
13. Stević, Ź., Integrated model for supplier evaluation in supply chain (Integrisani model vrednovanja dobavljača u lancima snabdevanja), Doktorska disertacija, (2018), *Univerzitet u Novom Sadu, Fakultet tehničkih nauka*

14. Vasiljevic, M.; Fazlollahtabar, H.; Stevic, Z.; Veskovic, S. A rough multicriteria approach for evaluation of the supplier criteria in automotive industry. *Decision Making: Applications in Management and Engineering*, 1(1), (2018), 82-96.
15. Zavadskas, E. K., Stević, Ž., Tanackov, I., & Prentkovskis, O. A Novel Multicriteria Approach–Rough Step-Wise Weight Assessment Ratio Analysis Method (R-SWARA) and Its Application in Logistics. *Studies in Informatics and Control*, 27(1), (2018), 97-106.



WHAT ARE THE TRANSMITTING CHANNELS OF 2007-2008 GLOBAL FINANCIAL CRISIS TO THE ECONOMY OF PALESTINE? AND HOW THE LAST IS INFLUENCED AND SURVIVED?

Islam Bolbol

*Doctoral School of Business Administration, University of Pécs,
Hungary*

Abstract: The economy of Palestine is significantly affected by Israel's economic shock policies especially in the absence of any economic and political settlements between both parties in which these impediments are creating great challenges for the prospected final solution. This paper would collocate the way through a brief definition of the global financial crisis of 2007-2008, its origin, its causes, effects, and its transmitted channels. Then, this paper would also discuss the meaning of monetary policy in general with its tasks, its major components, and mechanisms. Going deeply, the literature reviews would go further to the topic nucleus through defining the Palestine Monetary Authority (PMA), its origin, its territories' governance, its functions, and mentioning the main official currencies that are circulating in Palestine. The influence of global financial crisis of 2007-2008 on the economy of Palestine would be provoked with emphasizing on channels that transmitted this crisis to Palestinian economy and how the last survived under the existing light of deliberated Israeli procedures. Nevertheless, for the purpose of presenting the full picture, this paper would illustrate the current Palestine Monetary Policy (PMP) during the years of 2011-2015 with its main elements, interlaced links, and mechanisms such as growth, inflation, and unemployment rates, clearance and grants as a percent of public revenues and expenditures, domestic saving as a percent of GDP for selected countries compared to Palestine, lending and deposit interest rates for the main circulated currency in Palestine such as USD, Jordanian Dinar (JOD), and New Israeli Shekel (NIS), and annual change in USD exchange rate against New Israeli Shekel (NIS) in Palestine; and how all of that together with the deliberated Israeli procedures would massively affect the PMP during the years of this study. Finally, the conclusion and future research would be settled down at the end of this paper.

Keywords: Global Financial Crisis, Economy Of Palestine, Monetary Policy Of Palestine, Gross Demotic Product (GDP), Growth, Inflation, Unemployment, Interest, Clearance, Grants, Domestic Saving, Lending And Deposit Interest, And Exchange Rates

1. INTRODUCTION

The global financial crisis refers to a situation when inadequate financial information leads to a general panic due to confidence lack where all parties of financial contracts in several countries would worth less than what previously thought simultaneously because of

the values of financial assets are decreased. Furthermore, these parties such as banks would cease advance funds to their clients, would start to demand early loans as well as other financial instruments repayment, liquidate some financial assets, raise collateral requirements in which all of that would lead to freezing the financial markets [7].

Moreover, private individuals would participate in such crisis through their fear on their wealth in which they would demand the financial institution to repay their money back or even holding their wealth either in the form of gold, cash, or in any other tool that has a real intrinsic and precious value [7]. Nevertheless, The real global financial crisis started in September 2008, from US investment bank, Lehman Brothers where the last collapsed due to the sharp revaluations of lower quality US mortgage-backed securities' prices (called for subprime mortgages) regardless of many other financial markets started to malfunction before that time such as some European countries which they started to suffer from a notable recession from the third quarter of 2007 [7] and [9].

Adding more weights, the US government rejected any type of bailing out which lead to such counterparty risk fears and lastly lead to almost drying up of financial markets' transactions in the third and the fourth quarters of 2008. As a consequence, the reduction of working capital results desperate companies to liquidate their stocks, cut purchasing of components and parts, and firing staffs in which the whole international markets began to plummet [7].

Thus, this loss of confidence disseminated its contagion to stocks markets, insurance firms, bank deposits, government bonds, and all other country's sectors in which this contagion crossed the borders and transmitted to other nations through the standard linkages between their financial and economic systems [4]. Nevertheless, according to the [7] that the following four major channels had disseminated the contagion from the source nation to others:

Firstly, the international financial assets investments losses affected their owners directly in their home countries. Secondly, the participants of financial markets in a particular nation assessed specific and obvious immanent risks at one state in which these circumstances would be similar in other countries for the purpose of warning them that this recession would occur at your place; such as what happened in the aftermath of Thailand Succumbing to a financial crisis in July 1997, where the currencies of other southeast Asian countries as well as their assets prices' fell in their values due to the perceived commonalities in their governance, institutional markets, and structures regardless of even if these kinds of assessments were right or wrong.

Thirdly, the severe economic downturns led to minimize the exports and reduce the national incomes through the utilized international supply chains in which the sales of final products' reductions shrank the foreign sourced orders, components, and parts where all of that is called as bullwhip effect, and later this effect led to a sharp fall in the global trade.

Finally, the volition of government policies to bolster its domestic economy at the expense of other countries' economies such as the policies of beggar-thy-neighbour where the last is attributed to taxing foreign companies and workers worse than competitive domestic ones, subsidising exports for the purpose of winning international contracts at the expense of companies located in trading partners, restricting governmental contracts to local companies, depreciate national currencies, increasing trade barriers and tariffs, and force the domestic financial firms to repatriate their international financial assets.

After this quick introduction about the general origin, causes, effects, and transmitted channels of this global financial crisis of 2007-2008, the next section would establish literature reviews to go deep to the nucleus of the topic through defining the meaning of

monetary policy in general, its major components and mechanisms. Then, the literature reviews would be more specific through defining the Palestine Monetary Authority (PMA), its origin, its territories' governance, and mentioning the main official currencies that are circulating in Palestine.

Then, Section number (3) would focus on the influence of global financial crisis of 2007-2008 on the economy of Palestine in which that section would also emphasize on how this crisis had been transmitted to Palestine through illustrating the most significant channels that lead this crisis contagion to hit the economy of Palestine and how the last survived.

Section number (4) would discuss and analyze the current Palestine Monetary Policy (PMP) during the years of 2011-2015 with its principal elements and mechanisms such as growth, inflation, and unemployment rates, clearance and grants as a percent of public revenues and expenditures, domestic saving as a percent of GDP for selected countries compared to Palestine, lending and deposit interest rates for the main circulated currency in Palestine such as USD, Jordanian Dinar (JOD), and New Israeli Shekel (NIS), and annual change in USD exchange rate against New Israeli Shekel (NIS) in Palestine; and how all of that together with the deliberated Israeli procedures would massively affect the PMP during the years of this study. Finally, the last section would draw the conclusion and the future research.

2. LITERATURE REVIEWS

Monetary policy is that operation get used to being run by the monetary authority of a particular country, such as the currency board or the central bank for the purpose of controlling the money supply, interest rate, and targeting the inflation rate as well as guaranteeing the stability of prices and boosting public trust in the currency. Furthermore, monetary policy has additional aims in which it usually participates in economic growth and steadiness in order to minimize the unemployment rate and keep foreseeable country's exchange rates with other currencies [3], [12], and [17].

Since the 1970s, the monetary policy has been set up individually from fiscal policy in which the last regards to lending and borrowing, government spending, and taxation as well; while the monetary economics gives visions about how to handle the optimal monetary policy [8]. Moreover, monetary policy could be either contractionary or expansionary in which both of them would happen in particular circumstances. Applying expansionary policy by utilizing monetary authority instruments to encourage the economy through raising the total money supply more quickly than the normal [1].

In addition, another expansionary monetary policy duties are fighting unemployment rate in case of recession through minimizing the interest rates in the hope that easy credit will attract businesses to be widened in which this raises the total demand for all services and goods and elevate growth, and it could be measured by gross domestic product (GDP). An expansionary monetary policy reduces typically the currency value in which it leads to minimize the exchange rate as well [1].

On the contrary, as there is expansionary monetary policy, the vice versa is a contractionary monetary policy where the last shrink the growth rate of money supply or even slows it down in which this decelerate the economic growth to minimize or preventing inflation. Also, the contractionary monetary policy would boost the unemployment and decrease spending and borrowing made by businesses and consumers which finally this could lead to an inevitable economic recession; thus this policy should be well conducted and managed with high care by the monetary policy authority of a given country [2].

Going further, in the year of 1995, the PMA established its duties as an independent institution initially by the late President Yasser Arafat (may Allah has mercy on him) through a presidential decree in which its autonomy and authority of money and banking markets subsequently formed in the law number (2) of 1997. The primary goal of the PMA is to maintain and keep the steadiness and efficiency of Palestinian financial system, boosting the economic sustainability as well as promoting the financial growth of Palestinian economy by transparent and efficient rules and regulations for the purpose of supervising not only the banks' operations but also the payments' system in Palestine. Furthermore, the PMA longer-term ambition is to become the central bank for the future independent Palestinian state [16]³⁴³⁵³⁶.

Nevertheless, until today the PMA does not yet fully operate the monetary policy due to that it cannot issue a national currency without Israeli agreement because Palestine is under the occupation of Israel and officially there is no Palestinian state. Since the Israeli occupation in the year of 1967, Palestine is formally named as Occupied Palestinian Territory (OPT) in which it represents West Bank including Jerusalem and Gaza Strip where Israel destroyed the Palestinian Central Bank and terminated the using of Palestinian Pound (PAP) and Jordanian Dinar (JOD) where both of them were circulated in Palestine. After this occupation, Israel complied its New Israeli Shekel (NIS) as a formal currency of Palestine [14].

Furthermore, according to Paris Protocol on Economic Relations between the Government of Israel and the Palestine Liberation Organization (PLO) which it signed in Oslo agreement in the year of 1994, the NIS would be used as a legal tender and would serve as means of payment in the OPT. Furthermore, Oslo agreement also agrees that the JOD and the United States Dollars (USD) function as legal tenders as well [14].

Accordingly, around 50% of Palestine's banks' customer deposits are in USD, followed by 26% of JOD, then 22% are in NIS, while the other 2% are in various currencies. Nevertheless, the JOD is pegged to USD where both of them are fundamental deposit currencies, while the NIS is utilized for significant retail transactions. However, in the year of 2007, the transitions between banks operating in OPT and Israel reached 20 Billion NIS approximately because of Israel is considered as the most significant trading partner of OPT [16].

In the year of 2006, the PMA adopted a Strategic Transformation Plan (STP) in which the PMA prepared itself to convert its current institution from agency of banking supervision to a full-fledged modern central bank. The major aspects of STP are essential interior renovation and restructuring itself through adopting of a pure emphasizing over the monetary twin missions which they represent the financial steadiness and designating of a Research and Monetary Policy Department (RMPD); where the STP also visualize the adoption of "Real Time Gross Settlement (RTGS) payments system" [16].

³⁴ Wazir: Assistant Director of International Monetary Fund from January 2016 – Present (1 year); Governor and Chairman of the Board of Palestine Monetary Authority (PMA) from January 2008 – November 2015 (7 years 11 months); Acting as Finance Minister of Palestine from 2005 – 2006 (1 year); & acting as Deputy Finance Minister of Palestine from 2004 – 2005 (1 year).

³⁵ Atallah: Director of Monetary Policy Research Department in Palestine Monetary Authority (PMA).

³⁶ Sarsour: Research Associates & Economic Researcher in Research and Monetary Policy Department of Palestine Monetary Authority (PMA).

3. THE INFLUENCE AND TRANSMITTING CHANNELS OF THE GLOBAL FINANCIAL CRISIS OF 2007-2008 ON THE ECONOMY OF PALESTINE, AND HOW THE LAST SURVIVED

As well known that transmission of the global financial crisis came from developed countries to less developed ones not only through their international banking channels but also through the whole economic relations between them. Nevertheless, because of the limited connection between the international, regional, or even emerging markets in term of capital markets or investments; the volatility in the stock markets are considered to be very bounded.

Furthermore, the Palestinian financial market is connected to the global financial crisis by its transmission impacts from Israeli economy due to the forthcoming reasons that would be later mentioned in this paper. Moreover, the inclusion of the Palestinian economy by the Israeli economy made the Palestinian economy performance subjects to be affected by any disaster or advantage that comes from the Israeli economy. So, the global financial crisis had been transmitted to the Palestinian economy through the following three channels:

3.1 PALESTINIAN TRADE WITH ISRAEL

During the last five decades, Israel is considered as the primary trade partner with West Bank and Gaza Strip (WBGs) in which more than 90% of the Palestinian goods' exports are directed to the Israeli markets; while 80% of the Palestinian merchandises' imports are coming from Israel. Thus, any variation that would happen in the Israeli macroeconomic forces would obviously affect the level of trade between WBGs and Israel. In addition, the Palestinian goods' importing represents 70% of the WBGs GDP approximately. At the crisis, the Palestinian exporters avoided the local currency devaluation against USD through paying in local currencies (either NIS or JOD) in which it encouraged the Israeli importers to buy more Palestinian goods in NIS as well, rather than in USD [6].

As a consequence of the crisis, particularly during the years of 2008 and 2009, the Israeli economic policies focused on stabilization and amendments of prices for the purpose of increasing the aggregate demand in which this also reflected in the Palestinian economy as well, where the inflation rates in both Palestine and Israel were swinging between 4% and 5%. Indeed, the local Palestinian prices were stabilized by increasing imports from Israel where it reached 60% approximately of Palestinian consumption demand [6] and [13].

3.2 INTERNATIONAL FINANCIAL FLOWS FROM DONOR COUNTRIES

In the year of 2009, the Palestinian economy was anticipated to suffer from the global financial crisis by decreasing international grants and aids, particularly from Europe and Gulf countries as a consequences of USD fall as well as the natural losses of these countries due to the general crisis, in which these aids are significant for the purpose of financing the developments and humanitarian projects in Palestine [5].

Additionally, these foreign aids are covering the budget deficit in which they reached around \$2 billion in the year of 2008, and they represented 22% approximately of Gross National Disposable Income (GNDI). Moreover, these aids also cover around 60% of the current expenditures in which any reduction in the Palestinian National Authority (PNA)

budget would reduce the health and social services, food to the people, and even shutting down some institutions and associations which they get 100% funding from abroad [5].

During the years of 1999 - 2009, the donors' grants quadrupled from \$ 497 million to \$ 1.953 billion in 2008 in which 90% of them were used in budget financing purpose, especially that since the year of 2006, the PNA local revenues were insufficient to finance the public sector' salaries and wages bill where the last represented around 55% of the total public expenditures. Last but not least, these grants also demonstrate 40% of GDP approximately [15], [10], and [11].

3.3 BANKING SYSTEM

As the normal of any country, the necessity of international investment exists in Palestinian banking system in which the last invest their deposits abroad in the form of Certificates of Deposits (CDs) and short-term financial debt securities which they represented around 50% of the Palestinian banking system investments' resources. Only 2% were invested in US banks which made the influences of the crisis to be very limited because of the small size of these deposits which they are made by Palestinian residents in both foreign and local banks operating in either in Palestine or abroad [15].

The reasons behind this limited effect of the banking system during the time of global crisis that in the year of 2007, the PMA declared a package of acts for the purpose of regulating the Palestinian banking system and decreasing the banks' investing risk in international deposits which they are as the following:

I- Any bank wants to invest in foreign treasury bills, bonds, or even stocks must take the PMA approval first.

II- The PMA prohibited any bank to invest in any country that imposes money transactions regulations.

III- The PMA prohibited investing deposits in any non-banking institution by Palestinian banks.

IV- In the case of any Palestinian wants to invest his or her money abroad, the International Standard Credits (ISC) must be taken into consideration.

V- Providing customer loans to invest in Palestinian securities is prohibited by the PMA.

VI- Fines, Penalties, and certain measures would be imposed on any Palestinian bank violates one of these regulations.

Unsurprisingly, the total investments in international bonds and stocks by Palestinian banks reached around 6% at the time of crisis in which made its effect to be limited not only on the Palestinian banking system but also on the PNA where the data available at that time showed an excellent deposits stability in the Palestinian banks. In other words, the amount of deposits increased instead of decreasing in which they raised from \$4.6 billion in 2007 to \$5.8 billion in 2008 and to \$6.5 billion in 2009 which they represented a raise by 26% and 41% in the years of 2008 and 2009 respectively, where both of them are compared to the base crisis year of 2007 [15].

4. THE CURRENT PALESTINE MONETARY POLICY (PMP) MECHANISMS AND HOW IT IS AFFECTED BY ISRAELI PROCEDURES DURING THE YEARS OF 2011 UNTIL 2015

For the purpose of presenting a full and a real explanation of how global financial crisis affects the PMP; the illustration of interlaced links that would jeopardize the PMP either internally or externally during an up to date years of 2011 to 2015 would be presented:

4.1 PALESTINIAN ECONOMIC PERFORMANCE IN TERM OF GROWTH, INFLATION, AND UNEMPLOYMENT RATES DURING THE YEARS OF 2011-2015

According to figure (1) that in the year of 2015, the Palestinian economy expanded in marvelous way in which the GDP increased by 3.5%, in comparison with 2014 where it dropped down to -0.2% as a consequence of the last Israeli war against Gaza Strip which happened in July, 2014 in where Israel deliberated in that aggression to do enormous damages to the production and infrastructure bases together with clearance revenue transfers suspension and a significant increase of Israeli restrictions and violations imposed on individuals, goods, and services whether inside OPT or between Palestine and other countries. Nevertheless, the inflation rate decreases from 1.7% in 2014 to 1.4% in 2015 due to price consistency in which it developed adequately; while the unemployment rate fell to 25.9% in 2014 compared to 26.9% in 2015 due to the large creating of several jobs [14].

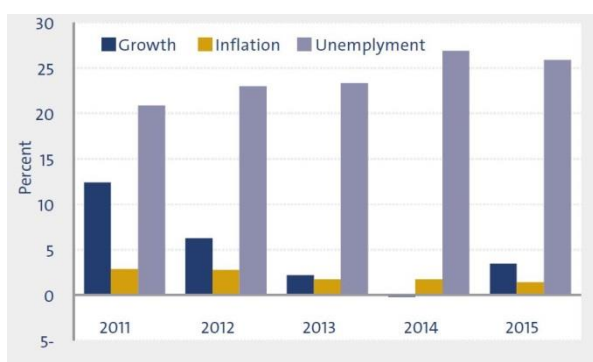


Figure 1. Palestinian economic performance during 2011-2015, [14]

The government of Palestine succeeded in decreasing both the current and overall deficits before having grants from donors' countries (i.e., the European Union and some Arab countries) in which the public revenues were higher than the public expenditures, and after aggregating these grants, the total balance had excess money in 2015. Although of some developments in the year of 2015 regarding the fiscal performance, the governmental public debt raised by 14.5% compared to the previous year where it reached 2,537.2 million of USD (about NIS 9,908.1 million) representing around 20% of the GDP in which all of these attributed to the notable rise of local government debt by 30% with USD 1,466.5 million while the external governmental debt was 1.7% with USD 1,070.7 million. By the end of 2015, the government arrears in which they are payable to the private sector and for its employees' wages and salaries reached NIS 12,928.1 million representing 27.4% of the GDP [14].

4.2 CLEARANCE AND GRANTS AS A PERCENT OF PUBLIC REVENUES & EXPENDITURES DURING THE YEARS OF 2011-2015

The Palestinian government suffers from financial fragility which it reflected in depending on one of two financing sources whenever Israel halts the clearance revenues' transfer. The two sources of funding are grants from Arab safety net financed by the Arab World or borrowing from local banking sector which in turn that would increase the local and national debts as this was mentioned before where figure (2) presents that the local and national debts which they reached around 1,466.5 million of USD representing 30% of the GDP in the year of 2015. However, the importance of foreign grants reflected during 2011-2015 in which they reached 31% of the public expenditure on an ordinary matter. In the year of 2015, these grants represented around 79.8% of net public revenues and they could cover about 82.5% of the public expenditure [14].

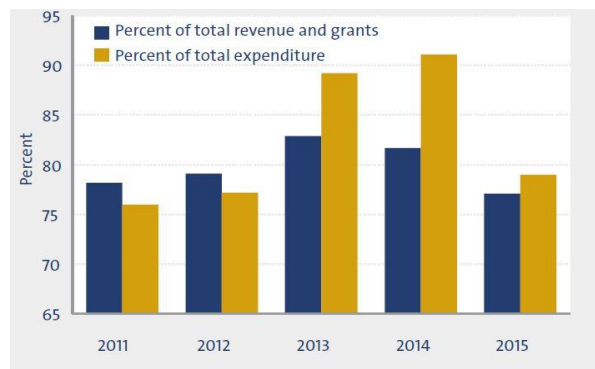


Figure 2. Clearance and grants as a percent of public revenues and expenditures during 2011-2015, [14]

4.3 DOMESTIC SAVING AS A PERCENT OF GDP FOR SELECTED COUNTRIES DURING THE YEARS OF 2011-2014

As figure (3) shows that all Palestinian local saving rates as a percent of GDP are negative, while the Arab World has the highest rates of saving with 39.6%. Even in the case of comparing Palestine with the lowest income countries, it is notable that they had 9.2% during the same period which this attributed to the Israeli occupation policies where the last is doing a systematic destruction of Palestinian domestic production forces which this leads the Palestinian economy to be incapable of covering the local consumption needs. Taking into consideration and comparing to several countries worldwide, Palestine has a good ratio of average salaries and wages to the average total public expenditures with 48.6% in the year of 2014 and 50.7% on the average during 2011-2014 [14].

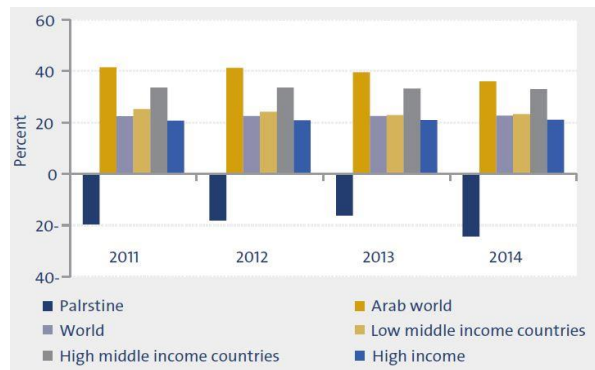


Figure 3. Domestic saving as a percent of GDP, selected countries during 2011-2014, [14]

4.4 LENDING AND DEPOSIT INTEREST RATES FOR USD, JOD, AND NIS IN PALESTINE, 2014-2015

In this Figure (5), it is notable that the USD increased from 5.58% to 5.84%, while the JOD and NIS decreased from 6.95% to 6.85% and from 9.5% to 8.61% during the years of 2014 and 2015 respectively. All of these occurred due to the reflection of the financial intermediation efficiency enhancements in the Palestinian banking system in which these improvements touch the soul of interbank competitiveness and highlight the policies and measurements that adopted by the PMA where the last targets are boosting the competitiveness and efficiency of Palestinian banking system [14].

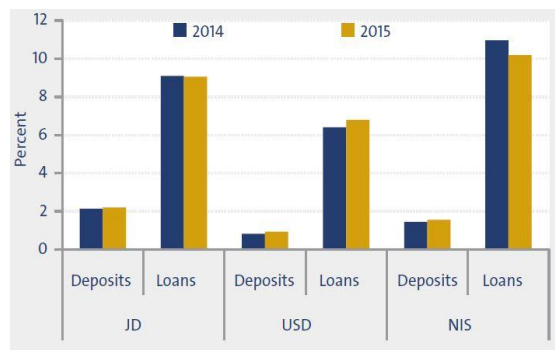


Figure 4. Lending and deposit rates in Palestine during 2014-2015, [14]

Furthermore, these policies and measures include financial inclusion, geographical dispersion, creating more prominent and more competitive banking institutions through banking mergers and acquisition, and create a colossal credit information system database are handled for the purpose of boosting the velocity and specialization of bank loans decisions where the Palestinian interest rates developments made it sits on the highest throne of interest rates in comparison with the neighbouring countries such as Egypt, Jordan, Lebanon, and Syria.

From another angle, the Palestinian banking sectors receive significant threats from countries whose issuing their currencies in circulation in Palestine, particularly USA, Israel, and Jordan due to the fluctuation of their interest rates. Moreover, the interest rates in the Palestinian market have more probability of declining more than to climb, in both of lending

and depositing cases, due to hedging policies adopted by banks where the last invest their excess liquidity of these specific currencies at currency-issuing countries' international banks.

4.5 ANNUAL CHANGES IN USD EXCHANGE RATE AGAINST NIS, 2011-2015

The exchange rate is considered as one of the main risks that threaten the Palestinian economy in general where the banking system of Palestine, in particular, utilize the mentioned three different currencies namely USD, JOD, and NIS. Some of these threats are represented in governmental budget deficit where Palestine receives almost of its international grants either by USD or Euros, while the central part of Palestinian expenditures are in NIS for the purpose of wages and salaries payments to its employees in which all of these are affecting and influencing not only the Palestinian financial system but also the whole economy.

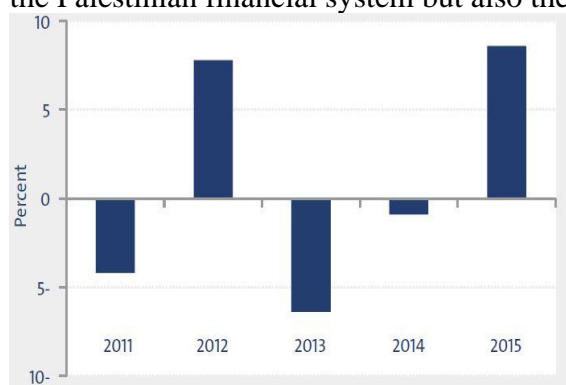


Figure 5. Annual change in USD exchange rate against NIS during 2011-2015, [14]

Also, the amount of public debt is affected by the fluctuation of exchange rates, particularly in the case of borrowing from banking system where the domestic debt represented around 70% and overdraft balances with banks are in NIS. Nevertheless, figure (2) shows a significant fluctuation in the exchange rate between USD and NIS during the years of 2011-2015 where the last had swung from -7% to 8% (total difference of 15%) which this is considered as a major source of risk [14].

5. CONCLUSION AND FUTURE RESEARCHES

The Global financial crisis had an insufficient impact not only on the PMP but also on the whole economy of Palestine which this attributed to the restricted linkage of Palestinian stock market with other international markets. Nowadays, the PMA has diversified investment portfolios in 22 international banks which all of them are under the international financial system exposure [14]. As consequence of the adopted conservative PMP procedures regarding regulating the Palestinian banking system and decreasing the banks' investing risk in international deposits, around 95% of banks' foreign assets operating in Palestine are protected from the international financial markets risks of both control and dominance [14]. Future researches could be conducted from various angles such as investigating the influence of this global financial crisis of 2007-2008 on the Palestinian non-financial institutions (i.e. Industry and Construction firms' sectors) in which the last has several characteristics that

would be affected by this crisis such as their financial depth, their financial inclusion, their financial efficiency, and finally their financial stability.

REFERENCES

1. Amadeo, K., Expansionary Monetary Policy: Definition, Purpose, Tools (2016a). Retrieved May 5, 2018, from The Balance: <https://www.thebalance.com/expansionary-monetary-policy-definition-purpose-tools-3305837>
2. Amadeo, K., Contractionary Monetary Policy: Definition, Examples (2016b). Retrieved May 07, 2018, from The Balance: <https://www.thebalance.com/contractionary-monetary-policy-definition-examples-3305829>
3. Board of Governors of the Federal Reserve System, (2016). Retrieved May 03, 2018, from Federal Open Market committee: <https://www.federalreserve.gov/monetarypolicy/fomc.htm>
4. Claessens, S., & Kose, M. A., Financial crises explanations, types, and implications, The Australian National University, Canberra, Australia 2013.
5. El-Jafari, M., The Impact of the World Financial Crisis on the Palestinian Economy. Institut Europeu de la Mediterrània, (2010), 45-49.
6. El-Jafari, M., & Yousef, D. Palestinian Capacity, United Nations Conference on Trade and Development, 2010, Geneva, Switzerland, 2010,
7. Financial Times Lexicon, (2017). Retrieved January 25, 2018, from Definition of global financial crisis: <http://lexicon.ft.com/Term?term=global-financial-crisis>
8. Friedman, B. M., Monetary policy. International Encyclopaedia of the Social & Behavioural Sciences, (2001), 9976-9984.
9. Guillén, M. F., The global economic & financial crisis: A timeline. The Lauder Institute: University of Pennsylvania, Pennsylvania, 2009.
10. Kanaan, O., Gomez, J., & Sumlinski, M., Macroeconomic and fiscal framework for the west bank and Gaza: fourth review of progress. IMF, New York, 2009.
11. Kanaan, O., Gomez, J., & Sumlinski, M., Macroeconomic and fiscal framework for the west bank and Gaza: fifth review of progress. IMF, Madrid 2010.
12. Jahan, S., Inflation Targeting: Holding The Line (2012). Retrieved April 25, 2018, from International Monetary Fund: <http://www.imf.org/external/pubs/ft/fandd/basics/target.htm>
13. Shalhat, A., Yousif, A., Mustafa, M., Jeris, H., Shehadeh, M., Al-Saleh, N., & Jaml, A., MADAR Strategic Report 2010: The Israeli Scene 2009, The Palestinian Forum for Israeli Studies (MADAR), Ramallah, Palestine, 2010.
14. Palestine Monetary Authority, Financial Stability Report 2015, Research and Monetary Policy Department, Ramallah, Palestine, 2016.

15. Palestine Monetary Authority, Annual report 2010, Research and Monetary Policy Department, Ramallah, Palestine, 2010.
16. Wazir, J. K., Atallah, M., & Sarsour, S. A., From occupation to an independent monetary policy. In D. Cobham, & G. Dibeh (Ed): Money in the Middle East and North Africa, Monetary Policy Frameworks and Strategies Routledge, London: 2010, 106.
17. Yeyati, E. L., & Sturzenegger, F., Monetary and exchange rate policies, Elsevier: In Handbook of Development Economics 5, 2010, 4215-4281.

**STUDENTS SYMPOSIUM ON
STRATEGIC MANAGEMENT**



THE PROTECTION OF DATA ON THE NETWORK AND THE IMPLEMENTATION OF THE XML DIGITAL SIGNATURE IN CRYPTOGRAPHY

Dušan Bogdanović

*University of Belgrade, Technical Faculty in Bor, Engineering Management Department,
Bor, Serbia*

Abstract: This paper presents the basic aspects of applying the XML digital signature (XML-DSIG) in order to protect and to lock the specific documents. It relies on the public key technology in which Hash elements or a set of XML elements is signed by the signer's private key and which can therefore be verified by the third parties by performing cryptographic operations on the hash data with the public key of the sender. In addition, the basic principles of security and data protection in the exchange process are also determined (TLS, SSL and HTTPS protocols) in this paper. A special accent is given to the concept of cryptography, symmetric encryption and dual Public-Key Infrastructure (PKI) as a significant encryption technology.

Keywords: XML digital signature, PKI public key, cryptography, protocols, data protection.

1. UVOD

Sastavni i neizbežni deo današnjeg poslovanja je neophodnost bezbedne razmene informacija s poslovnim partnerima [1]. Pritom, date informacije mogu biti u različitim oblicima u kojima neokrnjene treba da stignu od samog pošiljaoca do onog lica kome je informacija i namenjena. Upravo zato, visok stepen pouzdanosti i sigurnosti komercijalnih transakcija u smislu zaštite prenosa i zaštite konkretnih dokumenata važi za jedno je od veoma osetljivih pitanja u modernom poslovanju, pogotovo ako se radi o transakcijama visoke vrednosti.

U težnji da se pokrije što širi kontekst bezbednosti podataka u biznis sferi, uz poseban osvrt na mogućnost zaštite samih dokumenata kroz aspekt zaključavanja dela ili celokupnog sadržaja tih dokumenata, ali i uz osvrt na gledište zaštite komunikacije i prenosa podataka putem mreže, celokupni rad podeljen je u tri dela.

Prvi deo rada posvećen je osnovnim dimenzijama i značaju zaštite podataka na mreži, kao i vrstama napada koji su danas karakteristični. U ovom delu determinisani su i načini zaštite transakcija primenom SSL/TLS protokola, koji je razvila firma Netscape, a koji je trenutno najčešće korišćen metod za obavljanje sigurnih transakcija na internetu. Takođe, u ovom segmentu rada poseban osvrt dat je i HTTPS protokolu u okviru koga su integrisani SSL/TLS sigurnosni elementi.

Drugi segment ovog rada obrađuje osnove kriptografije, tj. sam pojam enkripcije (šifriranja), jednoključno šifriranje (Single-Key encryption), ali i dvoključno šifriranje uz primenu tzv. PKI (Public-Key Infrastructure) tehnologije za enkripciju.

U *trećem delu rada* predstavljena je osnova i važnost upotebe XML digitalnog potpisa u biznisu, a koji u principu predstavlja digitalni potpis dizajniran za upotrebu u XML transakcijama i koji se može koristiti za različite tipove podataka i zaključavanje istih u cilju zaštite. Naime, sam standard definiše šemu za snimanje rezultata digitalnog potpisivanja primenjene na određene proizvoljne podatke.

2. ZAŠTITA PODATAKA NA MREŽI

Komunikacija između digitalnih uređaja danas podrazumeva strogi set pravila u cilju izbegavanja grešaka u pripremi podataka za prenos, u samom prenosu ili, pak, u prijemu podataka. Pravila prenosa nazivaju se još i *protokolima*, a osnovni protokol kojim se prenose podaci i uopšte komunicira na internetu je TCP/IP (Transfer Control Protocol/Internet Protocol) protokol, koji koristi *klijent/server* (Client/Server) model komunikacije u kome korisnik računara (klijent) zahteva i dobija uslugu od drugog računara (server) u mreži. TCP/IP protokol treba da prenese sve podatke koje dobija sa jednog računara na drugi u neizmenjenom obliku, pri čemu ne postoje ugrađeni bezbednosni mehanizmi za zaštitu sadržaja tih podataka. [2]

Stoga, informacije poslate preko IP mreža i njihov otvoren karakter predmet su brojnih zloupotreba od strane zlonamernih korisnika koji sadržaj mogu da diskredituju na različite načine.

Kako bi se rešio ovaj problem, počinju da se razvijaju prvi protokoli za pružanje bezbednog prenosa podataka mrežom, i to, najpre se razvija tzv. SSL (Secure Sockets Layer) protokol, da bi ubrzo nakon njega došlo do razvoja sličnog protokola nazvanog TLS (Transport Layer Security) protokol. Navedeni protokol našao je razne primene u autentifikaciji servera, udaljenom pristupu resursima, osiguravanju poruka elektronske pošte i sl. [3]

2.1. VRSTE NAPADA NA MREŽI

Kada se govori o zaštiti podataka na mreži, najčešće se pod tim misli na zaštitu poverljivih podataka koji se prenose putem računarskih mreža. Naime, sve masovnija upotreba računarskih mreža iziskuje korišćenje mehanizama i mera za zaštitu podataka koji se tim putem prenose, i to zaštitu od različitih vidova napada.

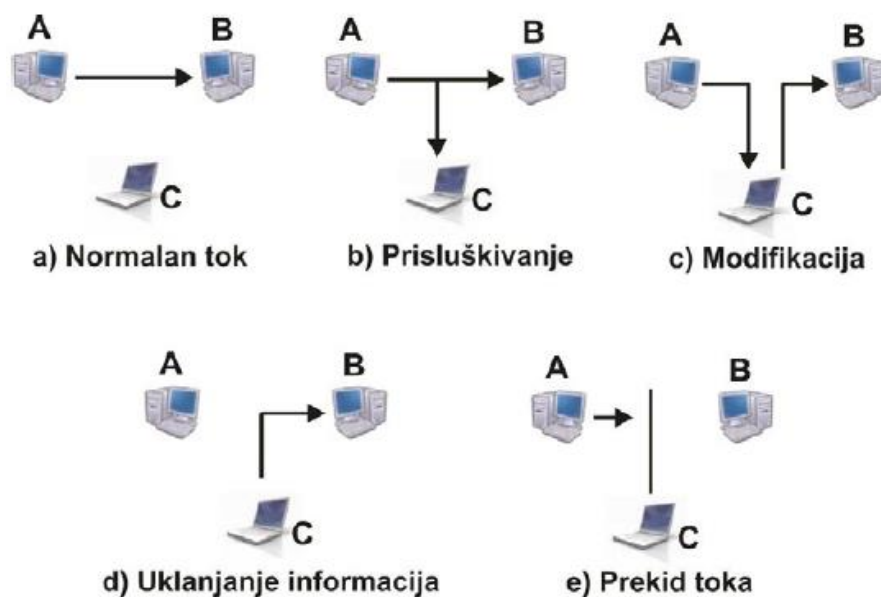
Svi napadi na podatke mogu se podeliti u dve osnovne grupe [4]:

1. Pasivni napadi i
2. Aktivni napadi.

Pasivni napadi su karakteristični jer se odnose na sva prisluškivanja i nadgledanja informacija tokom prenosa, bez ikakvih izmena. Ovom vrstom napada napadač na relativno jednostavan način dolazi do informacija i to vrlo često neprimećeno. Pasivni napadi se, dakle, teško otkrivaju i kao najčešće korišćeni mehanizam zaštite od pasivnih napada primenjuje se kriptovanje podataka, koji se prenose putem komunikacionih linija. Kriptovanje podataka se odnosi na modifikaciju istih na način da postanu nerazumljivi ili besmisleni za sve one korisnike kojima nisu namenjeni. Kao takvo, kriptovanje predstavlja vrlo važan element zaštite podataka u računarskim mrežama. [4]

Aktivni napadi su svi napadi koji vrše promenu sadržaja ili toka informacija. Ova vrsta napada je daleko komplikovanija i teža za otkrivanje nego pasivni napadi. U aktivne napade se ubrajaju modifikacije paketa informacija koji se kreću putem mreže, slanje lažnih paketa, prekidi toka informacija kao i razne vrste preusmeravanja paketa na mreži. Zbog raznovrsnosti ove vrste napada, mehanizmi zaštite moraju biti daleko komplikovaniji i napredniji nego kod pasivnih napada. [4]

Na Slici 1 prikazani su neki od veoma karakterističnih vidova napada na mreži, a koji se mogu podvesti pod prethodno definisane aktivne i pasivne vrste napada.



Slika 1. Vrste napada na mreži [5]

Jedna od veoma karakterističnih studija vođena na temu zaštite podataka na računarskoj mreži ukazala je da se u poslednje dve decenije vreme koje je korisnicima ostavljeno kao mogućnost reagovanja u situaciji kada dođe do napada ubrzano smanjivalo do dan-danas, gde ono sada iznosi svega par sekundi.

evolucija napada



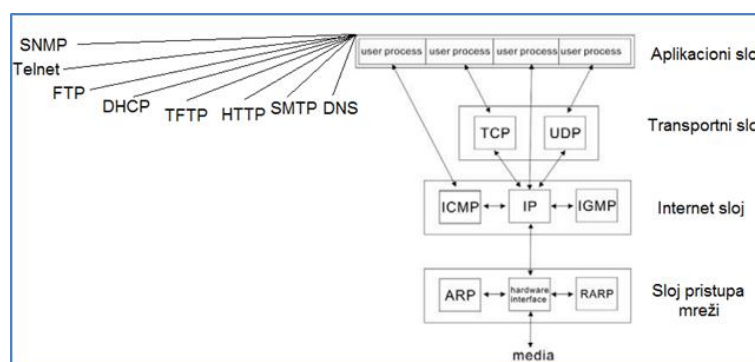
Slika 2. Evolucija napada na podatke na mreži u pogledu reakcije [6]

2.2. SIGURNOSNI SERVISI U TCP/IP MODELU

2.2.1. Struktura TCP/IP modela

TCP/IP model je familija protokola na kojoj je zasnovana internet komunikacija za povezivanje tzv. WAN računarskih mreža (Wide Area Network). TCP/IP model razvila je Agencija za napredne istraživačke projekte pri Ministarstvu odbrane SAD (DARPA-Defense Advanced Research Projects Agency) 1969. godine, a nastao je kao rezultat istraživanja zajedničkog korišćenja resursa u eksperimentu nazvanom *ARPAnet*, koji je zapravo preteča interneta. [7]

TCP/IP model sastoji se od četiri sloja, što je ilustrativno dato i na Slici 3 [8]:



Slika 3. Struktura TCP/IP modela sa protokolima po nivoima [8]

- sloja pristupa mreži,
- internet sloja,
- transportnog sloja i
- aplikacionog sloja.

Sloj pristupa mreži, ili sloj linka naziva se ponekad i slojem interfejsa, jer obuhvata drajver uređaja na operativnom sistemu i mrežnu interfejs karticu u računaru. Naime, drajver uređaja i mrežna kartica imaju funkciju bavljenja svim hardverskim detaljima fizičkog povezivanja. Za ovaj sloj karakteristična su dva specijalizovana protokola: ARP (Address Resolution Protocol) i RARP (Reverse Address Resolution Protocol), koji se upotrebljavaju u nekim tipovima mrežnog interfejsa za međusobno konvertovanje adresa koje koristi internet sloj (IP adrese) i adresa koje se nalaze u istoj lokalnoj mreži. [7]

Sloj interneta naziva se i slojem mreže, a bavi se kretanjem paketa po internetu. Zadužen je za adresiranje, formiranje paketa i usmeravanje istih i osnovni je sloj za prenos informacija. Sloj interneta definiše zvanični format paketa (tzv. IP paket) i protokol koji se naziva IP (Internet Protocol). Za identifikovanje stanice sa kojom treba ostvariti komunikaciju koriste se IP adrese mreže i adrese stanice. Zadatak internet sloja je da isporuči IP pakete do odredišta (koje može da bude u drugoj mreži), pri čemu paketi mogu da stignu na odredište mimo redosleda po kome su poslani. Pored IP protokola, za ovaj sloj karakteristični su ICMP (Internet Control Message Protocol) protokol, koji ima zadatak da obezbedi dijagnostičke funkcije i obavesti o greškama usled neuspešnog prenosa, kao i IGMP (Internet Group Management Protocol) upravlja grupama sa IP protokola višeznačnim upućivanjem. [7]

Na *transportnom nivou*, TCP/IP model definiše dva protokola: TCP (Transfer Control Protocol) i UDP (User Datagram Protocol) protokol. TCP je transportni protokol konekcionog tipa koji omogućava uspostavljanje pouzdanog toka bajtova između dve udaljene lokacije. [9] Njime se vrši uspostavljanje veze, pouzdan prenos podataka, numeracija poruka, kontrola toka i sl. Upravo zbog svoje pouzdanosti mnogi protokoli aplikacionog nivoa oslanjaju se na njega, poput: HTTP (Web), SMTP (elektronska pošta), POP3 (elektronska pošta), FTP (prenos datoteka) i drugih protokola. [7] Sa druge strane, UDP protokol podatke organizuje u segmete koji se nazivaju datagrami i šalje ih ka odredištu, bez da ih numerise ili čeka potvrdu na njih. Datagrami mogu biti oštećeni, izgubljeni, ili mogu doći do odredišta, ali da nema dovoljno mesta za njihovo smeštanje. U svakom od tih slučajeva datagram se odbacuje, bez potrebe da se izvor obavesti o tome. [7]

Aplikacioni sloj odgovoran je za pružanje mogućnosti pristupa uslugama drugih slojeva, te definiše protokole putem kojih se podaci razmenjuju [10]. U nastavku objašnjeni su neki od karakterističnih protokola ovog sloja TCP/IP modela [7]:

- HTTP (Hypertext Transfer Protocol) – omogućuje pristup dokumentima preko Web-a,
- FTP (File Transfer Protocol) – omogućuje prenos datoteka,
- SMTP (Simple Mail Transfer Protocol) – omogućuje slanje elektronske pošte,
- POP3 (Post Office Protocol v3) – omogućuje preuzimanje elektronske pošte sa servera,
- DNS (Domain Name System) – omogućuje prevođenje simboličkih imena računara u IP adrese,
- Telnet (Telecommunication network) – omogućuje pristup udaljenim računarima i izvršavanje komandi na njima.

2.2.2. HTTPS protokol u zaštiti paketa informacija TCP/IP modela

Paketima informacija se u razmeni u mreži može vrlo jednostavno manipulirati kada se šalju posredstvom HTTP protokola. Danas postoje brojni mehanizmi koji zadovoljavaju cilj zaštite ovih paketa, ali SSL/TLS protokol ugrađen u HTTP postao je de facto standard bezbednosti, koji se danas jednim imenom naziva *HTTPS protokolom zaštite*. [11] Inače, sam HTTP predstavlja glavni i najkorišćeniji metod prenosa informacija preko interneta. Osnovna namena ovog protokola je isporučivanje HTML stranica (Web prezentacija) i uopšte uspostavljanje komunikacije između servera i klijenta, koja funkcioniše po principu zahtev/odgovor.

Sa druge strane, HTTPS (HTTP Secure) je protokol koji je identičan HTTP protokolu, s tim što govori Browseru da koristi SSL/TLS mehanizam radi bezbednije konekcije. Postoji više kriterijuma na osnovu kojih se mogu odrediti razlike između HTTP i HTTPS protokola, ali su tri glavne razlike vrlo uočljive [12]:

1. *URL šema*: HTTPS linkovi počinju sa https:// i koriste port 443, dok HTTP linkovi počinju sa http:// i koriste port 80.
2. *Bezbednost*: HTTP nije bezbedan protokol i omogućava trećim licima da na lak način dođu do poverljivih informacija, dok je HTTPS osmišljen da takve situacije spreči.

3. *Mrežni slojevi*: HTTP funkcioniše na najvišem, aplikacionom nivou TCP/IP modela, dok se SSL/TLS nalazi u nižem podnivou istog TCP/IP modela i vrši enkripciju podataka prilikom slanja i prijema.

Dakle, HTTPS je naprednija verzija HTTP-a (Hyper Text Transfer Protocol), koja omogućava enkripciju, autentifikaciju i integritet komunikacije između računara korisnika i servera, uz pomoć kriptografskih ključeva i SSL sertifikata. Tačnije, SSL (Secure Socket Layer) je naziv zastarelog protokola koga je odavno nasledio TLS (Transport Layer Security) protokol, ali se i dalje često koristi termin „SSL sertifikat“. [13]

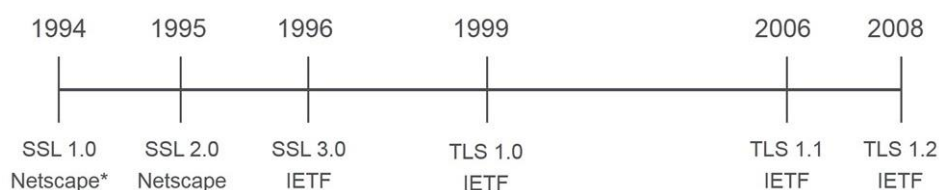
Kada se pristupa sajtu putem `https://` adrese neophodno je postojanje validnog sertifikata na serveru koji je povezan sa privatnim ključem i koji zajedno obezbeđuju potvrdu izvora podataka, enkripciju sadržaja i bezbedan prenos podataka putem internet mreže. Podaci koji na ovaj način putuju internet mrežom ne mogu se prislušivati ili modifikovati od strane trećih lica, za razliku od HTTP protokola. Postoje različiti tipovi sertifikata koji se mogu podeliti po nivou validacije. Osnovni tip sertifikata je takozvani *DV (Domain Validation)*, koji zahteva samo proveru vlasništva domena i zbog toga ima jednostavan proces izdavanja. Drugi tip je *OV (Organisation Validation) sertifikat*, koji je namenjen isključivo pravnim licima i poslovnim korisnicima, a zahteva dodatnu administrativnu proceduru i proveru postojanja pravnog lica. Treći tip je tzv. *EV (Extended Validation) sertifikat*. Ovaj sertifikat je takođe namenjen isključivo poslovnim subjektima, ali zahteva temeljniju proveru firme i ima malo duži period izdavanja. EV sertifikat, za razliku od OV sertifikata, u Browseru uvek jasno ističe i naziv firme, odmah pored naziva domena. [13]

2.2.3. SSL/TLS protokol kao deo HTTPS-a

TLS (Transport Layer Security) i njegov prethodnik SSL (Secure Sockets Layer) su kriptografski protokoli namenjeni obezbeđivanju sigurne komunikacije preko mreže. Ovi protokoli su standardna tehnologija koja se koristi za ostvarivanje bezbedne veze između klijenta i servera i obezbeđuju siguran prenos brojeva kreditnih kartica i ostalih ličnih podataka. Dakle, HTTPS se može zamisliti kao HTTP koji je obmotan SSL/TLS protokolom koji štiti podatke koje on prenosi. [14]

SSL (Secure Sockets Layer) protokol je prethodnik TLS protokola. Nakon SSL 3.0 verzije, sledeća nadogradnja imenovana je kao TLS 1.0 (umesto SSL 4.0), jer nova verzija nije bila interoperabilna sa SSL 3.0 modelom. Ipak, mnogi ljudi ne prave razlike između TLS i SSL protokola, ili ih čak nazivaju jednim imenom SSL/TLS protokolom. Međutim, danas su sve verzije SSL-a manje-više zastarele. [15]

Timeline SSL/TLS verzija



Slika 4. Vremenska linija razvoja SSL/TLS protokla

Ipak, nije na odmet najpre definisati sam SSL protokol, a kasnije sagledati i razlike u odnosu na noviji TLS protokol. Stoga, može se reći da SSL sadrži sledeće funkcionalnosti [3]:

1. *Autentifikacija servera* – omogućuje korisniku otkrivanje i potvrdu identiteta servera. Korisnik može koristiti tehnike poput kriptografije javnog ključa kako bi proverio valjanost sertifikata. Važnost ovog postupka se ističe posebno u sistemima gde se razmenjuju važni podaci (finansijski recimo).
2. *Autentifikacija korisnika* – omogućuje serveru potvrdu korisničkog identiteta. Upotrebom istih tehnika kao kod autentifikacije servera, server može proveriti sertifikat korisnika. Ovaj postupak ima veliki značaj kod slanja poverljivih informacija korisniku.
3. *Kriptovana SSL veza* – zahteva kriptovanje svih informacija koje se razmenjuju između korisnika i servera, kako bi se osigurao visok stepen poverljivosti. Pri tome, moguće je detektovati izmenu podataka u prenosu.

U odnosu na SSL protokol, već sa prvom verzijom TLS 1.0 protokola, determinisana su odgovarajuća proširenja. U nastavku navedena su neka od njih [3]:

1. Kod TLS protokola KMAC algoritam (Keyed-Hashing for Message Authentication Code) zamenjuje MAC (Message Authentication Code) algoritam koji se koristi kod SSL protokola. KMAC postupak pruža više sigurnosti od MAC algoritma, jer stvara vrednost za proveru integriteta (Integrity Check Value), ali upotrebom Hash funkcija³⁷.
2. U specifikaciji TLS protokola dodate su mnoge nove poruke za upozoravanje,
3. TLS protokol definiše vrednosti za povećanje blokova (Padding Block Values)³⁸ koji se koriste u blokovskim algoritmima šifriranja.

SSL/TLS protokol ima *dva svoja osnovna načina rada*. Prvi je kada se uspostavi SSL/TLS tunel i jedino pri čemu je server autentifikovan, i drugi način je kada su i server i klijent autentifikovani. U oba slučaja SSL/TLS protokol se uspostavlja pre nego što počne HTTP transakcija. SSL/TLS koristi kombinaciju šifriranja javnim ključem, simetričnog šifriranja³⁹, kao i digitalnih sertifikata. [17]

SSL/TLS pregovaranje sa autentifikacijom samo servera je postupak od *devet koraka* [17]:

1. Prvi korak u procesu je kada klijent šalje serveru «Client Hello» poruku. Ova pozdravna poruka sadrži verziju SSL/TLS-a koju klijent podržava.
2. Server odgovara na pozdravnu poruku sa jednom od svojih poruka koja određuje verziju SSL/TLS protokola, šifru i dužinu ključa koji će se koristiti prilikom konverzacije, a na osnovu ponuđenih vrednosti u okviru klijentske pozdravne poruke.
3. Server šalje digitalni sertifikat klijentu na uvid. Većina modernih Browsersa automatski proveravaju sertifikat i upozoravaju korisnika ako isti nije validan.

³⁷ Hash funkcije za ulaz uzimaju poruku koja je uglavnom fiksne dužine i za izlaz daju “šifriranu” poruku poznatiju kao hash-code, hash-rezultat, hash-vrednost ili jednostavno hash. [16]

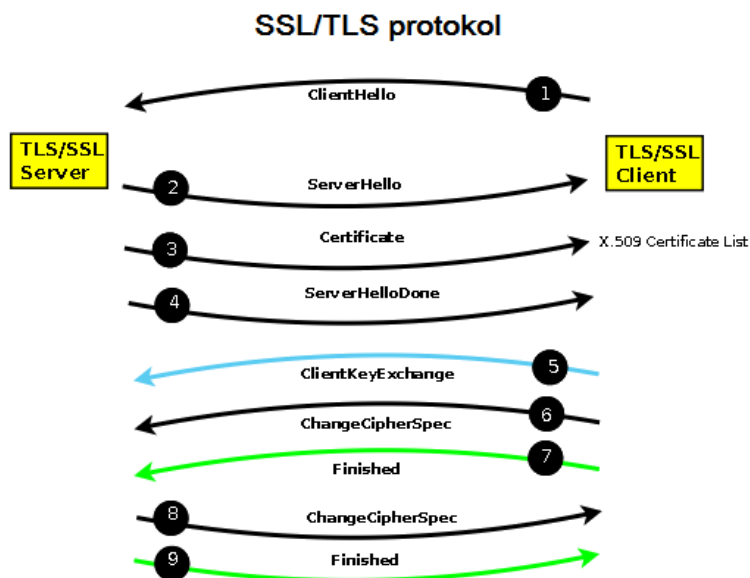
³⁸ Kod blok šifriranja enkripcija se vrši po blokovima podataka, tj. uzimaju se blokovi od više bitova (64, 128, 196, 256 ...), te se enkriptuju kao celina.

³⁹ Single-Key Encryption

4. Server šalje «Server Done» poruku koja klijenta obaveštava da je server završio početni deo inicijalne sekvence.
5. Klijent generiše simetričan ključ i šifrjuje ga koristeći serverov javni ključ.
6. Klijent šalje «Cipher Spec» poruku koja serveru govori da sva buduća komunikacija treba da se vrši sa novim ključem.
7. Klijent sada šalje poruku o završetku koristeći novi ključ, pri čemu utvrđuje da li server može takvu poruku da dekodira, te da li je pregovaranje bilo uspešno.
8. Server šalje «Change Cipher Spec» poruku koja klijentu govori da sva buduća komunikacija treba da bude kriptovana.
9. Server šalje svoju «Finished» poruku kriptovanu sa novim ključem. Ako klijent može da pročita ovakvu poruku, znači da je pregovaranje uspešno završeno.

SSL/TLS pregovaranje sa obostranom autentifikacijom (sa klijentske i serverske strane) je proces od dvanaest koraka. Dodatni koraci se dodaju prethodno navedenim pod relevantnim rednim brojevima [17]:

- 4.1. Server šalje zahtev za sertifikat nakon slanja svog sertifikata.
- 6.1. Klijent dostavlja svoj sertifikat.
- 8.1. Klijent šalje poruku o proverenom sertifikatu u koju kriptuje deo poznatog teksta koristeći svoj tajni ključ. Server koristi klijentski sertifikat za dekriptovanje i, na osnovu toga, ustanovljava da klijent ima ispravan tajni ključ.



Slika 5. Algoritam funkcionisanja SSL/TLS protokola [18]

3. KRIPTOGRAFIJA

Koncept sigurnosti u razmeni informacija kroz kriptografiju ima dugu istoriju. Još se Juliju Cezaru za života pripisuje kreiranje jednog od najstarijih kriptografskih sistema u okviru koga su slate vojne poruke između rimskih generala. [19]

Može se zaključiti da kriptografija postoji već hiljadama godina, pri čemu su računari danas radikalno izmenili vrste dostupnih kodova koji se u svrhu zaštite informacija i koriste. Jedna od veoma važnih karakteristika koju treba zapamtiti u smislu kriptografije i računara jeste i *koncept brutalnih napada (brute-force attack)*⁴⁰ koji su danas sve učestaliji. Naime, ako haker poznaje algoritam koji se koristi za šifriranje određene poruke, to bi moglo da podrazumeva da poseduje računar koji testira svaki mogući ključ za dekodiranje poruke. Stoga, suština zaustavljanja ovakvih napada jeste u posedovanju ključa koji je toliko dug, da bi za testiranje svake kombinacije istog bile potrebne stotine godina da se dođe do rešenja. Međutim, tehnologije šifriranja koje su smatrane sigurnim pre 20 godina danas mogu biti slomljene u roku od svega par sati. Zato se enkripcija treba veoma ozbiljno shvatiti u smislu svakog vida komunikacije između računara, i to posebno ako je nema, ili ako je tehnologija koja se koristi zastarela. Bez enkripcije (šifriranja) relativno je lako da neautorizovana lica namerno, ili, pak, slučajno čitaju ili menjaju sadržinu poruke koja je predmet razmene. [20]

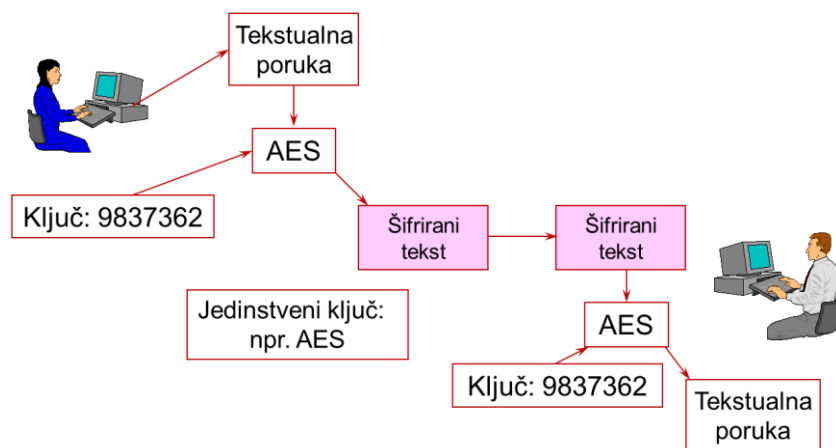
Šifriranje je dostupno uz mnoge PC softverske pakete. Naime, skoro svi elektronski podaci u vidu tabela i procesora teksta dozvoljavaju šifriranje datoteka kada se one sačuvaju. Sa druge strane, da bi se ponovo otvorile od korisnika se zahteva unošenje korektnе šifre. Takođe, veoma lako se mogu iznaći i softverski paketi za šifriranje na internetu koji bi mogli štiti, recimo, e-mail poruke.

Danas moderni kriptografski sistemi poznaju dva vida šifriranja, i to:

1. Simetrične šifrske sisteme (Single-Key Systems) i
2. Asimetrične šifrske sisteme (Public-Key Systems).

3.1. SINGLE-KEY KRIPTOGRAFIJA

Simetrična kriptografija, ili tzv. Single-Key kriptografija naziva se i kriptografijom tajnog ključa, jer se informacije i kriptomu i dekriptomu istim ključem. Kako se može videti na Slici 6, i pošiljalac i primalac poruke poseduju softver u smislu algoritma koji upravlja enkripcijom i dekripcijom.



Slika 6. Enkripcija sa jednim ključem (Single-Key Encryption) [21]

⁴⁰ Isprobavanje svih mogućih kombinacija tajnog ključa sve dok se ne pronade korišćena kombinacija

Naime, i pošiljalac i primalac poseduju zajednički tajni ključ, koji samo oni znaju, saglasno prethodno dogovorenom zajedničkom kriptografskom algoritmu koji će se koristiti. Stoga, kada pošiljalac želi da pošalje poruku primaocu, on šifrira originalnu poruku (Plain text message) korišćenjem tajnog ključa i prethodno dogovorenog algoritma. Time se dobija šifrirana poruka (Encrypted text) koja se dalje prosleđuje primaocu. Primalac prima šifriranu poruku i dešifruje je svojim tajnim ključem kako bi dobio originalnu poruku.

Ipak, mana simetrične enkripcije je ta što podrazumeva da su se obe strane, i pošiljalac i primalac, unapred dogovorile o vrednosti enkripcijsko-dekripcijskog ključa, koji mora da ostane u tajnosti od neautorizovanih korisnika. Kod takvog prenosa gde se koristi jedinstveni ključ, takođe, moguće je da dođe i do tzv. „napada sirovom silom“ (brute-force attack), koji podrazumeva isprobavanje svih mogućih kombinacija tajnog ključa sve dok se ne pronade korišćena kombinacija, o čemu je već bilo reči u uvodnom delu o kriptografiji.

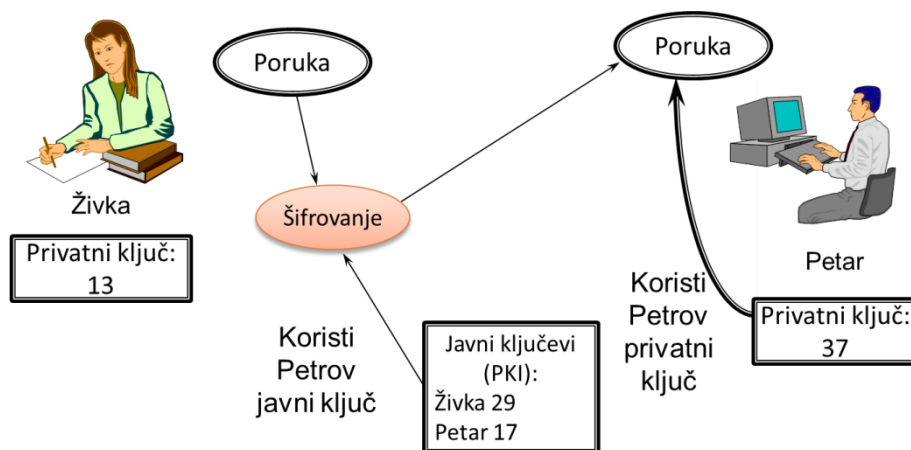
Zapravo, još kasnih 70-ih godina prošlog veka u poslovnom svetu razvijen je prvi simetrični enkripcijski algoritam *DES (Data Encryption Standard)*, koji je, kao takav, podržavao 56-bitne ključeve i koji bi danas konceptom napada sirove sile mogao biti razbijen u roku od svega 24 sata. Kako bi se nadomestio ovaj nedostatak, razvijen je ojačani DES algoritam, i to tzv. „Triple DES“ algoritam, koji za enkripciju koristi čak tri DES ključa, čime se broj kombinacija penje na brojku od 2168. Ipak, s obzirom da je bio sporiji barem dva puta od DES-a, već 2001. godine zamenjen je novom metodom nazvanom *AES algoritmom (Advanced Encryption Standard)*. AES je daleko brži enkripcijski algoritam koji svojim korisnicima nudi dužine ključeva od 128, 192 i 256 bita. Ovde svakako treba imati na umu činjenicu da duži ključevi čine poruku daleko sigurnijom, ali treba znati i to da se i vreme potrebno za enkripciju i dekripciju poruke itekako povećava. [20]

3.2. PUBLIC-KEY INFRASTRUKTURA (PKI) I DUAL-KEY KRIPTOGRAFIJA

Značajan pomak u razvoju tehnologija enkripcije zabeležen je razvojem infrastrukture javnog ključa – PKI (Public-Key Infrastructure). Metod je ponikao najpre u vojno-političke svrhe i zasniva se na enkripcijskom sistemu koji koristi dva ključa: *javni ključ* i *privatni ključ* (Dual-Key Encryption). Javni ključ služi za šifriranje, dok tajni ključ ima svrhu dešifrovanja određene poruke.

Kao najčešće korišćeni asimetrični algoritmi javljaju se: RSA (Rivest-Shamir-Adleman) i Diffie-Hellman algoritmi, a uz njih i: El Gamal, Rabin, Eliptic Curves i drugi manje korišćeni algoritmi asimetrične kriptografije. [22]

Sam postupak asimetričnog šifriranja ilustrovan je na Slici 7, odakle se jasno može zaključiti da pošiljalac određene poruke (Živka) kodira poruku radi slanja Petru upotrebom javnog ključa Petra koji je svima dostupan (pa čak eventualnom napadaču). Živka je javni ključ mogla dobiti putem Email-a, preuzeti ga sa nekog Web sajta i sl. Međutim bilo ko, pa čak i potencijalni napadač, i pored toga što poznaje javni ključ, ne može otkriti sadržaj poruke. Poruku može dešifrovati samo Petar korišćenjem svog tajnog ključa. Na ovaj način poruka je zaštićena od trećeg lica. [22]



Slika 7. Enkripcija sa dva ključa (Dual-Key Encryption) [21]

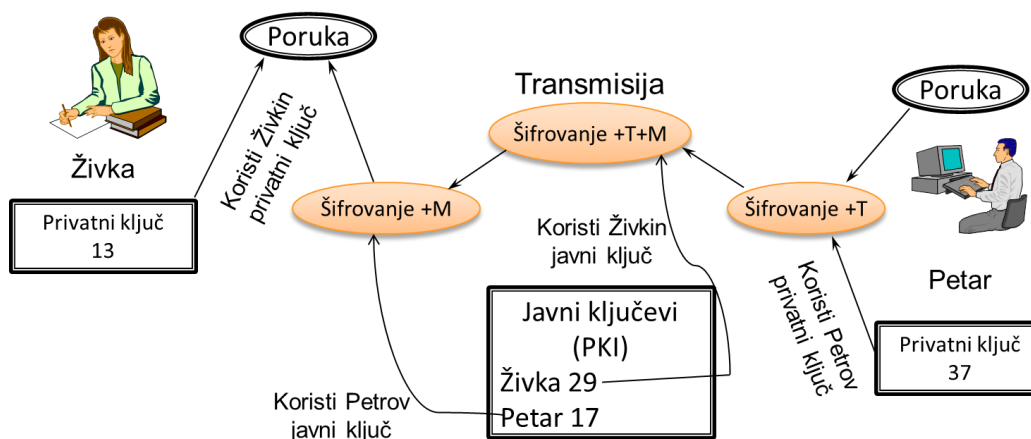
Ipak, osnovni nedostatak ovog načina kriptovanja je njegova sporost i neprikladnost za kriptovanje velikih količina podataka. Takođe, ostaje otvoreno pitanje autentičnosti poruke, odnosno kako Petar može biti siguran da je poruku koju je primio zaista poslala Živka. U tom slučaju, osiguravanje autentičnosti informacije, tj. definisanje i provera identiteta pošiljaoca postiže se upotrebom *digitalnih sertifikata*, o kojima je već bilo reči u odeljku 2.2.2. i *digitalnih potpisa*, koji su predmet obrade u nastavku.

4. DIGITALNI POTPIS

Pored klasičnog šifrovanja, kriptografija javnog ključa služi i za digitalne potpise, odnosno za ocenu autentičnost pošiljaoca koji poruku potpisuje privatnim ključem, a koja može biti proverena pomoću javnog ključa. Celokupan proces kreiranja digitalnog potpisa dat je sledećim primerom.

Recimo, ukoliko se zamisli slučaj gde Živka radi u banci i dobija poruku koja upućuje na to da je poslata od strane Petra sa sadržinom u kojoj se od Živke traži da mu uplati milion evra, postavlja se pitanje kako će u toj situaciji Živka da zna da je poruka autentična i da nije reč o zloupotrebi? Dakle, u nastavku je razmotren slučaj gde Petar želi da mu Živka isplati određenu svotu novca u svojstvu bankara, ali ta suma svakako ne iznosi milion evra, već svega 100 evra.

Da bi bio siguran da će jedino Živka moći da pročita poruku i da niko drugi neće moći da je modifikuje, Petar je šifrira Živkinim javnim ključem. Da bi osigurao autentičnost svoje poruke, Petar je takođe enkriptuje i svojim privatnim ključem. Ovde je jako bitno, pritom, zapamtiti da ključevi uvek rade u parovima. Kada Živka primi poruku, ona koristi Petrov javni ključ i svoj privatni ključ za dešifrovanje same poruke. Ako je poruka dešifrovana ispravno, znači da nije bila modifikovana u transmisiji, te da je mogla doći jedino od Petra. [20]



Slika 8. Enkripcija sa dva ključa za autentifikaciju poruke [21]

Može se zaključiti da je za prethodno opisani proces, a koji je i ilustrovan na Slici 8, karakteristično to da se koristi za kreiranje tzv. *digitalnih potpisa*, pri čemu je od posebnog značaja za ovaj rad primena tzv. XML digitalnog potpisa u zaštiti dokumenata i podataka, što je i tematika odeljka 4.1.

Ipak, i pored velike sigurnosti koju pruža ova metoda zaštite, i dalje postoji mogućnost zloupotrebe. Naime, neko je mogao poslati Živki svoj javni ključ tvrdeći da je Petrov, a zatim je mogao da joj šalje poruke za koje bi ona mislila da ih šalje Petar. Rešenje ovog problema nalazi se u upotrebi digitalnih sertifikata, o kojima je već ranije bilo reči. [23]

4.1. XML DIGITALNI POTPIS

XML digitalni potpis obezbeđuje zaštitu digitalnog sadržaja u smislu da se može primeniti na jednoj ili više stavki određenog digitalnog dokumenta. XML potpisi su digitalni potpisi namenjeni za korišćenje u XML transakcijama. Standard definiše šemu za snimanje rezultata operacija digitalnog potpisa koji se primenjuje na proizvoljne XML podatke.

Kako je već spomenuto, osnovna karakteristika XML digitalnog potpisa je mogućnost potpisivanja delova XML stabla, a ne samo celog dokumenta. XML potpisom mogu se potpisati različite vrste resursa. Na primer, jedan pojedinačni XML potpis može pokriti podatke kodirane znakovima (HTML), podatke sa binarnim kodom (JPG), XML kodirane podatke, ali i samo određeni deo XML datoteke. [24]

Sama opšta struktura XML digitalnog potpisa koji se dodaje dokumentu data je na Slici 9.


```
<Signature>
  <SignedInfo>
    <SignatureMethod />
    <CanonicalizationMethod />
    <Reference>
      <Transforms>
      <DigestMethod>
      <DigestValue>
    </Reference>
    <Reference /> etc.
  </SignedInfo>
  <SignatureValue />
  <KeyInfo />
  <Object />
</Signature>
```

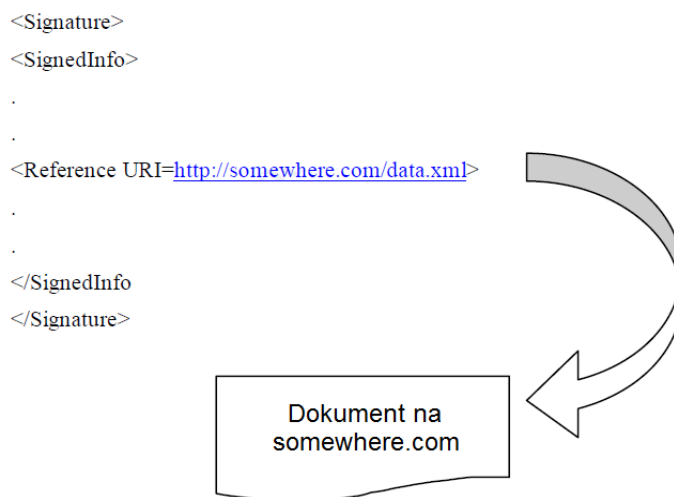
Slika 9. Opšta struktura XML digitalnog potpisa [24, 25]

U nastavku, definisani su osnovni elementi opšte strukture XML digitalnog potpisa respektivno kako su dati na pređašnjoj slici [1] [26]:

- *Signature* – element koji definiše granice samog digitalnog potpisa.
- *SignedInfo* – obavezni element koji opisuje ono što se potpisuje i uključuje algoritam kanonikalizacije, algoritam potpisa i jednu ili više referenci.
- *CanonicalizationMethod* i *SignatureMethod* – algoritmi za generisanje digitalnog potpisa.
- *Reference* - specificira resurse koji se potpisuju, te definiše transformaciju koja se obavlja na resursima pre potpisivanja. Kao neobavezni atribut unutar *Reference* elementa može se javiti *URI*, koji identifikuje objekt podataka (data object) koji želimo potpisati. Ovaj se atribut može javiti najviše u jednoj referenci unutar taga *Signature*.
- *Transforms* - uređena lista procesa koji su primenjeni na izvorni sadržaj pre nego što je on uređen. Transformacija može uključiti operacije pretvorbe u kanonski oblik, kodiranje i dekodiranje, sažimanje i raspakiranje (compression/inflation), XSLT, XPath, XML šeme provere i sl.
- *DigestMethod* - algoritam koji se primenjuje na podatke u cilju da proizvede *DigestValue*, kao rezultat primene datog algoritma na prethodno transformisane resurse. Dakle, *DigestValue* je ono što povezuje izvorni sadržaj s ključem osobe koja ga potpisuje.
- *SignatureValue* - sadrži rezultat potpisivanja kodiran preko algoritma Base64
- *KeyInfo* - ukazuje na ključ i sertifikat koji se treba koristiti za potvrdu.
- *Object* - sadrži potpisane podatke ako se radi o omotavajućem potpisu (Enveloping Signature).

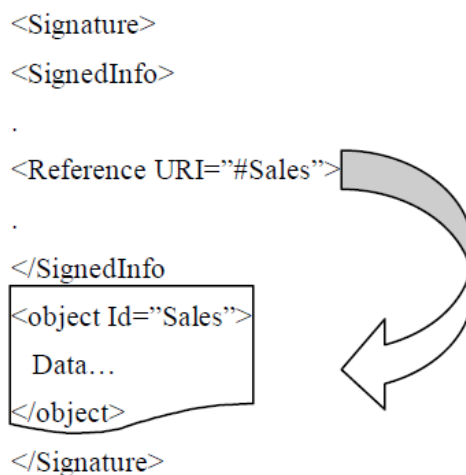
Postoje tri tipa XML digitalnog potpisa, pri čemu je klasifikacija na svaki od njih zasnovana na poziciji samog potpisa u odnosu na podatke koji treba da budu zaštićeni i nevidljivi za neautorizovane korisnike.

1. Kod *odvojenog potpisa (Detached Signature)* sama šema potpisa i podaci koji se potpisuju locirani su nezavisno jedan od drugog, tj. podaci i potpis nisu u istom dokumentu i predstavljaju dva odvojena stabla na različitim lokacijama.



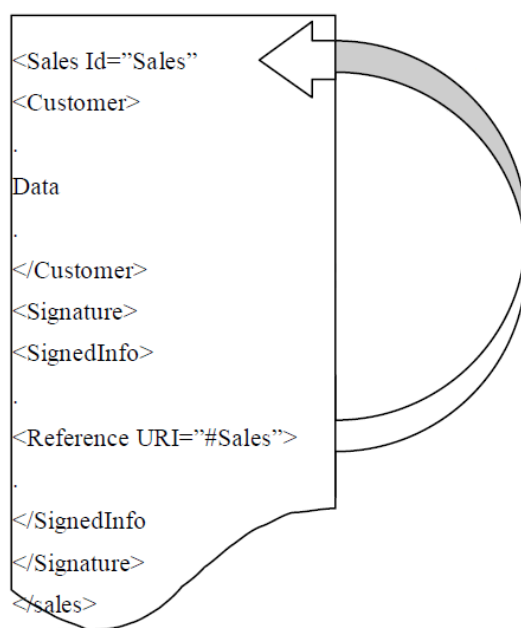
Slika 10. Šema odvojenog digitalnog potpisa [27]

2. U *omotavajućem potpisu (Enveloping Signature)* sam potpis je roditelj objekta koji je potpisan. Naime, potpisani objekt podataka nalazi se unutar strukture XML potpisa i taj se objekt identifikuje pomoću identifikatora fragmenta URI. U primeru na Slici 11 potpis je stablo, a potpisani objekt je grana stabla.



Slika 11. Šema omotavajućeg digitalnog potpisa [27]

3. Kod *omotanog potpisa (Enveloped Signature)* potpis je dete objekta koji se potpisuje. U sledećem primeru jasno se može zaključiti da je objekt koji je potpisan ("Sales") stablo, dok je potpis grana stabla.



Slika 12. Šema omotanog digitalnog potpisa [27]

Primer same strukture XML digitalnog potpisa u elektronskoj razmeni podataka dat je na narednoj Slici 13. Ova struktura, ovako data, koristi se, recimo, kao standard u zaštiti dokumenata kada je reč o XML transakcijama koje se obavljaju sa Narodnom bankom Srbije (NBS).

```
<Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
  <SignedInfo>
    <CanonicalizationMethod Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315" />
    <SignatureMethod
Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1"/>
    <Reference URI="">
      <Transforms>
        <Transform
Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
      </Transforms>
      <DigestMethod
Algorithm="http://www.w3.org/2000/09/xmldsig#sha1"/>
        <DigestValue>ClhQZ8H0lh1chKd22zQas6eCW9Y=</DigestValue>
      </Reference>
    </SignedInfo>

    <SignatureValue>IaF1Dy770iJJJa0V0OxCamp4g8YRd4x2Ei...</SignatureValue>
    <KeyInfo>
      <X509Data>
        <X509Certificate>MIIG1jCCBb6gAwIBAgIESK...</X509Certificate>
      </X509Data>
    </KeyInfo>
  </Signature>
```

Slika 13. Struktura XML digitalnog potpisa [28]

Prilikom *provere XML* potpisa prati se tzv. „*Core Validation*“ procedura, koja se sastoji iz dva dela [1]:

1. *Provera referenci* (Reference Validation) – sažetak svake reference se proverava preuzimanjem odgovarajućeg resursa i primenom metoda transformacije. Rezultat se upoređuje sa vrednošću DigestValue, a ako dođe do neslaganja vrednosti, provera će se smatrati neuspešnom.

2. *Provera potpisa* (Signature Validation) – element SignedInfo je determinisan kanoničkom metodom definisanom u elementu CanonicalizationMethod, pri čemu se ključni podaci sagledavaju preko elementa KeyInfo, te se potpis proverava upotrebom metode specificirane u elementu SignatureMethod. Ova procedura određuje da li je resurse zaista potpisala poverljiva strana.

5. ZAKLJUČAK

Danas se izrazito velika pažnja poklanja bezbednosti informacija koje se kao takve štite raznoraznim metodama, kako u toku samog prenosa, tako i sa aspekta konkretnih dokumenata u kojima su one kao takve sadržane. Upravo zbog toga može se zaključiti da informacije treba u izvornom obliku i neokrnjene da stignu od samog pošiljaoca do onog lica kome je informacija i namenjena. Iz pređašnjeg izlaganja jasno se može uočiti posvećenost današnje IT industrije tome da tok informacija, ali i same informacije budu nedostupne neautorizovanim korisnicima razvojem tehnologija koje obezbeđuju visok stepen sigurnosti komercijalnih transakcija u smislu zaštite prenosa i zaštite konkretnih dokumenata. U radu su izložene tek neke od ovih tehnologija čija je namena različita, a opet skupa sve one čine nezamenjiv set zaštite koji danas primenjuje gotovo svaka ozbiljnija kompanija u svom poslovanju. Uostalom, ako se sagledaju ranije izloženi primeri, nedvosmisleno je moguće zaključiti da HTTPS protokoli imaju izuzetan značaj u bezbednom prenosu podataka, a da opet uspon, recimo, XML tehnologija za digitalno potpisivanje sve više uzima primat i u našim uslovima poslovanja, o čemu govori i primer svih privrednih subjekata čija se komunikacija sa Narodnom bankom Srbije u mnogome zasniva na XML transakcijama.

Svakako se na osnovu svega navedenog može reći da se u budućnosti očekuje širenje opisanih tehnologija zbog njihove jednostavnosti i lakoće upotrebe u raznim područjima. To se osobito može reći za primenu XML-a i uopšte XML digitalnih potpisa u praksi, gde je trend ovakvog vida zaštite već duži vremenski period na uzlaznoj putanji.

REFERENCE

- [1] Grupa autora (2011): *XML digitalni potpis*, Centar informacijske sigurnosti, Zagreb, p. 4, 13, 15
- [2] Zoranović, T. (2014): Internet i sigurnost podataka, *Letopis naučnih radova* 38(1), Poljoprivredni fakultet, Univerzitet u Novom Sadu, Novi Sad, pp. 144-151.
- [3] Grupa autora (2009): *TLS protokol (CCERT-PUBDOC-2009-03-257)*, Croatian Academic and Research Network, Zagreb, p. 4, 19, 20
- [4] Đorđević, M. (2009): *Zaštita podataka u računarskim mrežama*, [Internet]. Dostupno na: https://dokupdf.com/download/poslovna-informatika-143-5a00408fd64ab279f46cea6f_pdf, Pristupljeno: 1.1.2018.
- [5] Jevremović, A., Veinović, M., Šarac, M., Šimić, G. (2014): *Zaštita u računarskim mrežama*, Fakultet za informatiku i računarstvo, Univerzitet Singidunum, Beograd, pp. 8-16
- [6] Krajnović, N. (2006): *Sigurnost i zaštita računarskih mreža* [Power Point], Elektrotehnički fakultet, Univerzitet u Beogradu, Beograd, p. 17
- [7] Milosavljević, S. (2016): *TCP/IP model protokola*, [Internet]. Dostupno na: <https://profsrboljubmilosavljevic.wordpress.com/2016/09/15/rm-70-71-tcpip-protokol-transportni-sloj-interneta-tcp-mrežni-sloj-interneta-ip/>, Pristupljeno: 2.1.2018.
- [8] Hong-You, W., Sing-Ping, Z. (2012): *The Predigest Project of TCP/IP Protocol Communication System Based on DSP Technology and Ethernet*, International Conference on Solid State Devices and Materials Science, Elsevier, Amsterdam, pp. 1253-1257.
- [9] Stojčev, M. (2007): *TCP/IP* [Skripta], Elektronski fakultet, Univerzitet u Nišu, Niš, p. 8
- [10] Rajwal, D., Band, D., Yadav, A. (2013): Study Of Different Attacks On Network & Transport Layer, *International Journal of Engineering and Computer Science* 2(3), Mandasaur, India, p. 692-695
- [11] Wei, X., Wolf, M. (2017): A Survey on HTTPS Implementation by Android Apps: Issues and Countermeasures, *Applied Computing and Informatics* 13(2), Elsevier, Amsterdam, pp. 101-117
- [12] Stanić, M. (2015): *WordPress migracija sa HTTP na HTTPS*, [Internet]. Dostupno na: <https://adriahost.rs/wordpress-migracija-sa-http-na-https/>, Pristupljeno: 3.1.2018.
- [13] Dream Technologies Group (2017): *HTTPS protokol i SSL sertifikati*, [Internet]. Dostupno na: <https://blog.dreamweb.rs/https-protokol-i-ssl-sertifikati/>, Pristupljeno: 3.1.2018.
- [14] Vujović, S. (2015): *Zašto je došlo vreme za prelazak na HTTPS — bezbednost, privatnost i SEO*, [Internet]. Dostupno na: <https://startit.rs/zasto-je-doslo-vreme-za-prelazak-na-https-bezbednost-privatnost-i-seo/>, Pristupljeno: 3.1.2018.
- [15] Dugan, E. M. (2015): *What is HTTPS and SSL/TLS?* [Internet]. Dostupno na: <https://wpengine.com/support/how-does-all-this-work-https/>, Pristupljeno: 3.1.2018.

- [16] Gorša-Cvijović, S. (2013): *Hash-funkcije u kriptografiji*, Diplomski rad, Sveučilište J.J. Strossmayera, Osijek, p. 4
- [17] Džigurski, S. (2003): *Bezbednost Web aplikacija*, SCRIBD, Novi Sad, p. 17, 18
- [18] Zytrax Services (2015): *Survival guides - TLS/SSL and SSL (X.509) Certificates* [Internet]. Dostupno na: <http://www.zytrax.com/tech/survival/ssl.html>, Pristupljeno: 4.1.2018.
- [19] Curry, I. (2001): *An Introduction to Cryptography and Digital Signatures*, Entrust, Addison, USA, p. 3
- [20] Post, V. I., Anderson, L. D. (2003): *Management Information Systems*, McGraw Hill, New York, USA, p. 135, 136, 137, 138
- [21] Nikolić, Đ. (2017): *Bezbednost, privatnost i autonomija u IS* [Power Point], Tehnički fakultet u Boru, Univerzitet u Beogradu, Bor, p. 11, 12, 13
- [22] Kovačević, V. (2010): *Zaštita podataka primenom kriptografskih metoda* [Internet]. Dostupno na: <http://es.elfak.ni.ac.rs/Papers/Zastita%20podataka.pdf>, Pristupljeno: 6.1.2018.
- [23] Petrović, D. (2007): *Kriptografija – simetrični i asimetrični algoritmi* [Internet]. Dostupno na: <http://www.maturskiradovi.net/downloads/Kriptografija.pdf>, Pristupljeno: 8.1.2018.
- [24] Simon, E., Madsen, P., Adams, C. (2001): *An Introduction to XML Digital Signatures* [Internet], Dostupno na: <https://www.xml.com/pub/a/2001/08/08/xmlldsig.html>, Pristupljeno: 9.1.2018.
- [25] Song, F., Cui, Z. (2012): *Electronic Voting Scheme About ElGamal Blind-signatures Based on XML*, International Workshop on Information and Electronics Engineering (IWIEE), Procedia Engineering, Elsevier, Amsterdam, pp. 2721-2725
- [26] Magdalenić, I. (2003): *Elektronička razmjena poslovnih dokumenata*, Magistarski rad, Fakultet elektrotehnike i računarstva, Sveučilište u Zagrebu, Zagreb, p. 93, 94
- [27] Kee, J. (2002): *XML Digital Signature by Example - Practical Assignment: GSEC Version 1.3*, SANS Institute, Swansea, UK, p. 4, 5, 6
- [28] Janković, D., Žunić, B. (2014): *Uputstvo o bližim tehničkim uslovima i načinu elektronskog potpisa XML dokumenta koji se dostavljaju NBS* [Internet], Dostupno na: https://www.nbs.rs/internet/latinica/20/kpb/elektronsko_potpisivanje_uputstvo.pdf, Pristupljeno: 10.1.2018.

6. PRILOZI

PRILOG 1

```
<?xml version="1.0" encoding="WINDOWS-1250"?>
<ZaSlanje>
  <Dokument>
    <DatumStanja>31.01.2009</DatumStanja>
    <Obrazac>DR</Obrazac>
    <MaticniBroj>99999999</MaticniBroj>
    <RedniBroj>1</RedniBroj>
    <PodatkeObradio>Petar Petrovic</PodatkeObradio>
    <Kontakt>011 1234567,email:petar.petrovic@nbs.yu</Kontakt>
    <SlogDR>
      <SifraPodatka>1.1.</SifraPodatka>
      <Iznos1>1288</Iznos1>
      <Iznos2>1389</Iznos2>
      <Iznos3>1588</Iznos3>
      <Iznos4>1689</Iznos4>
      <Iznos5>1788</Iznos5>
      <Iznos6>1889</Iznos6>
      <Iznos7>1988</Iznos7>
      <Iznos8>1089</Iznos8>
      <Iznos9>1089</Iznos9>
      <Iznos10>1089</Iznos10>
    </SlogDR>
  </Dokument>
  <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
    <SignedInfo>
      <CanonicalizationMethod Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315" />
      <SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />
      <Reference URI="">
        <Transforms>
          <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
        </Transforms>
        <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
        <DigestValue>bOnJtjT8ttu+OLJQq1MSL.TcfzN4=</DigestValue>
      </Reference>
    </SignedInfo>
    <SignatureValue>I4CUqGULFhXSswSFN...</SignatureValue>
    <KeyInfo>
      <X509Data>
        <X509Certificate>MIIGIjCCBb6j...X509Certificate</X509Certificate>
      </X509Data>
    </KeyInfo>
  </Signature>
</ZaSlanje>
```

Prilog 1. Primer XML digitalnog potpisa u XML transakcijama sa Narodnom bankom Srbije (NBS) [28]



THE IMPLEMENTATION OF THE SIMPLEX METHOD OF THE LINEAR PROGRAMMING IN MIXED MATRIX GAMES

Dušan Bogdanović

*University of Belgrade, Technical Faculty in Bor, Engineering Management Department,
Bor, Serbia*

Abstract: Each antagonistic game in game theory can be solved by linear programming. The aim of applying a linear programming is to determine optimal strategies of observed game participants, who are in a mutual conflict, and to determine the value of the game with the previous defining of a mathematical model. Therefore, the aim of this paper is to show the possibility of applying the Simplex method of linear programming in mixed matrix games and to define the methodology by which the value of the game without a saddle point and the optimal strategies of players can be determined, but through the concrete example from practice.

Keywords: Simplex method, Game Theory, linear programming, matrix games, optimal strategies of players.

1. UVOD

Iako se pojam *igre* vrlo često poistovećuje sa zabavom i razonodom, u uslovima tržišne ekonomije koja je dominantna u današnjem poslovnom svetu, on podražava dijametralno suprotno značenje i oličava neku vrstu sukoba u kome jedna strana pobeđuje, dok druga gubi [1]. Naime, rezultat igre ne zavisi samo od poteza jednog igrača, već i od izbora, tj. alternativa koje izaberu drugi igrači, čiji su interesi u suprotnosti sa interesima ovog prvog. Upravo s tog aspekta javlja se situacija neizvesnosti u odlučivanju, a sam konkretan model realne konfliktne situacije definiše se kao *igra* [2]. Kako su igrači strane koje se nalaze u konfliktu s obzirom na svoje suprotne interese, oni teže da budu racionalni u odabiru svojih poteza nastupa na tržištu, tj. da maksimiziraju svoju ličnu dobrobit i pobeđe u igri. To će učiniti jedino odabirom *optimalne strategije*, koje će im obezbediti maksimalni mogući srednji dobitak, odnosno minimalni mogući srednji gubitak.

U zavisnosti od toga da li su u pitanju proste ili mešovite matrice igre, zavisiće i metodologija njihovog rešavanja u smislu određivanja optimalnih strategija igrača, kao i vrednosti datih igara. S obzirom da će ovaj rad biti baziran na mešovitoj matricnoj igri, koja će uključivati dva igrača (dva privredna društva), težište i fokus primenjene metodologije bazirani su na linearnom programiranju, odnosno na Simpleks metodi.

Prvi deo rada posvećen je osnovnim dimenzijama teorije igara, osobito aspektima koji se tiču mešovitih matricnih igara, kao i osnovnim postulatima linearnog programiranja za rešavanje problema iz oblasti matricnih igara višeg reda.

Drugi deo rada zasniva se na samoj primeni Simpleks metode linearnog programiranja u postupku rešavanja konkretnog zadatka iz prakse iz domena mešovityh igara, a s ciljem da se ukaže na praktičnu primenu ove metode u ovoj oblasti.

2. TEORIJSKO-METODOLOŠKE POSTAVKE RADA

2.1. MEŠOVITE MATRIČNE IGRE

Kako je već napomenuto u uvodnom delu, kada matrica nema sedlastu tačku, onda je određivanje optimalne strategije igrača i vrednosti igre (v) daleko kompleksnije. Naime, ukoliko igrač A nema čistu strategiju koja bi mu obezbedila minimalni zagarantovani dobitak, odnosno igrač B nema strategiju kojom se osigurava gornja granica plaćanja, onda oni više ne biraju po jednu strategiju, već se odlučuju za različite strategije, pri čemu je izbor svake od njih određen odgovarajućom verovatnoćom. [2] Ovako definisan konkurentski odnos između igrača zasniva se na tzv. nultoj tački, odnosno na *igri sa nultim zbirom*⁴¹, pri kojoj se preko verovatnoća referenciraju različite alternative igrača istovremeno, u zavisnosti od razvoja situacije [3].

Kod mešovityh matricnih igara racionalno strateško ponašanje učesnika igre ne možemo da postignemo jednostavnim oslanjanjem na Valdov *maxmin-minmax princip*, s obzirom da nema sedlaste tačke za koju bi vrednost igre i gornja i donja granica bile jednake, već se sada data vrednost igre nalazi u određenom rasponu između tih granica [4].

Kod mešovityh igara, igrač A na raspolaganju ima m alternativa (strategija, poteza) i svaku od njih bira sa određenom verovatnoćom $p_1, p_2, p_3, \dots, p_m$, pri čemu one kao takve zadovoljavaju sledeće uslove [5]:

$$p_i \geq 0, i = 1, 2, \dots, m \quad (1)$$

$$\sum_{i=1}^m p_i = 1 \quad (2)$$

Vektor $P = (p_1, p_2, p_3, \dots, p_m)$ naziva se *mešovitom strategijom igrača A*, pri čemu najmanje dve verovatnoće u vektoru moraju biti različite od nule.

Na sličan način posmatra se i igrač B. On ima na raspolaganju n alternativa (strategija) i za svaku se odlučuje sa određenom verovatnoćom. Verovatnoće za izbor njegovih strategija označavaju se sa $q_1, q_2, q_3, \dots, q_n$, a uslove koje te verovatnoće moraju zadovoljiti su sledeći [2]:

$$q_j \geq 0, j = 1, 2, \dots, n \quad (3)$$

$$\sum_{j=1}^n q_j = 1 \quad (4)$$

Vektor $Q = (q_1, q_2, q_3, \dots, q_n)$ naziva se *mešovitom strategijom igrača B*, pri čemu, kao i malopre, najmanje dve verovatnoće u vektoru moraju biti različite od nule.

⁴¹ *Igra sa nultim zbirom* podrazumeva da je iznos dobitka jednog igrača jednak vrednosti gubitka (plaćanja) drugog.

Kada oba igrača upotrebljavaju mešovite strategije P i Q, onda vrednost igre neće odgovarati samo vrednosti jednog elementa matrice plaćanja. Igrač A će dobiti iznos a_{ij} od igrača B samo ako odabere i-tu alternativu, a igrač B j-tu alternativu. Verovatnoća da igrač A odabere i-tu alternativu jednaka je p_i , a verovatnoća da igrač B izabere j-tu alternativu jednaka je q_j . Kako će igrač A nastojati da izborom svoje strategije uveća vrednost igre, a igrač B da istu što više smanji, oni će tada nastojati da izaberu svoje optimalne strategije. Rešenje mešovite igre je par optimalnih strategija P^* (za igrača A) i Q^* (za igrača B), koje poseduju osobinu da ako se jedan od učesnika igre pridržava svoje optimalne strategije, onda ni drugom ne odgovara da odstupa od svoje optimalne strategije. To znači da je ispunjen naredni uslov za sve moguće vrednosti vektora P i Q [2]:

$$E(P, Q^*) \leq E(P^*, Q^*) \leq E(P^*, Q) \quad (5)$$

Predstavljena relacija podrazumeva da ako igrač A koristi optimalnu strategiju P^* , on osigurava da mu srednji dobitak bude najmanje $E(P^*, Q^*)$, pod uslovom da igrač B odabere svoju optimalnu strategiju Q^* [2]. Takođe, i igrač B izborom optimalne strategije Q^* osigurava da njegov srednji gubitak ne bude veći od $E(P^*, Q^*)$, u slučaju da igrač A odabere svoju optimalnu strategiju P^* [2].

Dakle, vektori P^* i Q^* predstavljaju rešenje matrice igre i tzv. optimalne mešovite strategije, na osnovu kojih se vrednost igre v može odrediti na sledeći način [6]:

$$v = E(P^*, Q^*) = \sum_{i=1}^m \sum_{j=1}^n a_{ij} p_i q_j \quad (6)$$

2.1.1. Metode rešavanja mešovitih matičnih igara

Već je napomenuto da je teorija igara matematička disciplina koja se bavi formalizacijom procesa odlučivanja u situacijama gde učestvuje odg. broj subjekata odlučivanja (igrača). To su sve one situacije kada konačan ishod ne zavisi samo od izbora jednog subjekta odlučivanja, nego i od izbora svih ostalih koji u datoj igri učestvuju. Iz toga sledi da se svaki igrač mora ponašati „strateški“, to jest mora predviđati ponašanje ostalih igrača i tome se prilagođavati. [7]

Upravo zato, u postupku rešavanja mešovitih matičnih igara izdvaja se izvestan broj metoda, koje omogućavaju diferenciranje strategija igrača i koje bi bile odraz njihovog strateškog načina razmišljanja [2] [8]:

1. *analitički metod rešavanja* za matrice reda 2×2 (direktna primena formula i preko parcijalnih izvoda funkcije),
2. *grafički metod rešavanja* za matrice reda 2×2 , $2 \times n$ ili $m \times 2$ i
3. *metoda rešavanja primenom linearnog programiranja* za matrice višeg reda $m \times n$.

U ovom radu fokus je stavljen na rešavanje mešovitih matičnih igara višeg reda primenom Simpleks metode linearnog programiranja.

2.2. REŠAVANJE MEŠOVITIH MATRIČNIH IGARA PRIMENOM LINEARNOG PROGRAMIRANJA

Linearno programiranje je jedna od najbolje proučavanih metoda optimizacije i rešavanja problema, ne samo u domenu teorije igara, već i u mnogim drugim oblastima. Velikom broju svetskih problema formulisan je linearni karakter, što je i doprinelo tome da primena linearnog programiranja ima veliki značaj u njihovom rešavanju. [9] Algoritam Simpleks metode, razvijen od strane Dantziga u cilju rešavanja problema linearnog programiranja, počinje odgovarajućom matematičkom osnovom i koristi čitav stožer operacija u cilju očuvanja izvodljivosti modela i garantovanja monotonosti objektivne vrednosti istog [10].

Postupak formiranja matematičkog modela pri primeni linearnog programiranja za rešavanje mešovitih matricnih igara polazi od definisane matrice plaćanja. Optimalna strategija P^* igrača A ima osobinu da on njome dobija najminimalnije vrednosti igre v , bez obzira na to koju strategiju odabere igrač B [2]. Od očekivanih srednjih vrednosti dobitaka igrača A , za pojedine čiste strategije igrača B , formira se sl. sistem nejednačina [2]:

$$\sum_{i=1}^m a_{ij} p_i \geq v, j = 1, 2, \dots, n \quad (7)$$

Ovom sistemu nejednačina dodaju se i uslovi koje moraju zadovoljiti verovatnoće p_i [2]:

$$\sum_{i=1}^m p_i = 1 \quad (8)$$

$$p_i \geq 0, i = 1, 2, \dots, m \quad (9)$$

Kada se sistem nejednačina (7) i jednačinu (8) podeli sa vrednošću igre v , dobija se [2]:

$$\sum_{i=1}^m \frac{p_i}{v} a_{ij} \geq 1, j = 1, 2, \dots, n \quad (10)$$

$$\sum_{i=1}^m \frac{p_i}{v} = \frac{1}{v}, \quad (11)$$

Uvodeći u izraze (10) i (11) sledeću smenu [2]:

$$\frac{p_i}{v} = y_i, i = 1, 2, \dots, m \quad (12)$$

dobija se [2]:

$$\sum_{i=1}^m y_i a_{ij} \geq 1, j = 1, 2, \dots, n \quad (13)$$

$$\sum_{i=1}^m y_i = \frac{1}{v}, \quad (14)$$

Ako se analizira jednačina (14), igrač A će nastojati da svojom strategijom što više poveća vrednost igre v . On će to postići ako u jednačini (14) što više umanja njenu recipročnu vrednost $1/v$, odnosno [2]:

$$\min \sum_{i=1}^m y_i = \frac{1}{\max v} \quad (15)$$

Polazeći od matematičkog modela matrice igre za igrača A , dobijaju se svi elementi modela linearnog programiranja. Dakle, potrebno je da se minimizira vrednost funkcije kriterijuma za prvog učesnika igre [2]:

$$\min g_0 = \sum_{i=1}^m y_i \quad (16)$$

Na sličan način formira se linearni model i za igrača B . Njegova optimalna strategija Q^* ima osobinu da on njome gubi najviše vrednosti igre v , bez obzira na to koju strategiju odabere igrač A [2]. Od očekivanih srednjih vrednosti gubitaka igrača B , za pojedine čiste strategije igrača A , formira se sl. sistem nejednačina [2]:

$$\sum_{i=1}^m a_{ij} q_j \leq v, i = 1, 2, \dots, m \quad (17)$$

Datom sistemu dodaju se i uslovi koje moraju zadovoljiti verovatnoće q_j [2]:

$$\sum_{j=1}^n q_j = 1 \quad (18)$$

$$q_j \geq 0, j = 1, 2, \dots, n \quad (19)$$

Kada se sistem nejednačina (17) i jednačina (18) podeli sa v , dobija se [2]:

$$\sum_{j=1}^n \frac{q_j}{v} a_{ij} \leq 1, i = 1, 2, \dots, m \quad (20)$$

$$\sum_{j=1}^n \frac{q_j}{v} = \frac{1}{v}, \quad (21)$$

Uvodeći u izraze (20) i (21) smenu [2]:

$$\frac{q_j}{v} = x_j, j = 1, 2, \dots, n \quad (22)$$

dobija se sledeći linearni problem [2]:

$$\sum_{j=1}^n x_j a_{ij} \leq 1, i = 1, 2, \dots, m \quad (23)$$

$$\sum_{j=1}^n x_j = \frac{1}{v}, \quad (24)$$

Ako se analizira jednačina (24), igrač B će nastojati da svojom strategijom što je moguće više smanji vrednost igre v . On će to postići ako u jednačini (24) što više poveća njenu recipročnu vrednost $1/v$, odnosno [2]:

$$\max \sum_{j=1}^n x_j = \frac{1}{\min v} \quad (25)$$

Polazeći od matematičkog modela matrične igre za igrača B , dobijaju se svi elementi modela linearnog programiranja. Dakle, funkcija kriterijuma za drugog učesnika igre izgledaće na sledeći način [2]:

$$\max z_0 = \sum_{j=1}^n x_j \quad (26)$$

Na osnovu svega navedenog, lako se može zaključiti da su oba linearna modela međusobno povezana, te da su jedan drugome *dualni*. Stoga, dovoljno je rešiti jedan od njih i da se na osnovu dobijenog rešenja iznađe i rešenje ovog drugog. [6]

3. REZULTATI PRAKTIČNOG PRIMERA

U postupku implementiranja Simpleks metode linearnog programiranja i softverske podloge za rešavanje mešovutih matričnih igara, definisan je jedan praktičan problem borske turističke agencije „Aster travel“ za koji su primenjena metodologija i korišćeni programski paket Lindo dali odgovarajuće rezultate.

Naime, na osnovu dosadašnje velike potražnje koja je među stanovnicima opštine Bor vladala za turističkim aranžmanima za letovanje u Grčkoj, turistička agencija „Aster travel“ za nastupajuću sezonu 2016/2017. treba da ugovori saradnju sa receptivnom turističkom agencijom „Yalos Tours“ iz Grčke, a u cilju organizovanja letovanja domaćih turista po što povoljnijim cenama u sledećim mestima: Paralija, Olimpik Bič, Leptokarija, Hanioti i Nei

Pori. Zadatak inicijativne turističke agencije iz Bora u predsezoni je da u jednom ili više letovališta obezbedi 70 ležajeva po smeni u postojećim kapacitetima, i to za period od juna do septembra meseca. Receptivna agencija iz Grčke koja je preuzela odgovornost dovođenja turista iz Bora u ova letovališta već je potvrdila mogućnost celosezonskog obezbeđivanja neophodnih 70 ležajeva po svakoj smeni, i to u sledećim smeštajnim kapacitetima: hoteli sa 4*, hoteli sa 3*, garni hoteli i vile i apartmani. Dogovoreno je i da u zavisnosti od izbora letovališta i vrste smeštaja, organizator iz Grčke ponudi i odgovarajuće bonitete turističkoj agenciji „Aster travel“ iz Bora, i to na sledeći način:

- za Paraliju:
 - 10% popusta za hotele sa 4*,
 - 8% popusta za hotele sa 3*,
 - 5% popusta za garni hotele i
 - 12% popusta za vile i apartmane.
- za Olimpik Bič:
 - 7% popusta za hotele sa 4*,
 - 4% popusta za hotele sa 3*,
 - 5% popusta za garni hotele i
 - 4% popusta za vile i apartmane.
- za Leptokariju:
 - 9% popusta za hotele sa 4*,
 - 10% popusta za hotele sa 3*,
 - 11% popusta za garni hotele i
 - 5% popusta za vile i apartmane.
- za Hanioti:
 - 11% popusta za hotele sa 4*,
 - 9% popusta za hotele sa 3*,
 - 5% popusta za garni hotele i
 - 7% popusta za vile i apartmane.
- za Nei Pori:
 - 5% popusta za hotele sa 4*,
 - 4% popusta za hotele sa 3*,
 - 5% popusta za garni hotele i
 - 3% popusta za vile i apartmane.

3.1. REŠAVANJE DEFINISANOG PROBLEMA PRIMENOM SIMPLEX METODE

Za tako definisan zadatak, u narednim koracima postavljen je model linearnog programiranja prema organizatoru iz Grčke i rešen primenom Simpleks metode. Takođe, određene su i optimalne strategije za obe agencije, ali je određen i bonitet koji će biti dat turističkoj agenciji „Aster travel“ ukoliko i ona i organizator izaberu optimalne strategije.

Stoga, na osnovu izloženog problema konstruisana je relevantna matrica plaćanja, pri čemu su vrednosti u matrici izražene u %.

Tabela 1. Matrica plaćanja

		Receptivna turistička agencija „Yalos Tours“ iz Grčke (igrač B)				
		b_1	b_2	b_3	b_4	
		Hoteli sa 4*	Hoteli sa 3*	Garni hoteli	Vile i apartmani	
„Aster travel“ (Igrač A)	a_1	Paralija	10	8	5	10
	a_2	Olimpik Bič	7	4	5	4
	a_3	Leptokarija	9	10	11	5
	a_4	Hanioti	11	9	5	7
	a_5	Nei Pori	5	4	5	3

Za tako definisanu početnu matricu plaćanja, procesom redukcije, problem matrične igre sveden je sa dimenzija 5x4 na dimenziju 3x3, na način da su međusobnim poređenjem alternativa prema igračima eliminisane sve irelevantne strategije, koje kao takve nikada ne bi bile izabrane za optimalne od strane ova dva igrača. Postupak redukcije izvršen je po igraču A na sledeći način:

$$\begin{bmatrix} 10 & 8 & 5 & 10 \\ 7 & 4 & 5 & 4 \\ 9 & 10 & 11 & 5 \\ 11 & 9 & 5 & 7 \\ 5 & 4 & 5 & 3 \end{bmatrix} \left\{ \begin{array}{l} a_1 \geq a_2 \\ \text{nije } a_3 \geq a_4 \text{ i} \\ \text{nije } a_4 \geq a_3 \end{array} \right\} \left\{ \begin{array}{l} \text{nije } a_1 \geq a_3 \text{ i} \\ \text{nije } a_3 \geq a_1 \end{array} \right\} \left\{ \begin{array}{l} \text{nije } a_1 \geq a_4 \text{ i} \\ \text{nije } a_4 \geq a_1 \end{array} \right\} \left\{ \begin{array}{l} a_1 \geq a_5 \end{array} \right\} \begin{bmatrix} 0 & 8 & 5 & 10 \\ 11 & 5 & & \\ 5 & 7 & & \end{bmatrix} \quad (27)$$

Postupak redukcije sproveden po igraču B izvršen je vrlo sličnom metodologijom, s tim što su sada eliminisane alternative sa većim ishodbima, s obzirom na to da drugi igrač teži da minimizira svoje plaćanje:

$$\begin{bmatrix} 10 & 8 & 5 & 10 \\ 9 & 10 & 11 & 5 \\ 11 & 9 & 5 & 7 \end{bmatrix} \Rightarrow \begin{bmatrix} 8 & 5 & 10 \\ 10 & 11 & 5 \\ 9 & 5 & 7 \end{bmatrix} \quad (28)$$

$\underbrace{\text{nije } b_1 \leq b_2 \text{ i}}_{\text{nije } b_1 \leq b_3 \text{ i}} \quad \underbrace{\text{nije } b_2 \leq b_3 \text{ i}}_{\text{nije } b_3 \leq b_2} \quad \underbrace{\text{nije } b_3 \leq b_4 \text{ i}}_{\text{nije } b_4 \leq b_3}$

U daljem postupku, za red i nije $b_3 \leq b_1$ nije $b_2 \leq b_4$ i nije $b_4 \leq b_2$ nja neophodno je odrediti gornju i donju vrednost matrične igre primenom V $b_4 \leq b_1$ juma, odnosno proveriti da li je u domenu prostih matričnih igara i ima *sedlasta* tačka [11].

⁴² Sedlasta tačka je element matrice plaćanja koji ispunjava uslov da je najmanji element svoga reda, a u isto vreme i najveći element svoje kolone [12]. Sedlasta tačka predstavlja izraz jednakosti za gornju i donju graničnu vrednost proste matrične igre, a ujedno definiše i optimalne strategije za oba igrača.

Tabela 2. Određivanje sedlaste tačke

			Receptivna turistička agencija „Yalos Tours“ iz Grčke (igrač B)				min _j max _i { min _j }	
			(q ₁)	(q ₂)	(q ₃)			
„Aster travel“ (Igrač A)			b ₁	b ₂	b ₃	min _j	max _i { min _j }	
			Hoteli sa 3*	Garni hoteli	Vile i apartmani			
			(p ₁) a ₁ Paralija	8	5			10	5
			(p ₂) a ₂ Leptokarija	10	11	5	5	5
(p ₃) a ₃ Hanioti	9	5	7	5				
max _i			10	11	10			
min _j { max _i }			10					

Kako u ovom slučaju ne postoji sedlasta tačka, može se zaključiti da se rešavanje problema nalazi u domenu mešovitih matrice igara višeg reda (3x3), pri čemu se vrednost igre kreće u opsegu $5 \leq v \leq 10$. Za konkretno izračunavanje vrednosti igre i određivanje optimalnih strategija za oba igrača neophodno je primeniti metod linearnog programiranja i postaviti adekvatan matematički model prema jednom od učesnika igre. Matematički model neuporedivo je lakše definisati za igrača B, s obzirom da se u postupku primene Simpleks metodologije uvode samo dopunske promenljive. Dati model prikazan na sledeći način:

$$\text{Funkcija cilja: } q_1 + q_2 + q_3 = 1 \quad (29)$$

$$\begin{aligned} \text{Ograničenja: } 8q_1 + 5q_2 + 10q_3 &\leq v \\ 10q_1 + 11q_2 + 5q_3 &\leq v \\ 9q_1 + 5q_2 + 7q_3 &\leq v \end{aligned}$$

Pošto se funkcija cilja i ograničenja podele sa vrednošću igre v , dobija se:

$$\text{Funkcija cilja: } \frac{q_1}{v} + \frac{q_2}{v} + \frac{q_3}{v} = \frac{1}{v} \quad (30)$$

$$\begin{aligned} \text{Ograničenja: } 8 \cdot \frac{q_1}{v} + 5 \cdot \frac{q_2}{v} + 10 \cdot \frac{q_3}{v} &\leq 1 \\ 10 \cdot \frac{q_1}{v} + 11 \cdot \frac{q_2}{v} + 5 \cdot \frac{q_3}{v} &\leq 1 \\ 9 \cdot \frac{q_1}{v} + 5 \cdot \frac{q_2}{v} + 7 \cdot \frac{q_3}{v} &\leq 1 \end{aligned}$$

Uvođenjem smene:

$$\frac{q_1}{v} = x_1, \frac{q_2}{v} = x_2, \frac{q_3}{v} = x_3 \quad (31)$$

dobija se sledeći matematički model linearnog programiranja:

$$\max F(X) = x_1 + x_2 + x_3 = \frac{1}{v} \quad (32)$$

$$\begin{aligned} 8x_1 + 5x_2 + 10x_3 &\leq 1 \\ 10x_1 + 11x_2 + 5x_3 &\leq 1 \\ 9x_1 + 5x_2 + 7x_3 &\leq 1 \end{aligned}$$

Pošto se izvrši prilagođavanje matematičkog modela za primenu Simpleks metode linearnog programiranja, dobija se:

$$\max F(X) = x_1 + x_2 + x_3 + 0 \cdot (x_4 + x_5 + x_6) = \frac{1}{v} \quad (33)$$

$$\begin{aligned} 8x_1 + 5x_2 + 10x_3 + x_4 &= 1 \\ 10x_1 + 11x_2 + 5x_3 + x_5 &= 1 \\ 9x_1 + 5x_2 + 7x_3 + x_6 &= 1 \end{aligned}$$

Kroz tri iteracije došlo se i do odgovarajućeg relevantnog rešenja postavljenog problema:

Tabela 3. Početna simpleks tabela ST_0

C			1	1	1	0	0	0	θ	$\theta = \frac{b}{x_2}$	$\theta = \frac{b}{x_3}$
C _b	X _b	B	x ₁	x ₂	x ₃	x ₄	x ₅	x ₆	$= \frac{b}{x_1}$		
0	x ₄	1	8	5	10	1	0	0	0,125	0,200	0,100
0	x ₅	1	10	11	5	0	1	0	0,100	0,091	0,200
0	x ₆	1	9	5	7	0	0	1	0,111	0,200	0,143
$F_j - C_j$		0	-1	-1	-1	0	0	0	$F_j - C_j^{(l)} = 0 - (-1 \cdot 0,100) = 0,1$		

Iz Table ST_0 jasno se može uočiti da će u bazu u narednoj iteraciji ući promenjiva x₁, a izaći promenjiva x₅.

Tabela 4. Simpleks tabela nakon prve iteracije ST_1

C			1	1	1	0	0	0	$\theta = \frac{b}{x_3}$
C _b	X _b	B	x ₁	x ₂	x ₃	x ₄	x ₅	x ₆	
0	x ₄	0,2	0	-3,8	6	1	-0,8	0	0,033
1	x ₁	0,1	1	1,1	0,5	0	0,1	0	0,200
0	x ₆	0,1	0	-4,9	2,5	0	-0,9	1	0,040
$F_j - C_j$		0,1	0	0,1	-0,5	0	0,1	0	$F_j - C_j^{(ll)} = 0,1 - (-0,5 \cdot 0,033) \approx 0,12$

Iz Table ST_1 jasno se može uočiti da će u bazu u narednoj iteraciji ući promenjiva x₃, a izaći promenjiva x₄.

Tabela 5. Simpleks tabela nakon druge iteracije ST_2

C			1	1	1	0	0	0	$\theta = \frac{b}{x_2}$
C _b	X _b	B	x ₁	x ₂	x ₃	x ₄	x ₅	x ₆	
1	x ₃	0,033	0	-0,633	1	0,167	-0,133	0	-
1	x ₁	0,083	1	1,417	0	-0,083	0,167	0	0,059
0	x ₆	0,017	0	-3,317	0	-0,417	-0,567	1	-
$F_j - C_j$		0,116	0	-0,216	0	0,084	0,034	0	$F_j - C_j^{(III)} = 0,116 - (-0,216 \cdot 0,059) \approx 0,13$

Iz Table ST_2 jasno se može uočiti da će u bazu u narednoj iteraciji ući promenjiva x_2 , a izaći promenjiva x_1 .

Tabela 6. Simpleks tabela nakon treće iteracije ST_3

C			1	1	1	0	0	0
C _b	X _b	B	x ₁	x ₂	x ₃	x ₄	x ₅	x ₆
1	x ₃	0,070	0,447	0	1	0,130	-0,059	0
1	x ₂	0,059	0,706	1	0	-0,059	0,117	0
0	x ₆	0,211	2,341	0	0	-0,611	-0,176	1
$F_j - C_j$		0,129	0,153	0	0	0,071	0,058	0

Optimalno rešenje primarnog modela je: $X^* = [0; 0,059; 0,070; 0; 0; 0,211]$.
 Maksimalna vrednost funkcije cilja iznosi: $\max F(x) = 0,129$. Kako važi da je $\max F(x) = 1/v$,
 onda se lako može dobiti i vrednost matrice igre:

$$v = \frac{1}{\max F(x)} = \frac{1}{0,129} = 7,752 \quad (34)$$

S obzirom na ranije uvedenu smenu: $\frac{q_j}{v} = x_j$, iz koje se određuje: $q_j = v \cdot x_j$, dobijaju se sl. vrednosti vektora Q^* :

$$\begin{aligned} q_1 &= v \cdot x_1 = 7,752 \cdot 0 = 0 & (35) \\ q_2 &= v \cdot x_2 = 7,752 \cdot 0,059 = 0,457368 \approx 0,46 \\ q_3 &= v \cdot x_3 = 7,752 \cdot 0,070 = 0,54264 \approx 0,54 \\ \text{pa je: } Q^* &= (q_1^*, q_2^*, q_3^*, q_4^*) = (0; 0; 0,46; 0,54). \end{aligned}$$

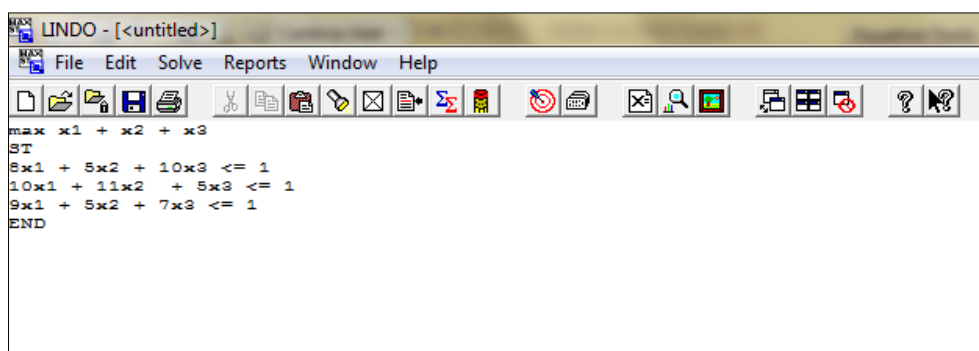
Optimalno rešenje dulanog problema je: $Y^* = [0,071; 0,058; 0; 0,153; 0; 0]$. Pošto je izvršena smena u matematičkom modelu za prvog igrača: $\frac{p_i}{v} = y_i$, dobija se da je: $p_i = v \cdot y_i$. Tada se vrednosti vektora P^* dobijaju na sledeći način:

$$\begin{aligned} p_1 &= v \cdot y_1 = 7,752 \cdot 0,071 = 0,550392 \approx 0,55 \\ p_2 &= v \cdot y_2 = 7,752 \cdot 0,058 = 0,449616 \approx 0,45 \\ p_3 &= v \cdot y_3 = 7,752 \cdot 0 = 0 \\ \text{pa je: } P^* &= (p_1^*, p_2^*, p_3^*, p_4^*) = (0,55; 0; 0,45; 0; 0). \end{aligned} \quad (35)$$

3.2. REŠAVANJE DEFINISANOG PROBLEMA PRIMENOM PROGRAMSKOG PAKETA LINDO

Kako se postavljeni problem iz domena linearnog programiranja može na vrlo jednostavan način rešiti i primenom programskog paketa Lindo, a u cilju ukazivanja na gotovo identične rezultate koji bi se njime dobili, izvršeno je i softversko rešavanje postavljenog praktičnog primera prema igraču B.

Izgled ekrana sa prethodno determinisanim matematičkim modelom za receptivnu turističku agenciju, uz primenjenu Lindo sintaksu, dat je na Slici 1.



Slika 1. Matematički model igrača B definisan u Lindo programu

Na osnovu problema koji je definisan na prethodnoj slici, proračunom u Lindo softveru dobijaju se sledeći rezultati predočeni na Slici 2.

Na osnovu tih rezultata, jasno se vidi da je optimalno rešenje primarnog modela: $X^* = [0; 0,058824; 0,070588; 0; 0; 0,211765]$, što je veoma približno vrednostima dobijenim gore primenjenom Simpleks metodologijom. Maksimalna vrednost funkcije cilja vrlo je identična i iznosi: $\max F(x) = 0,1294118$. Odatle sledi da je vrednost matrične igre jednaka:

$$v = \frac{1}{\max F(x)} = \frac{1}{0,1294118} = 7,727271 \quad (36)$$

S obzirom na ranije uvedenu smenu: $\frac{q_j}{v} = x_j$, iz koje se određuje: $q_j = v \cdot x_j$, sada se dobijaju sledeće vrednosti vektora Q^* :

$$\begin{aligned} q_1 &= v \cdot x_1 = 7,727271 \cdot 0 = 0 \\ q_2 &= v \cdot x_2 = 7,727271 \cdot 0,058824 = 0,454548989 \approx 0,45 \\ q_3 &= v \cdot x_3 = 7,727271 \cdot 0,070588 = 0,545452605 \approx 0,55 \end{aligned} \quad (37)$$

pa je: $Q^* = (q_1^*, q_2^*, q_3^*, q_4^*) = (0; 0; 0,45; 0,55)$.

```

LINDO - [Reports Window]
File Edit Solve Reports Window Help
LP OPTIMUM FOUND AT STEP      2
OBJECTIVE FUNCTION VALUE
1)      0.1294118
VARIABLE      VALUE      REDUCED COST
X1      0.000000      0.152941
X2      0.058824      0.000000
X3      0.070588      0.000000
ROW      SLACK OR SURPLUS      DUAL PRICES
2)      0.000000      0.070588
3)      0.000000      0.058824
4)      0.211765      0.000000
NO. ITERATIONS=      2
RANGES IN WHICH THE BASIS IS UNCHANGED:
VARIABLE      CURRENT      OBJ COEFFICIENT RANGES      ALLOWABLE
COEF      INCREASE      DECREASE
X1      1.000000      0.152941      INFINITY
X2      1.000000      1.200000      0.216667
X3      1.000000      1.000000      0.342105
ROW      CURRENT      RIGHTHAND SIDE RANGES      ALLOWABLE
RHS      INCREASE      DECREASE
2      1.000000      0.346154      0.545455
3      1.000000      1.200000      0.500000
4      1.000000      INFINITY      0.211765
    
```

Slika 2. Rezultati primene Lindo programa za matematički model igrača B

Sa Slike 2. jasno se mogu uočiti i rešenja dualnog modela, koji u ovom slučaju karakteriše igrača A. Naime, optimalno rešenje dualnog modela je: $Y^* = [0,070588; 0,058824; 0; 0,152941; 0; 0]$. Pošto je izvršena smena u matematičkom modelu za prvog igrača: $\frac{p_i}{v} = y_i$, dobija se da je: $p_i = v \cdot y_i$. Sada su vrednosti vektora P^* vrlo identične onim vrednostima koje su dobijene primenom Simpleks metode linearnog programiranja:

$$\begin{aligned}
 p_1 &= v \cdot y_1 = 7,727271 \cdot 0,070588 = 0,545452605 \approx 0,55 & (38) \\
 p_2 &= v \cdot y_2 = 7,727271 \cdot 0,058824 = 0,454548989 \approx 0,45 \\
 p_3 &= v \cdot y_3 = 7,727271 \cdot 0 = 0 \\
 \text{pa je: } P^* &= (p_1^*, p_2^*, p_3^*, p_4^*) = (0,55; 0; 0,45; 0; 0).
 \end{aligned}$$

4. DISKUSIJA REZULTATA

Na osnovu dobijenih rezultata prethodno definisanog problema, koji se vrlo često javlja u turizmu, jasno se može zaključiti da bonitet koji turistička agencija „Aster travel“ dobija u slučaju da budu izabrane optimalne strategije oba igrača iznosi $7,752 \approx 8\%$ u slučaju primene Simpleks metodologije, ili $7,727271 \approx 8\%$ u slučaju primene Lindo programskog paketa.

Da bi borska putnička agencija dobila maksimalni mogući popust, neophodno je da sa receptivnom turističkom agencijom „Yalos Tours“ iz Grčke ugovori 55% kapaciteta u Paraliji i 45% smeštajnih kapaciteta u Leptokariji. Divergentnost u dobijenim rezultatima primenom dva različita pristupa rešavanja zadatka u ovom slučaju je minimalna.

Sa druge strane, prema rezultatima Simpleks metode, optimalna strategija organizatora iz Grčke je da ugovori sa borskom poslovnicom 46% smeštaja turista u garni hotelima i 54% smeštaja turista u vilama i apartmanima. Nasuprot tome, Lindo paket generisao je sledeće,

minimalno različite rezultate: 45% smeštaja turista u garni hotelima i 55% smeštaja turista u vilama i apartmanima

Od ovako organizovanog letovanja, očito je da bi turistička agencija „Aster travel“, vođena rezultatima Simpleks metode, u Paraliji trebalo da ugovori 25,3% ležajeva u garni hotelima i 29,7% ležajeva u vilama i apartmanima, dok bi u Leptokariji trebalo da ugovori 20,7% ležajeva u garni hotelima i 24,3% ležajeva u vilama i apartmanima. Na ovaj način izvršila bi se dobra organizacija letovanja domaćih turista u predstojećoj sezoni 2016/2017, a da se pritom ostvari makar najminimalniji mogući dobitak, dat kroz odgovarajući procenat boniteta.

Ako bi se, pak, agencija vodila rešenjima dobijenim putem Linda, način organizovanja bio bi gotovo isti, s tim da bi u Paraliji trebalo da ugovori 24,75% ležajeva u garni hotelima i 30,25% ležajeva u vilama i apartmanima, dok bi u Leptokariji trebalo da ugovori 20,25% ležajeva u garni hotelima i 24,75% ležajeva u vilama i apartmanima.

Tabela 7. Način organizovanja letovanja za predstojeću sezonu na osnovu rezultata Simpleks metode

Organizacija letovanja 2016/2017.			Receptivna turistička agencija „Yalos Tours“ iz Grčke (igrač B)					
			$(q_1 = 0)$	$(q_2 = 0)$	$(q_3 = 0,46)$	$(q_4 = 0,54)$	Σ	
			b_1	b_2	b_3	b_4		
			Hoteli sa 4*	Hoteli sa 3*	Garni hoteli	Vile i apartmani		
„Aster travel“ (Igrač A)	$(p_1 = 0,55)$	a_1	Paralija	-	-	25,3	29,7	55
	$(p_2 = 0)$	a_2	Olimpik Bič	-	-	-	-	-
	$(p_3 = 0,45)$	a_3	Leptokarija	-	-	20,7	24,3	45
	$(p_4 = 0)$	a_4	Hanioti	-	-	-	-	-
	$(p_5 = 0)$	a_5	Nei Pori	-	-	-	-	-
	Σ			-	-	46	54	100

Tabela 8. Način organizovanja letovanja za predstojeću sezonu na osnovu rezultata Lindo programskog paketa

Organizacija letovanja 2016/2017.			Receptivna turistička agencija „Yalos Tours“ iz Grčke (igrač B)					
			$(q_1 = 0)$	$(q_2 = 0)$	$(q_3 = 0,45)$	$(q_4 = 0,55)$	Σ	
			b_1	b_2	b_3	b_4		Σ
			Hoteli sa 4*	Hoteli sa 3*	Garni hoteli	Vile i apartmani	Σ	
„Aster travel“ (Igrač A)	$(p_1 = 0,55)$	a_1	Paralija	-	-	24,75		30,25	55
	$(p_2 = 0)$	a_2	Olimpik Bič	-	-	-	-	-
	$(p_3 = 0,45)$	a_3	Leptokarija	-	-	20,25	24,75	45
	$(p_4 = 0)$	a_4	Hanioti	-	-	-	-	-
	$(p_5 = 0)$	a_5	Nei Pori	-	-	-	-	-
	Σ			-	-	45	55	100

5. ZAKLJUČAK

Na osnovu rezultata dobijenih pri rešavanju praktičnog primera definisanog u domenu mešovitih matricnih igara višeg reda, jasno se može zaključiti koliki značaj ima primenjena Simpleks metodologija linearnog programiranja.

Naime, lako je uočljivo da su oba modela korišćena za izračunavanje optimalnih strategija dva igrača međusobno povezana, kao i da su jedan drugom dualni. Time je jasno predočeno da se rešavanje antagonističke igre može svesti praktično na rešavanje para dualnih problema linearnog programiranja, a da pritom nije potrebno svaki od njih rešavati zasebno.

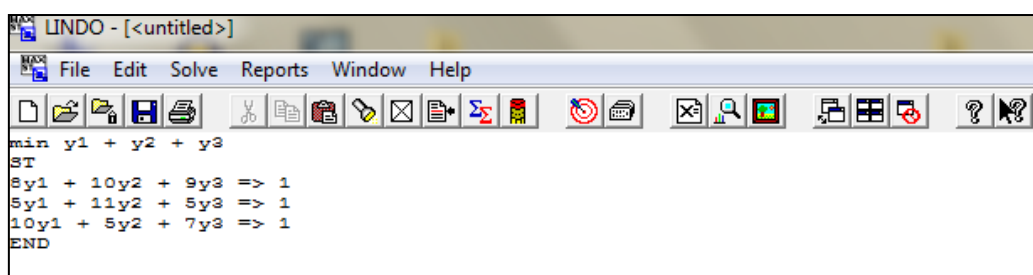
Takođe, može se zaključiti i da se mešovite matricne igre mogu koristiti u različitim oblastima u kojima je neophodno doneti odgovarajuće odluke, koje mogu biti vezane za brojne aspekte ljudskog delovanja, i gde se, realno gledano, mogu javiti međusobno suprotstavljene strane, kao potencijalni učesnici igre.

Vredan zaključak može se izvući i iz primenjena dva načina rešavanja postavljenog problema, koji su dali gotovo identične rezultate. Naime, Simpleks metoda linearnog programiranja imala je gotovo minimalna odstupanja u svojim rešenjima u odnosu na Lindo programski paket, a kao očigledan razlog tome izdvaja se zaokruživanje vrednosti dobijenih veličina na tri decimale.

Sumarno gledano, jasno je da je kroz ovaj rad prikazana samo još jedna od mnogobrojnih oblasti gde je linearno programiranje, tj. Simpleks metoda linearnog programiranja našla svoju primenu u postupku analize i matematičkog rešavanja prethodno ustrojenog problema. Njome su izvedeni zaključci i definisane optimalne strategije na osnovu kojih oba igrača mogu realizovati svoje interese na odgovarajući način.

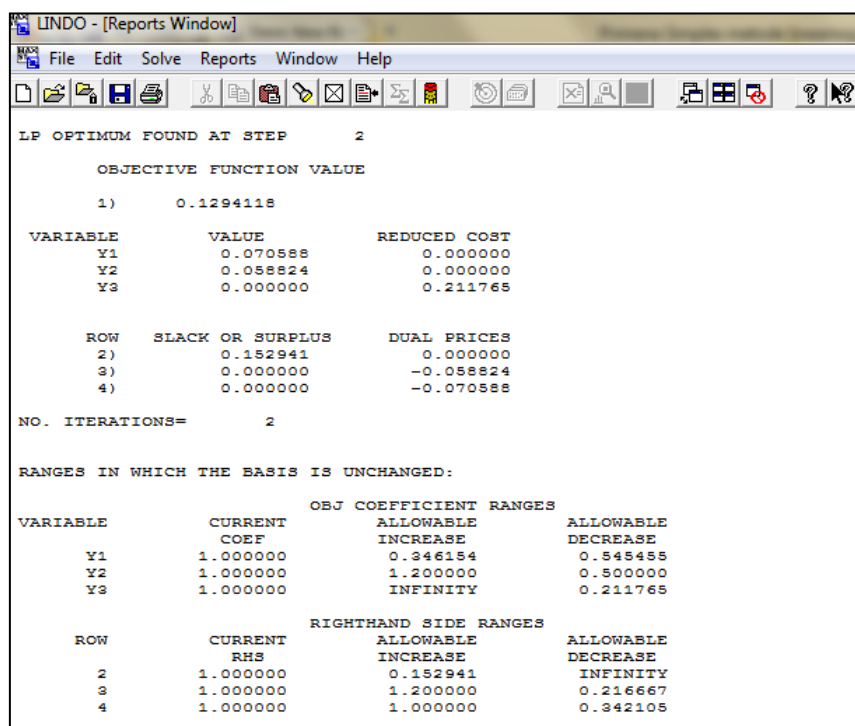
6. DODATAK

U cilju što potpunije analize posmatranog problema, a kako bi se ukazalo na gotovo identične rezultate koji se dobijaju pri različitim načinima njegovog rešavanja, izvršena je softverska analiza postavljenog praktičnog primera, i to prema igraču A. Sama postavka modela u Lindo programu i relevantni rezultati dobijeni iz tog modela dati su na Slikama 3. i 4.



```
LINDO - [untitled]
File Edit Solve Reports Window Help
min y1 + y2 + y3
ST
8y1 + 10y2 + 9y3 => 1
5y1 + 11y2 + 5y3 => 1
10y1 + 5y2 + 7y3 => 1
END
```

Slika 3. Matematički model igrača A definisan u Lindo programu



LINDO - [Reports Window]

LP OPTIMUM FOUND AT STEP 2

OBJECTIVE FUNCTION VALUE

1) 0.1294118

VARIABLE	VALUE	REDUCED COST
Y1	0.070588	0.000000
Y2	0.058824	0.000000
Y3	0.000000	0.211765

ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.152941	0.000000
3)	0.000000	-0.058824
4)	0.000000	-0.070588

NO. ITERATIONS= 2

RANGES IN WHICH THE BASIS IS UNCHANGED:

VARIABLE	CURRENT COEF	OBJ COEFFICIENT RANGES	
		ALLOWABLE INCREASE	ALLOWABLE DECREASE
Y1	1.000000	0.346154	0.545455
Y2	1.000000	1.200000	0.500000
Y3	1.000000	INFINITY	0.211765

ROW	CURRENT RHS	RIGHTHAND SIDE RANGES	
		ALLOWABLE INCREASE	ALLOWABLE DECREASE
2	1.000000	0.152941	INFINITY
3	1.000000	1.200000	0.216667
4	1.000000	1.000000	0.342105

Slika 4. Rezultati primene Lindo programa za matematički model igrača A

Iz ovih rezultata jasno se može uvideti da će vrednost igre i optimalne strategije ostati nepromenjene, bez obzira na to za kog igrača se vrši analiza putem Linda. Na ovaj način još jednom je dokazano da su matematički modeli igrača *A* i igrača *B* jedan drugome dualni i da će se uvek na kraju dobiti ista rešenja.

REFERENCE

- [1] Ghadle, P., K., Pawar, S., T. (2014): Game Theory problems by an alternative Simplex method, *International Journal of Research in Engineering and Technology* 3(5), R.V College of Engineering, Bangalore, India, pp. 900-905
- [2] Jovanović, I. (2016): *Operaciona istraživanja II - teorija igara*, Autorizovana predavanja, Tehnički fakultet u Boru, Bor, p. 2, 24, 25, 29, 46-49
- [3] Fernandez, F., R., Puerto, J. (1996): Vector Linear Programming in Zero-Sum Multicriteria Matrix Games, *Journal of Optimization Theory and Applications* 89(1), Springer Verlag, Berlin, Nemačka, pp. 115-127
- [4] Pavličić, D. (2007): *Teorija odlučivanja*, Ekonomski fakultet u Beogradu, Beograd, p. 219
- [5] Petković, N. (2016): *Matematički modeli optimizacije poslovnih procesa*, Doktorska disertacija, Fakultet za menadžment, Zaječar, p. 79
- [6] Jovanović, A. (2005): *Metode operacionih istraživanja*, Tehnički fakultet u Boru, Bor, p. 173, 178
- [7] Stojanović, B. (2004): Uspostavljanje konvencija – primena teorije igara, *Sociološki pregled* 38(3), Srpsko sociološko društvo, Beograd, pp. 373-395
- [8] Ferguson, S., T. (2014): *Game Theory*, Mathematics Department, University of California, Los Angeles, pp. 9-16
- [9] Dantzig, G., B. (1963): *Linear Programming and Extensions*, Princeton University Press, New Jersey, USA, p. 28
- [10] Sampras, N., Sifelaras, A. (2009): A primal-dual exterior point algorithm for linear programming problems, *Yugoslav Journal of Operations Research* 19(1), Fakultet organizacionih nauka, Beograd, pp. 123-132
- [11] Duffy, J. (2015): *Game Theory and Nash Equilibrium*, Lakehead University, Ontario, Canada, p. 6
- [12] Waner, S. (2007): *Game Theory - Saddle Point & Strictly Determined Game*, [Internet], Dostupno na: <http://www.zweigmedia.com/RealWorld/Summary3b.html#top>, Pristupljeno: 13.4.2017.



FEASIBILITY OF THE PROJECT DLS APPLICATION PLATFORM FOR EDUCATION IN INTERNET ENTREPRENEURSHIP

Jelena Kovačević

Univerzitet u Beogradu, Tehnički fakultet u Boru, 12 Vojske Jugoslavije, 19210 Bor, Srbija

Abstract: Globalization has imposed an era of technology that dictates all business conditions. In order to be able to follow its trends, it is necessary to improve our business through the Internet, to modernize the concept of internet entrepreneurship. Leading economic countries have the most important resources, such as knowledge, language and technology, where we can see that their application is wide-ranging. In our country there is a gap that disrupts modern business and prevents us from stepping up with the most developed countries. The solution of this gap lies in the fusion of the most powerful resources into one business venture. Through the implementation of the DLS platform for learning English, we can contribute not only to the development of internet entrepreneurship, but also to broader education of the population and suppression of the so-called "brain drain". The feasibility of the project has been elaborated in detail through the Business Plan. The economic analysis of the project and the sensitivity analysis of the project were used to process the obtained results.

Keywords: internet, internet entrepreneurship, internet education, implementation of dls platform, project feasibility

1. UVOD

Na ivici smo tehnološke revolucije koja će promeniti iz korena naš način života, način na koji radimo i odnosimo se jedni prema drugima [1]. Činjenica je da živimo u eri tehnologije gde internet predstavlja fundamentalni deo današnjice i od nje kreira informatičko doba. Kao i na sve ostalo, razvoj tehnologije i interneta ima veliki uticaj na formiranje internet preduzetnika i razvoj internet preduzetništva.

Internet preduzetnik je preduzetnik i vlasnik, osnivač ili menadžer poslovanja zasnovanog na internet [2]. Za internet preduzetnike možemo reći da su to pojedinci čija znanja leže na dobrom poznavanju kulture i tehnologije interneta i koji ta znanja primenjuju kroz veštine prodaje proizvoda i usluga putem interneta. Iz ovog možemo zaključiti da je internet ustvari ništa drugo do jedan od vodećih preduzetničkih alata.

Internet preduzetništvo se u mnoštvome ne razlikuje od klasičnog vida preduzetništva. Preduzetništvo i dalje predstavlja delatnost koja je usmerena na pokretanje, organizovanje i inoviranje poslovanja preduzeća, sa osnovnim ciljem stvaranja novog tržišta i ostvarivanja dobiti [3]. Jedina razlika je što je tradicionalan način razmena dobara i pružanja usluga zamenjen internet razmenom iz koje su protekli mnogi benefiti poput: 1) potencijalne baze korisnika, 2) prodavnica koja se nikad ne zatvara, 3) nove šanse, 4) znatno smanjenje troškova poslovanja.

Ako posmatramo razvoj internet preduzetništva, možemo zaključiti da se pod pritiskom snažnog uticaja globalizacije u prethodnih deset godina internet preduzetništvo razvijalo munjevitom brzinom. Trendovi rasta i razvoja su galopirajući stoga je zastupljenost internet preduzetništva značajnog obima, posebno u BRIK zemljama (poput Kine, Brazila i Rusije) koje su iskoristile najviše šansi koje je globalizacija ponudila. Problem predstavlja to što je na našim prostorima internet preduzetništvo slabo razvijeno i benefiti koje ono nudi nisu u potpunosti iskorišćeni. Ovde nailazimo na gep između raspoloživih izvora i nedovoljno iskorišćenih šansi, čije rešenje leži u obrazovanju i njegovom unapređivanju. Balkan, odnosno Srbija, je oduvek bila bogata prirodno obdarenim, snalažljivim i pametnim ljudima. Stoga treba nastaviti sa ulaganjem u njihovo obrazovanje, u relevantnim tehnologijama danas, ali i u budućnosti kako bi bili u koraku sa vremenom. Ovakvim investicijama bićemo u mogućnosti da držimo korak sa razvijenim zemljama prema onom čemu svi putevi vode. "Space...the final frontier..." [4].

2. LITERATURNI PREGLED

Uloga preduzetnika je ključna u stvaranju novih ekonomskih aktivnosti koje pomažu u stvaranju vrednosti, i generisanju bogatstva i poslova. [5] Neki tvrde da se uspešni preduzetnici rađaju sa preduzetničkim talentom, međutim skorašnja istraživanja to negiraju i potvrđuju hipotezu da se preduzetnički talenat stvara učenjem i oblikuje iskustvom. Veoma bitan korak ka razvoju internet preduzetništva predstavlja preuzimanje rizika i iskorišćavanje šansi. Uspeh predstavlja jedinstvenost prilika i smelosti. Iz navedenog možemo zaključiti da bilo ko može da pokrene poslovni poduhvat. Sve što je potrebno da bi dobra ideja rezultirala uspešnim poduhvatom, je dobro propračunat i preduzet rizik u cilju iskorišćenja šanse.

Razvojno istraživanje industrija informacionih i komunikacionih tehnologija (ICT) se brzo povećava [5]. Iz tog razloga se obilje neiskorišćenih šansi nalazi u razvoju novih tehnologija. Ovde dolazimo do već pomenutog entiteta globalizacije. Globalizacija, u njenom najkraćem objašnjenju, predstavlja „Svet bez granica“. Sa ekonomske strane gledišta, globalizacija uključuje robu i usluge i ekonomske resurse kapitala, tehnologije i podataka [6]. Kako bismo uspeli da ispratimo trendove galopirajućeg razvoja tržišta usled efekta globalizacije moramo raspolagati ne samo određenom količinom sredstava već informacija i znanja. Razvoj globalizacije je doprineo povećanoj razmeni dobara, među zemljama, ljudi, informacija i tehnologija. Kontinuirana integracija i međusobno povezivanje između regiona, zemalja i kultura kroz ekonomske, društvene i političke sisteme uvek su evoluirali životni standard ljudskih društava u apsolutnom i relativnom smislu [7]. Mogućnost stvaranja interakcije između ljudi različitih demografskih, jezičkih i kulturoloških karakteristika, rezultirala je usvajanjem univerzalnog svetskog jezika kao jedinstvenim sredstvom za komunikaciju. U sklopu ove konstantne evolucije, globalizacija - ekonomska globalizacija - odigrala je značajnu ulogu naročito pošto je industrijska revolucija uspostavila ogromne inovacije [7].

Iz navedenog možemo zaključiti da su varijable poput globalizacije, razvijanja interneta, sticanja znanja i usavravanja jezika, rezultirale šansama pogodnim za razvoj internet preduzetništva. Rapidni razvoj Interneta rezultirao je enormnom promenom u preduzetništvu. Ovakav vid promene omogućio je preduzetnicima da uspeju u virtualnom svetu današnjice [8]. S obzirom da je današnjica bazirana na virtualnom svetu, i da je on kao nezavisna varijabla oblikovao sve oblike unapređenog i standardizovanog poslovanja, mnoge šanse budućih preduzetnika leže baš u ovakvim poduhvatima, iliti virtualnim poslovanjem putem platformi.

Poslovanje putem platforme bazira se na veb stranicama koje su omogućile virtualno preduzetništvo kroz poboljšanje hardvera i softvera i nove aplikacije u tehnologijama povezivanja. [8]. Njihovo funkcionisanje je bazirano na dvostranoj platformi koja povezuje dve različite strane što je preduzetnicima omogućilo da koriste platformu mreže za svoje poslovanje na način koji ranije nije bio moguć [9].

Naš uspeh u u novom vidu internet preduzetništva leži na adekvatnim i pravovremenim informacijama, znanju i jeziku. Kao što je već pomenuto, ključ uspeha i sustizanja vodećih zemalja u trci kroz globalizaciju leži u poznavanju jezika. Opšte prihvaćen jezik koji se koristi za internacionalnu komunikaciju u svim kulturama je Engleski. Odavde uvodimo novi termin, DLS (*Distance Learning System*) platformu, kao esencijalni alat za razvoj internet poslovanja. DLS predstavlja multimedijalnu i interaktivnu platformu za učenje na daljinu [10]. Platforma je razvijena na domaćoj teritoriji i predstavlja prvi ovakav vid platforme. E - learning platforme postoje u mnogim razvijenim zemljama. Neke od vodećih ekonomskih sila poput Kine, imaju već ustanovljeni sistem ovakvog poslovanja i kompanije kao što su iTutorGroup i VIPKid, u kojima rade više od 6.000 Srba, su jedne od njihovih pozitivnih praksi. Takođe primena DLS platforme dala je pozitivnu praksu i u našoj zemlji, gde je implementaciju stekla u kompaniji ITAcademy. DLS platforma u Srbiji predstavlja potpuno domaći proizvod Softlinka, softverskog sektora kompanije Link group d.o.o. [10] Za uspešan rad ove platforme, svaki aspekt učenja na daljinu je pažljivo analiziran i implementiran. Svi elementi neophodni za potpunu simulaciju nastavnog procesa implementirani su u platformu. Nastavno okruženje se stvara na bilo kom mestu i u bilo koje vreme koje krajnji korisnik izabere. Ono što je bitno je da platforma “browser based”, što za korisnika predstavlja olakšavajuću okolnost jer instalacija dodatnih softvera za pristup platform nije potrebna [10].

3. METODOLOGIJA

Rad platforme za održavanje nastave iz Engleskog jezika zasnivaće se na sledećim standardima. Budući studenti, kao i sertifikovani predavači, imaće mogućnost da se registruju na DLS platformu i tako prate predavanja.. Postojeće 2 vrste časova: 1) časovi sa odraslima u trajanju od 45 min; 2) časovi sa starijom decom: časovi sa decom do 12 godina i časovi sa decom od 12-18 godina, u trajanju od 25 i 45 min. Prvi tip časova sa odraslima biće orijentisan na njihove preferencije i sticanje znanja iz njima potrebnih sfera. Drugi tip su posebni časovi zanimljivog karaktera koji će se održavati sa decom ,do 12 godina, gde će ona imati priliku da uz učenje istražuju, uče pesmice i igraju igre na engleskom jeziku, u zavisnosti od njihovog nivoa znanja engleskog jezika i uzrasta. Tipologija časova biće podeljenja u 5 kategorija : 1) gramatika (grammar), 2) izgovor (pronunciation), 3) čitanje (reading), 4) komunikacija (speaking) i 5) slobodni časovi (free activities). Klijenti će imati priliku da prilikom zakazivanja časova odaberu i tip predavanja tj da li žele da vežbaju gramatiku, izgovor, čitanje, komunikaciju ili žele da imaju čas slobodne forme gde će predavač sam uskladiti predavanja. Takođe klijenti će imati priliku da, pre nego što se odluče za saradnju sa nama, pristupe demo času sa našim predavačima u trajanju od 15 minuta. Čas će biti besplatan, i cilj takvog časa je da klijente upoznamo sa načinom rada, izgledom platforme i nekim od aktivnosti koje će ih očekivati na regularnim časovima. Takođe, na tom času će se odrediti sposobnosti klijenta i njegov nivo znanja engleskog kako bi ga uvrstili u odgovarajuću grupu časova sa prilagođenim nivoom. Postojeće 4 nivoa znanja: 1) početni nivo, 2) srednji nivo, 3) visoki nivo i 4) napredni nivo. Tokom regularnog časa, klijenti će

moći da vide i čuju svog predavača i samim tim biti u mogućnosti da u svakom trenutku prekinu čas i postave pitanja ukoliko im nešto nije jasno.

Za potrebe ovog rada sprovedeno je istraživanje gde su prikupljeni podaci formirani u biznis plan, radi ispitivanja isplativosti projekta. Biznis planom je ispitano tržište, sa gledišta potencijalnih korisnika i predavača, konkurencija, finansijska analiza poduhvata i sama opravdanost ideje. Prednost primene biznis plana u ovakvom vidu istraživanja je što nam on može pokazati realnu sliku ovakvog preduzetničkog poduhvata i njegovu isplativost.

4. REZULTATI ISTRAŽIVANJA

Za empirijsku validaciju rezultata tj. definisanja ključnih faktora koji utiču na isplativost preduzetničke ideje, korišćena je analiza BP kroz sledeća četiri koraka.

Korak 1. SWOT analiza

SWOT analiza	Snage	Slabosti
	1. Raspoloživi obrazovani kadar u regionu 2. Postojanje realne mogućnosti realizacije projekta 3. Dostupnost sticanja potrebnih sertifikata 4. Manji troškovi poslovanja putem interneta 5. Lakoća upotrebe platforme 6. Nepostojanje direktne konkurencije	1. Nedostatak finansijskih sredstava 2. Visok procenat odliva mozgova 3. Nedovoljno ulaganje u privredni razvoj 4. Nesvakidašnji poduhvat 5. Spor razvoj internet preduzetništva
	Šanse	Pretnje
	1. Razvoj internet preduzetništva 2. Aktivacija mladih obrazovanih ljudi 3. Nova radna mesta 4. Mogućnost efikasnijeg korišćenja internet benefita 5. Približavanje Srbije razvijenim zemljama	1. Porast nezaposlenosti 2. „Odliv mozgova“ 3. Nedovoljna znanja o internet poslovanju 4. Otpor društva novim promenama 5. Korišćenje zastarelih vidova poslovanja 6. Nestabilna ekonomska situacija

Korak 2. Marketing plan projekta

Potreba za učenjem engleskog jezika je velika, zbog činjenica da je engleski jezik internacionalan, i svuda u svetu postoji potreba za njegovim znanjem. Iz prethodno navedenog možemo da zaključimo da se stanovništvo iz raznih razloga opredeljuje za učenje engleskog, npr. možemo poći od ljudi koji ga uče zbog posla, putovanja, zatim dece kojima treba za celokupno školovanje itd. S obzirom da je tržište mnogo veće nego što bi pružanje usluga moglo da podmiri, i finansijski pokazatelji su pozitivni, u planskom periodu, moglo bi se zaključiti da opravdanost poslovne ideje postoji.

Ciljna grupa za razvoj ovog poduhvata stanovništvo cele Srbije. Generalno čine je svi koji imaju potrebu za učenjem i usavršavanjem engleskog jezika. Okvirni podaci zastupljenosti klijenata izraženi su u sledećoj razmeri:

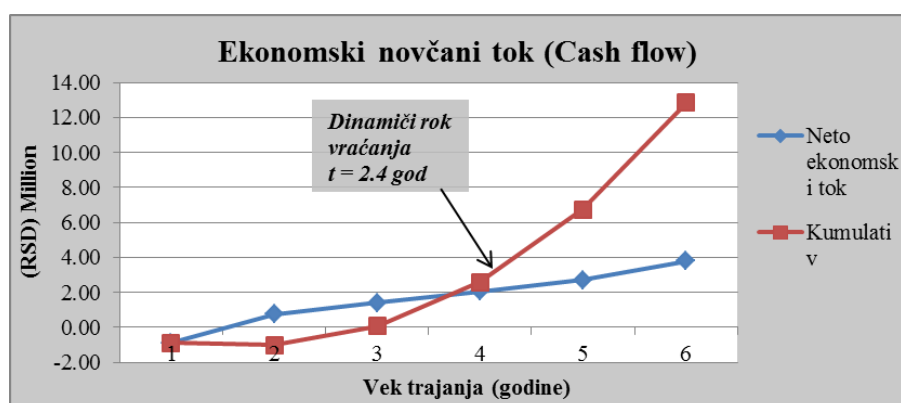
Odraslo stanovništvo preko 18 godina	36.8 %
Deca i omladina do 18 godina	63.2 %

Bitna stavka prilikom diferenciranja našeg proizvoda jeste dobar kvalitet nastave putem DLS platforme, poštovanje vremena naših korisnika i cene koje će biti 28,6% ispod tržišnih usled jeftinijeg poslovanja putem interneta.

Pitanje konkurencije je ono što ovaj projekat posebno čini perspektivnim, i u najvećoj meri mu daje izgled da ostvari veoma visoke pozitivne efekte. Naime, u okruženju postoje nekoliko tradicionalnih škola engleskog jezika koja, svojim kapacitetima i načinom predavanja, ne mogu da zadovolje potrošačke potrebe tržišta, pa se može konstatovati da konkurencija nema veliki uticaj na plasman proizvoda. Prednost projekta je u tome što klijenti predavanja mogu pratiti individualno iz njima potrebnih sfera, u vreme i na mestu koje njima odgovara. Tradicionalne škole predstavljaju našu indirektnu konkurenciju, dok direktnu konkurenciju nemamo, iz razloga što u Srbiji ne postoji internet platforma koja pruža ovakav vid usluge za srpsko tržište. Ovakav trend i povećanje tražnje izraženi su i van pomenutog lokalnog okruženja, tako da praktično ne postoje prepreke za ulazak na prodajno tržište.

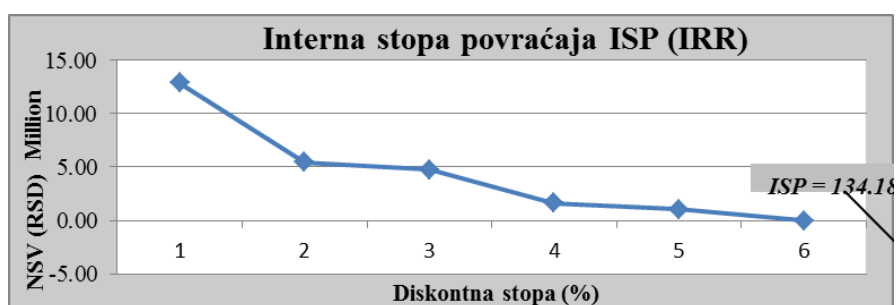
Korak 3. Finansijska analiza projekta

Sve izvršene analize u projektu izvedene su na osnovu analize Ekonomskog novčanog toka, Tabela 1. Kada se određuje finansijska izvodljivost poslovnog poduhvata, treba razmotriti dobijene podatke kroz odradjeni Ekonomski novčani tok. Izračunate tabelarne vrednosti i njihova tendencija u ovom radu su date u Slici 1 i Slici 2.



Slika 1. Ekonomski novčani tok

U prikazanom rezultatu vrednost pokazatelja tj **rok vraćanja** uložениh sredstava (t) je na polovini druge proizvodne godine. To se može videti u Tabeli 1, u redu koji označava kumulativni neto ekonomski novčani tok, kao i na Slici 1. gde se uočava tačka prelaska kumulativa sa negativne u pozitivnu novčanu oblast.



Slika 2. Interna stopa povraćaja (rentabiliteta)

Interna stopa rentabilnosti-povraćaja ISP (IRR–Internal Rate of Return) je oko 134.18 %, što se može uočiti u Tabeli 1 kada je NSV = 0, ili sa Slike 2.

Tabela 1. Ekonomski novčani tok (RSD)

Ekonomski novčani tok	RSD/god						UKUPNO
	2017	2018	2019	2020	2021	2022	
I UKUPNI PRILIV	0	4,940,000.00	6,500,000.00	8,060,000.00	9,620,000.00	11,913,430.92	41,033,430.92
1. Ukupni prihod	0	4,940,000.00	6,500,000.00	8,060,000.00	9,620,000.00	11,180,000.00	40,300,000.00
2. Ostatak vr.projekta	0	0	0	0	0	733,430.92	733,430.92
2.1. Osnovna sredstva						312,250.00	312,250.00
2.2. Obrtna sredstva						421,180.92	421,180.92
II UKUPAN ODLIV	888,180.92	4,179,935.00	5,084,735.00	5,989,535.00	6,894,335.00	8,132,135.00	31,168,855.92
3. Investicije	888,180.92	0.00	0.00	0.00		333,000.00	1,221,180.92
3.1. Osnovna sredstva	467,000.00					333,000.00	800,000.00
3.2. Obrtna sredstva	421,180.92						421,180.92
4. Poslovni rashodi	0	4,037,967.50	4,802,367.50	5,566,767.50	6,331,167.50	7,095,567.50	27,833,837.50
4.1. Materijalni troškovi		434,000.00	434,000.00	434,000.00	434,000.00	434,000.00	2,170,000.00
4.2. Bruto zarade		1,386,000.00	1,386,000.00	1,386,000.00	1,386,000.00	1,386,000.00	6,930,000.00
4.3. Zarade predavača		1,976,000.00	2,600,000.00	3,224,000.00	3,848,000.00	4,472,000.00	16,120,000.00
4.4. Nematerijalni tr.		100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	500,000.00
5. Porez na dobit	0.00	141,967.50	282,367.50	422,767.50	563,167.50	703,567.50	2,113,837.50
III NETO PRILIV I-II	-888,180.92	760,065.00	1,415,265.00	2,070,465.00	2,725,665.00	3,781,295.92	9,864,575.00
IV KUMULATIV	-888,180.92	-128,115.92	1,287,149.08	3,357,614.08	6,083,279.08	9,864,575.00	
NSV (disk. sa $i=10\%$)	-888,180.92	-116,469.02	1,063,759.57	2,522,625.16	4,154,961.46	6,125,124.96	12,861,821.22
KUMULATIV ZA $i=10\%$	-888,180.92	-1,004,649.93	59,109.64	2,581,734.80	6,736,696.26	12,861,821.22	-
NSV (disk. sa $i=16\%$)	-888,180.92	655,228.45	1,051,772.44	1,326,459.29	1,505,360.52	1,800,324.20	5,450,963.98
NSV (disk. sa $i=20\%$)	-888,180.92	633,387.50	982,822.92	1,198,185.76	1,314,460.36	1,519,618.02	4,760,293.64
NSV (disk. sa $i=55\%$)	-888,180.92	490,364.52	589,080.14	555,997.49	472,221.46	422,651.33	1,642,134.03
NSV (disk. sa $i=70\%$)	-888,180.92	447,097.06	489,711.07	421,425.81	326,344.87	266,315.26	1,062,713.16
NSV (disk. sa $i=135\%$)	-888,180.92	323,431.91	256,272.52	159,538.06	89,371.91	52,759.58	-6,806.93
NSV (disk. sa $i=134\%$)	-888,180.92	324,814.10	258,467.57	161,592.17	90,909.45	53,896.60	1,498.98

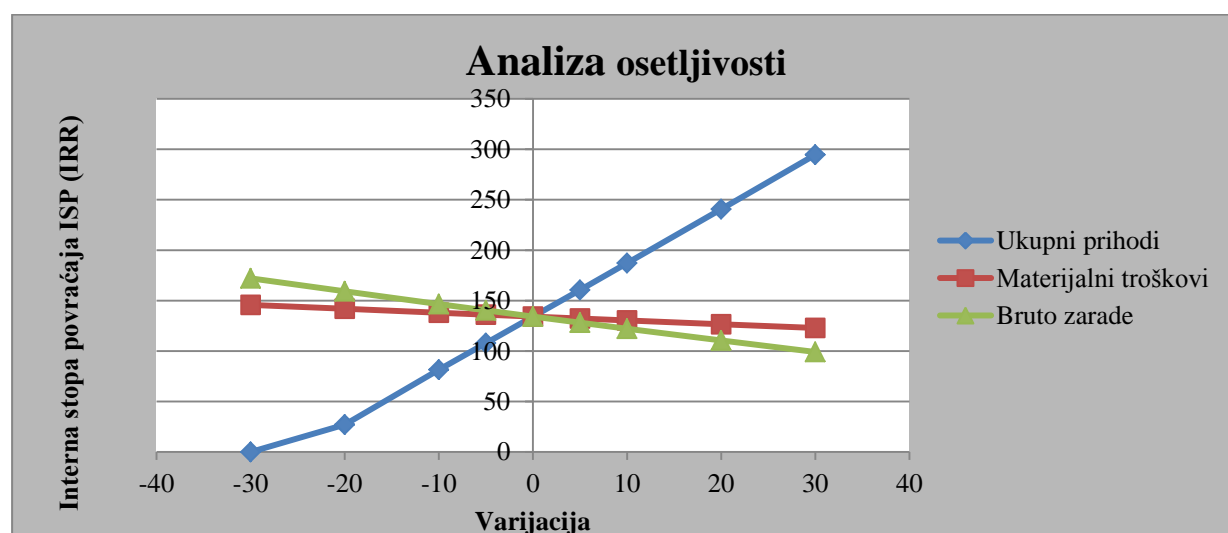
Korak 4. Analiza osetljivosti projekta

Analiza osetljivosti ovog biznisa je izvedena preko analize osetljivosti interne stope povraćaja ISP (IRR–Internal Rate of Return) za varijaciju ukupnih prihoda, materijalnih troškova i bruto zarada. Rekapitulaciju analize osetljivosti prikazala sam tabelarno i grafikom, kao što se može videti u Tabeli 2 i Slici 3.

Tabela 2. Analiza osetljivosti

Varijacije	ISP (%)								
	-30	-20	-10	-5	0	5	10	20	30
Ukupni prihodi	/	27.11	81.50	107.86	134.18	160.59	187.12	240.60	294.54
Materijalni troškovi	145.78	141.88	138.01	136.09	134.18	132.28	130.38	126.61	122.87
Bruto zarade	172.12	159.19	146.54	140.32	134.18	128.12	122.15	110.48	99.19

Kao što se vidi ovaj biznis je najosetljiviji na varijacije ukupnog prihoda. Smanjenje od oko 20% ukupnih prihoda smanjuje internu stopu rentabilnosti (povraćaja) sa 134.18% na 27.11%. Daljim trendom se može uočiti da se ukupni prihodi ne mogu smanjiti preko 20% a da interna stopa povraćaja bude pozitivna.



Slika 3. Analiza osetljivosti (Senzitivna analiza)

Povećanje materijalnih troškova i bruto zarada veoma malo utiču na smanjenje interne stope rentabilnosti. Povećanje materijalnih troškova od 30% neznatno dovodi do smanjenja interne stope rentabilnosti sa 134.18% na oko 122.87%. Povećanje bruto zarada od 30% takođe neznatno dovodi do smanjenja interne stope rentabilnosti sa 134.18% na oko 99.19%.

Ova analiza ukazuje da postoji prostor za osetnije povećanje zarada zaposlenima, da se može pozitivno odgovoriti na eventualno povećanje materijalnih troškova.

5. ZAKLJUČAK

Globalizacija je doprinela razvoju mnogih svetskih sila a najviše BRIK zemalja poput Kine, Brazila i Rusije. Što se tiče razvoja internet preduzetništva više je nego očigledno da se naša država nalazi u velikom zaostajanju u odnosu na njih. Ovo se ogleda u niskom znanju, nedovoljnoj usavršenosti jezika, manjku raspoloživih informacija i nedovoljno razvijenoj

privredi. Međutim, postepenim razvijanjem internet preduzetništva kroz implementaciju DLS platforme i usavršavanjem jezika, imamo velike šanse za pomak unapred. Opravdanost i izvodljivost ideje može dovesti do kombinovanja trenutno najjačih resorsa, kao što su znanje i jezik, u jednu jedinstvenu preduzetničku formu. Ovakav vid uspešnog poslovanja već predstavlja praksu u vodećim zemljama poput Kine iz koje potiču dve najveće kompanije, TutorABC i VIPkid, za nastavu Engleskog jezika preko internet platforme. Važno je napomenuti da za kompaniju TutorABC, po poslednjim podacima, od ukupnog broja zaposlenih predavača od oko 12.000 radi preko 6.000 kvalifikovanih ljudi sa Balkana. Ovakvim preduzetničkim poduhvatom ne samo da možemo iskoristiti jedan od najsavremenijih alata preduzetništva, internet, već možemo potpomoći edukaciji stanovništva. Jedan od benefita ove preduzetničke ideje je rešavanje kod nas već ustaljenog problema tzv. „odliva mozгова“, time što ćemo naše ljude aktivirati za rad na ovom području i samim tim sprečiti njihovu dalju emigraciju u potrazi za poslom. Ovakav oblik internet preduzetništva, predstavlja nesvakidašnji poduhvat spajanja znanja, jezika i biznisa, i kao i svaki novi poduhvat, nosi određene rizike sa sobom. Međutim upoređivanjem tih rizika sa svim benefitima kojima poduhvat može da rezultira dolazimo do zaključka da je opravdanost ideje realna. „Budućnost interneta je edukacija“, Dr. Eric Yang - Co-founder and CEO of iTutorGroup.

REFERENCE

- Klaus S., *“Fourth Industrial Revolution”*, Crown Publishing Group, Division of Random House Inc 2017.
- [Jon R., “On Being an Internet Entrepreneur”](#), Archived from [the original](#) 2014., Retrieved 2015.
- Nenad P., *“How to Become an Entrepreneur”*, Beograd, 2003.
- <http://balkans.aljazeera.net/vijesti/cetvrta-industrijska-revolucija-potpuno-mijenja-svijet>
- Chih-Wen W., Kun-Huang H., *“Global entrepreneurship and innovation in management”*, Journal of Business Research 68 (2015), 743-747
- Albrow, Martin, Elizabeth King (eds.), *“Gobalization, Knowledge and Society”*, London, 1990.
- Salifou K. Coulibaly, Cao Erbao, T. Metuge Mekongcho , *“Economic globalization, entrepreneurship, and development”*, Technological Forecasting & Social Change 127 (2018), 271-280
- Vallari C., Manjula S. Salimath, *“Peer-to-peer selling in online platforms: A salient business model for virtual entrepreneurship”*, Journal of Business Research 84 (2018), 162-174
- Mačiulienė M., Skaržauskienė A., *“Evaluation of co-creation perspective in networked collaboration platforms”*, Journal of Business Research, 69(11), 4826–4830
- <http://www.link-elearning.com/site/uputstva>



BIBLIOMETRIC ANALYSIS OF THE WRITTEN PUBLICATIONS IN INSTITUTES OF UNIVERSITY IN BELGRADE 2011-2016

Nina Ilić, Ivana Veličkovska

*University of Belgrade, Technical faculty in Bor, Engineering Management Department, Bor,
Serbia*

Abstract: Bibliometric analysis is one of the best indicators of scientific productivity. This paper represents a detailed analysis of a number of published research papers in all 11 science Institutes of University in Belgrade. Analysing the number of publications and citations in the period of 2011-2016, a conclusion can be made about the researcher's contribution to the science. The survey data is based on bibliometric data base SCOPUS. It is important to highlight that all considered papers are published in science journals from JCR list. At the end of the paper, final conclusions are presented.

Keywords: Bibliometric analysis, SCOPUS, institutes, publications, JCR (Journal Citation Reports)

1. UVOD

Razvoj nauke, porast broja naučnih istraživanja, povećanje broja naučnika i istraživača, doveo je do povećanja broja časopisa, knjiga, zbornika radova, patenata i drugih publikacija u kojima se obavljaju rezultati naučnog rada.

Bibliometrija se prvi put pojavljuje u članku Alana Pričarda (Alan Pritchard) iz 1969. godine, naglašavajući sledeće elemente: broje se knjige, radovi, publikacije, citati, svaka statistički značajna informacija, nezavisno od granica među disciplinama. Pričardova definicija bibliometrije glasi: "Bibliometrija je primena matematičkih i statističkih metoda na knjige i druge medije komunikacije" [1]. Može se definisati i na sledeći način: „Bibliometrija je, pojednostavljeno, istraživanje i merenje publikacijskih obrazaca svih oblika pisane komunikacije i njihovih autora“ [2].

Bibliometrijska analiza je metoda prihvaćena širom sveta, namenjena ocenjivanju nauke. Bavi se kvantitativnim proučavanjem fenomena kao što su autorstvo, izdavanje, čitanje, citiranje. Bibliometrija je, u suštini, primena kvantitativne analize i statistike u publikacijama kao što su časopisi i njihovi prateći citati [3]. Citirani podaci se mogu koristiti u različite svrhe i na puno načina.

Mogu se izdvojiti i određene zakonitosti u bibliometriji [4]:

- Lotkin zakon (Alfred James Lotka) - je objavio članak u kome je na temelju istraživanja naučne produkcije u području fizike i hemije potvrdio zakonitost da mali broj autora objavljuje veliki broj radova, a najveći broj autora objavi jedan ili dva rada unutar određenog područja.

- Bradfordov zakon (Samuel Clement Bradford) - se bavio analizom časopisa, pa je s tim u vezi dokazao da se u malom broju časopisa nalazi najveći broj radova koji se odnose na neko područje, odnosno da najveći broj časopisa tu problematiku obrađuje kroz jedan ili dva članka.
- Zipfov zakon (Robert Kingsley Zipf) - definiše učestalost javljanja reči u određenom tekstu.

Sve je veći broj izveštaja o naučnim i tehnološkim pokazateljima koji sadrže bibliometrijske podatke koji opisuju, prate i upoređuju naučne performanse istraživačkih institucija, sektora, zemalja i regiona.

Najčešće korišćeni bibliometrijski pokazatelji jesu broj objavljenih radova i broj citata. Osnovna mera bibliometrije jeste broj publikacija. Broj naučnih radova koji su obavljani u međunarodnim časopisima daje procenu obima istraživačke delatnosti i količinu dobijenog znanja. Naučna literatura istraživačkih radova se takođe koristi za merenje uticaja istraživanja i naučnog kvaliteta [3]. Važno je imati na umu da obim publikacija i stope citiranja mogu varirati između struka, disciplina i unutar institucija. Naučno istraživanje se u većini slučajeva vrši na univerzitetu ili institutu. Sabiranjem publikovanih output – a (radova) i citata mogu se meriti i upoređivati rezultati institucija, i naučna reputacija prepisati tim istraživačima, što takođe doprinosi ugledu same institucije.

Cilj ovog rada je razmatranje broja publikovanih naučnih radova korišćenjem SCOPUS baze za praćenje citata. U ovom radu biće izvršena bibliometrijska analiza jedanaest Instituta Beogradskog Univerziteta u periodu od 2011. do 2016. godine. Naučni instituti podrazumevaju visokoškolske jedinice sa svojstvom pravnog lica, čiji naučni kadar čine stručni saradnici, naučni saradnici, viši naučni saradnici i naučni savetnici.

2. METODOLOGIJA ISTRAŽIVANJA

Univerzitet u Beogradu čine tri glavne grupacije: fakulteti, instituti i centri. Predmet ovog istraživanja čini 11 instituta i radi se o sledećim:

1. Elektrotehnički institut „Nikola Tesla“
2. Institut za biološka istraživanja „Siniša Stanković“
3. Institut za medicinska istraživanja
4. Institut za molekularnu genetiku i genetičko inženjerstvo
5. Institut za multidisciplinarna istraživanja
6. Institut za nuklearne nauke „Vinča“
7. Institut za primenu nuklearne energije
8. Institut za fiziku u Beogradu
9. Institut za filozofiju i društvenu teoriju
10. Institut za hemiju, tehnologiju i metalurgiju
11. Institut „Mihajlo Pupin“

Na navedenim institutima, prema zvanjima zaposleno je ukupno 1338 radnika, od kojih 433 stručnih saradnika, 426 naučnih saradnika, naučnih savetnika 341 i viših naučnih saradnika ukupno 138. Podaci o broju zaposlenih istraživača navedenih instituta i njihovim zvanjima sakupljeni su sa web stranica instituta [5-15].

Kako bi se podaci dalje koristili u analizi potrebno je poslužiti se bibliografskom bazom podataka – SCOPUS, koja prati citiranost autora i naučnih radova. Scopus baza pokriva oko 16.500 indeksiranih izvora, 27.000.000 dokumenata, 245.000.000 citiranih referenci. U samoj bazi su zastupljeni radovi iz oblasti tehničkih, medicinskih i društvenih nauka [16]. Kreirana je od strane najvećeg svetskog izdavača naučne literature Elseviera, iz Holandije, kao najveća baza podataka o naučnoj literaturi [17]. Godišnje se dodaju novi naslovi sa ciljem da se pokriju svi regionii sveta.

Istraživanje je obuhvatilo samo radove publikovane u naučnim časopisima sa JCR liste, dok naučni skupovi i konferencije nisu razmatrani, kao ni autocitati.

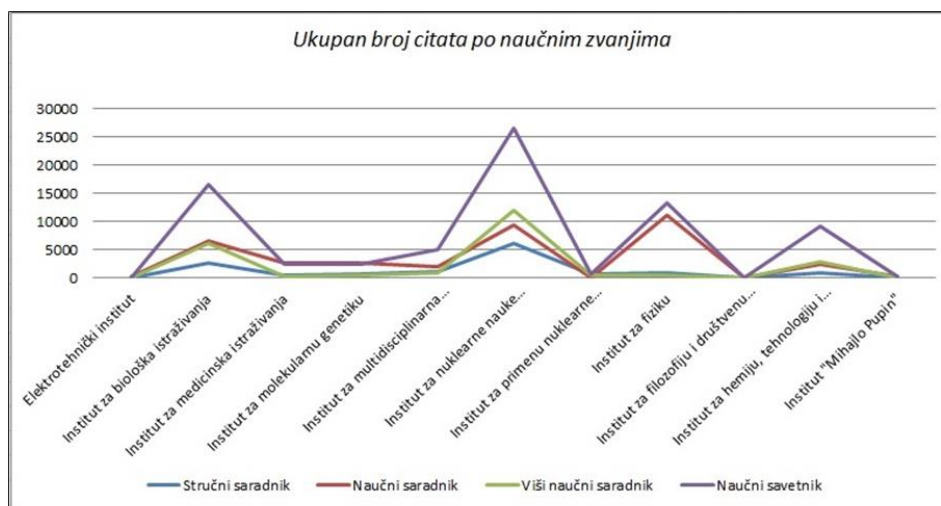
3. REZULTATI ISTRAŽIVANJA

Nakon prikupljenih podataka o publikacijama, potrebno je njihov broj i citiranost prikazati putem grafikona. Razmatra se period od 2011. do 2016. godine. Na Slikama 1 i 2 je prikazan broj publikacija realizovanih od strane istraživača na svim institutima Beogradskog Univerziteta, kao i broj radova po naučnim zvanjima istraživača na svakom institutu pojedinačno.



Slika 1. Ukupan broj radova po naučnim zvanjima na institutima Beogradskog Univerziteta (2011-2016)

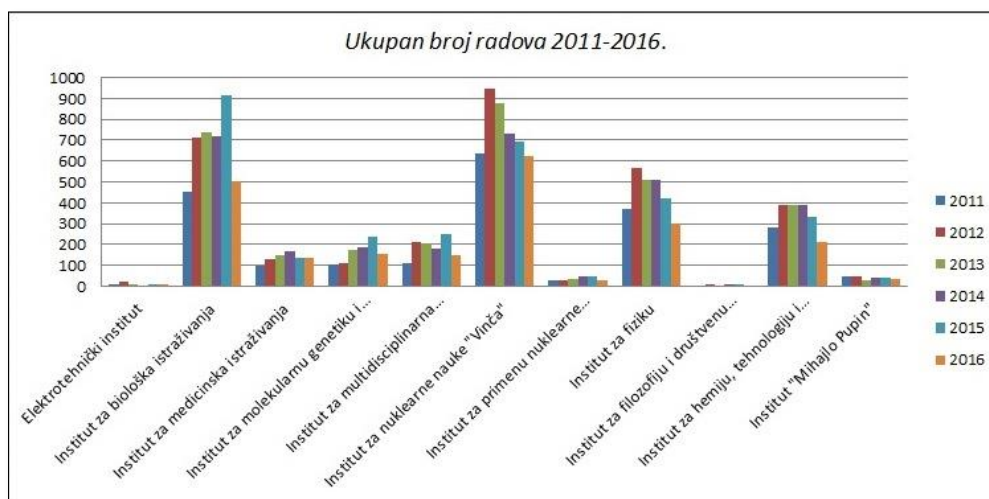
Slika 1 pokazuje da je najveći broj radova zastupljen na Institutu za nuklearne nauke „Vinča“. Kada razmatramo zaposlene, sa Slike se jasno vidi najveće angažovanje naučnih savetnika. Odmah posle Instituta za nuklearne nauke „Vinča“ prema broju radova nalazi se Institut za biološka istraživanja kod koga najveći doprinos ovakvom trendu daju takođe naučni savetnici, kao i kod treće rangiranog Instituta za fiziku.



Slika 2. Ukupan broj citata po naučnim zvanjima na institutima (2011-2016.)

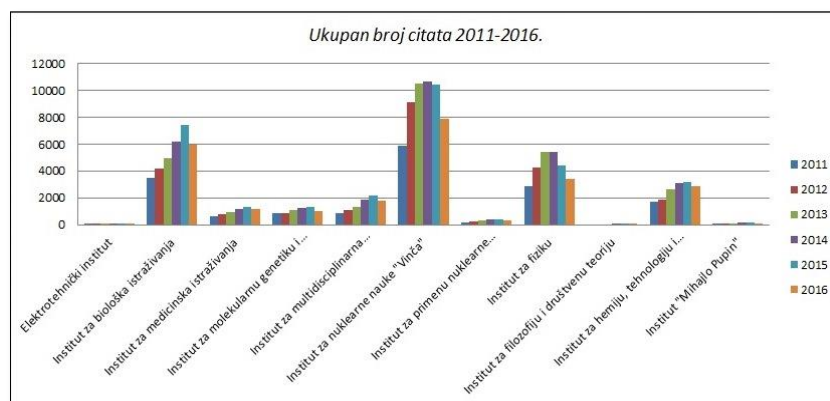
Slika 2 pokazuje podatke o citiranosti publikovanih radova istraživača na svih jedanaest instituta po njihovim zvanjima. Citirani su samo radovi koji su objavljeni u periodu od 2011. do 2016. godine, analizirani su samo heterocitati. Prvo mesto na osnovu citiranih radova pripada Institutu za nuklearne nauke „Vinča“. Ovakvom rezultatu najveći doprinos dali su naučni savetnici Instituta za nuklearne nauke, što Slika 2 i pokazuje.

Nakon što je dat trend kretanja ukupnog broja radova i citata za period 2011-2016 po naučnim zvanjima pomenutih instituta, rezultati istraživanja takođe zahtevaju i objašnjenje kretanja trenda kako broja radova, pomoću Slike 3, tako i njihove citiranosti – Slika 4.



Slika 3. Ukupan broj radova na institutima Beogradskog Univerziteta (2011-2016)

Sa Slike 3 se može primetiti da Institut za nuklearne nauke „Vinča“ i Institut za fiziku beleže najveći broj publikacija u 2012. godini. Institut za biološka istraživanja objavio je najveći broj radova u 2012. godini. Trend kretanja je najslabiji kod Instituta za filozofiju i društvenu teoriju.



Slika 4. Ukupan broj citata na institutima Beogradskog Univerziteta (2011-2016)

Sa Slike 4 se može zaključiti da je 2011. godina najslabija po rezultatima jer je broj citata vrlo mali, a kod Instituta za filozofiju i društvenu teoriju jednaka nuli, što se sa Slike 4 jasno vidi. Takođe, uočljive su blage oscilacije kod Instituta za molekularnu genetiku i genetičko inženjerstvo u periodu od 2013. do 2016. godine.

3.1. PROSEČAN BROJ RADOVA ISTRAŽIVAČA ZA PERIOD 2011-2016. GODINE

S obzirom na činjenicu da navedeni instituti nemaju isti broj zaposlenih, broj radova varira od instituta do instituta. Bez obzira na veličinu instituta i broj izdatih radova moguće je dokazati da se podaci mogu realno upoređivati, na taj način što se ukupan broj naučnih radova svih instituta podeli sa ukupnim brojem istraživača. U Tabeli 1 je dat prikaz ukupnog broja istraživača po zvanjima svih instituta Beogradskog Univerziteta.

Tabela 1. Ukupan broj istraživača po zvanjima svih insituta Beogradskog Univerziteta

Instituti	Istraživači po zvanjima				
	Stručni saradnik	Naučni saradnik	Viši naučni saradnik	Naučni savetnik	Ukupno
Elektrotehnički institut	0	9	0	1	10
Institut za biološka istraživanja	95	78	37	56	266
Institut za medicinska istraživanja	10	39	6	11	66
Institut za molekularnu genetiku i genetičko inženjerstvo	35	37	7	10	89
Institut za multidisciplinarna istraživanja	25	20	10	22	77
Institut za nuklearne nauke "Vinča"	143	110	39	44	336
Institut za primenu nuklearne energije	16	7	2	4	29
Institut za fiziku	36	49	9	138	232
Institut za filozofiju i društvenu teoriju	9	11	1	2	23
Institut za hemiju, tehnologiju i metalurgiju	64	45	24	43	176
Institut "Mihajlo Pupin"	0	21	3	10	34
Ukupno	433	426	138	341	1338

Publikacije imaju veoma značajnu ulogu u proceni rezultata rada naučnika, od kojih direktno zavisi njihov položaj i napredovanje u akademskoj sredini. Sledeći korak je prikaz prosečnog broja radova istraživača za razmatrani period na jedanaest instituta na Beogradskom Univerzitetu. Prikaz se nalazi u Tabeli 2.

Tabela 2. Prosečan broj radova po istraživaču

Instituti	Prosečan broj radova po istraživaču
Elektrotehnički institut	10.39
Institut za biološka istraživanja	13.65
Institut za medicinska istraživanja	11.15
Institut za molekularnu genetiku i genetičko inženjerstvo	10.78
Institut za multidisciplinarna istraživanja	13.02
Institut za nuklearne nauke "Vinča"	13.94
Institut za primenu nuklearne energije	9.31
Institut za fiziku	11.54
Institut za filozofiju i društvenu teoriju	2.87
Institut za hemiju, tehnologiju i metalurgiju	10.60
Institut "Mihajlo Pupin"	8.84

Posmatrajući Tabelu 2, može se zaključiti da je najveći broj radova po istraživaču prisutan kod Instituta za nuklearne nauke „Vinča“ (13.94), dok najmanji broj radova beleži Institut za filozofiju i društvenu teoriju, svega (2.87). Tabela 3 daće prikaz citiranosti objavljenih radova po istraživaču.

Tabela 3. Prosečan broj citata po istraživaču

Instituti	Prosečan broj citata
Elektrotehnički institut	56.83
Institut za biološka istraživanja	102.43
Institut za medicinska istraživanja	80.61
Institut za molekularnu genetiku i genetičko inženjerstvo	75.40
Institut za multidisciplinarna istraživanja	113.39
Institut za nuklearne nauke "Vinča"	162.41
Institut za primenu nuklearne energije	93.62
Institut za fiziku	101.93
Institut za filozofiju i društvenu teoriju	0.20
Institut za hemiju, tehnologiju i metalurgiju	76.62
Institut "Mihajlo Pupin"	24.70

Na osnovu rezultata prikazanih u Tabeli 3 može se zaključiti da najveću citiranost beleži Institut za nuklearne nauke „Vinča“ (162.41), dok se najmanja može zapaziti kod Instituta za filozofiju i društvenu teoriju (0.20). Na drugom mestu se nalazi Institut za multidisciplinarna istraživanja (113.39).

3.2. PROSEČAN BROJ RADOVA PO ZVANJIMA ISTRAŽIVAČA ZA PERIOD 2011-2016. GODINE

U Tabelama od 4 do 14 biće prikazani podaci o prosečnom broju radova i citata istraživača po zvanjima – stručni saradnik, naučni saradnik, viši naučni saradnik i naučni savetnik za svaki institut zasebno.

Tabela 4. Prosečan broj radova i citata po zvanjima istraživača Elektrotehničkog instituta

Zvanje	Rad / istraživač	Citat / istraživač
Naučni saradnik	5.78	22.67
Naučni savetnik	15	91

Tabela 4 pokazuje da su najvećem broju radova i citata doprineli naučni savetnici Elektrotehničkog instituta.

Tabela 5. Prosečan broj radova i citata po zvanjima istraživača Instituta za biološka istraživanja

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	46.15	252.26
Naučni saradnik	13.92	85.63
Viši naučni saradnik	19.97	165.16
Naučni savetnik	26.18	294.39

Iz Tabele 5 se može videti da broj radova i citata istraživača stalno varira, vidimo povećanje radova, zatim smanjenje, slično je i sa citatima. Stručni saradnici dominiraju po broju objavljenih radova, dok su po citiranošću to naučni savetnici.

Tabela 6. Prosečan broj radova i citata po zvanjima istraživača Instituta za medicinska istraživanja

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	21.23	120.83
Naučni saradnik	11.33	68.92
Viši naučni saradnik	15.33	65.33
Naučni savetnik	19	228.55

Tabela 6 tiče se Instituta za medicinska istraživanja. Može se zaključiti da su stručni saradnici dali svoj najveći doprinos radovima, a naučni savetnici citatima i to drastičan doprinos u poređenju sa ostalim zvanjima.

Tabela 7. Prosečan broj radova i citata po zvanjima istraživača Instituta za molekularnu genetiku i genetičko inženjerstvo

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	57.3	377.76
Naučni saradnik	10.35	64.54
Viši naučni saradnik	13.57	69.86
Naučni savetnik	26.6	241.8

Tabela 7 pokazuje prednost stručnih saradnika po najvećem broju objavljenih radova, kao i njihovu prednost po citiranosti, dok se na drugom mestu po citiranosti nalaze naučni savetnici, a takođe i po broju objavljenih radova.

Tabela 8. Prosečan broj radova i citata po zvanjima istraživača Instituta za multidisciplinarna istraživanja

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	11.85	136.35
Naučni saradnik	15.9	96.85
Viši naučni saradnik	15.8	103.9
Naučni savetnik	21.55	229.86

Kod Instituta za multidisciplinarna istraživanja najveći broj publikacija i citiranost postigli su naučni savetnici, što se može videti iz Tabele 8.

Tabela 9. Prosečan broj radova i citata po zvanjima istraživača Instituta za nuklearne nauke „Vinča“

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	80.35	778.81
Naučni saradnik	11.26	86.42
Viši naučni saradnik	22.51	310.82
Naučni savetnik	27.91	593.84

Podaci iz Tabele 9 pokazuju da Institut za nuklearne nauke „Vinča“ karakteriše na prvom mestu veliki broj citata ostvarenih od strane stručnih saradnika, a takođe se ovo zvanje izdvaja i po broju radova. Zalaganje naučnih saradnika je kod ovog instituta najslabije kako po broju objavljenih radova, tako i po citiranosti.

Tabela 10. Prosečan broj radova i citata po zvanjima istraživača Instituta za primenu nuklearne energije

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	11.37	70.07
Naučni saradnik	3.43	23.29
Viši naučni saradnik	13.5	212.5
Naučni savetnik	18.25	162.25

Tabela 10 daje prikaz podataka Instituta za primenu nuklearne energije u kome najbolje rezultate postižu naučni savetnici kako u broju objavljenih radova, tako i njihovoj citiranosti.

Tabela 11. Prosečan broj radova i citata po zvanjima istraživača Instituta za fiziku

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	6.64	24.64
Naučni saradnik	14.69	227.69
Viši naučni saradnik	13.22	59.44
Naučni savetnik	11.59	95.96

Iz Tabele 11 se može zaključiti da najveći broj radova beleže naučni saradnici, a nešto manje viši naučni saradnici. Po citiranosti publikacija takođe znatna prednost pripada naučnim saradnicima.

Tabela 12. Prosečan broj radova i citata po zvanjima istraživača Instituta za filozofiju i društvenu teoriju

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	7.5	0
Naučni saradnik	0.73	0.18
Viši naučni saradnik	2	0
Naučni savetnik	7	1

Na osnovu Tabele 12 se može videti da stručni saradnici najviše doprinose publikacijama, dok se po citiranosti ne beleži nikakav rezultat. Situacija je ista i sa višim naučnim saradnicima.

Tabela 13. Prosečan broj radova i citata po zvanjima istraživača Instituta za hemiju, tehnologiju i metalurgiju

Zvanje	Rad / istraživač	Citat / istraživač
Stručni saradnik	17.69	74.18
Naučni saradnik	11.09	56.51
Viši naučni saradnik	15.92	116.67
Naučni savetnik	18.88	212.37

Posmatrajući Tabelu 13, u okviru Instituta za hemiju, tehnologiju i metalurgiju citiranost je najveća od strane naučnih savetnika, a takođe im pripada najveće zalaganje i na osnovu broja objavljenih radova.

Tabela 14. Prosečan broj radova i citata po zvanjima istraživača Instituta „Mihajlo Pupin“

Zvanje	Rad / istraživač	Citat / istraživač
Naučni saradnik	5.86	13.33
Viši naučni saradnik	12.67	33.67
Naučni savetnik	8	27.1

Poslednji, Institut „Mihajlo Pupin“ izdvaja se po zalaganju svojih viših naučnih saradnika, njihovih publikacija i citiranosti, što se može zaključiti iz Tabele 14.

3.3. INDEKS KVALITETA NAUČNO-ISTRAŽIVAČKIH RADOVA

Ocena kvaliteta naučnih radova na institutima u najvećoj meri zavisi od broja publikacija istraživača u časopisima sa impakt faktorom. Da bi se to ostvarilo neophodno je da istraživači tome doprinose svakodnevnim aktivnostima.

Najjednostavniji bibliometrijski indikator je broj publikacija koje je objavio neki naučnik ili institucija. Samo brojanje publikacija je jednostavno, ali problemi nastaju kada publikacije treba rangirati po kvalitetu.

Citati se smatraju indikatorom kvaliteta i većina indikatora je zasnovana na citatima. Od broja citata zavisi rezultat objavljenih istraživanja i tim putem se može meriti kvalitet tih rezultata [18].

Kvalitet naučno – istraživačkog rada može se izraziti kao:

$$Q = f(C, R) \quad (1)$$

gde je:

Q – kvalitet naučnog rada

C – broj citata

R – broj publikovanih radova

Odnos prosečnog broja citata prema prosečnom broju radova istraživača predstavlja indeks kvaliteta naučno – istraživačkog rada na svih jedanaest instituta Univerziteta u Beogradu. U Tabeli 15 se može videti prikaz rezultata navedenog odnosa svih instituta.

Tabela 15. Indeks kvaliteta jedanaest instituta Univerziteta u Beogradu

Instituti	Prosečan broj radova	Prosečan broj citata	Indeks kvaliteta
Elektrotehnički institut	10.39	56.83	5.47
Institut za biološka istraživanja	13.65	102.43	7.50
Institut za medicinska istraživanja	11.15	80.61	7.23
Institut za molekularnu genetiku i genetičko inženjerstvo	10.78	75.40	6.99
Institut za multidisciplinarna istraživanja	13.02	113.39	8.71
Institut za nuklearne nauke "Vinča"	13.94	162.41	11.65
Institut za primenu nuklearne energije	9.31	93.62	10.06
Institut za fiziku	11.54	101.93	8.83
Institut za filozofiju i društvenu teoriju	2.87	0.20	0.07
Institut za hemiju, tehnologiju i metalurgiju	10.60	76.62	7.23
Institut "Mihajlo Pupin"	8.84	24.70	2.79

Iz Tabele 15 se može zaključiti da je najveći indeks kvaliteta zastupljen kod Instituta za nuklearne nauke „Vinča“ (11.65), a najmanji kod Instituta za filozofiju i društvenu teoriju (0.07). Institut za nuklearne nauke „Vinča“ je zbog navedenih rezultata najuspešniji u našoj zemlji i vrlo je važan kada je u pitanju doprinos nauci.

4. DISKUSIJA REZULTATA ISTRAŽIVANJA

Naučnoistraživačka delatnost se može prepoznati kao glavni pokretač privrednog i društvenog razvoja Republike Srbije. Univerzitet u Beogradu je ustanova sa najdužom tradicijom naučnog rada u Srbiji, a istraživači i saradnici Univerziteta u Beogradu čine najveći deo naučnog potencijala zemlje.

Na institutima Univerziteta u Beogradu obezbeđeni su prostor i oprema neophodni za kvalitetno izvođenje svih oblika naučnoistraživačke delatnosti. Rezultat intenzivne aktivnosti na osposobljavanju kadrova za naučnoistraživački rad jeste i 300 doktorskih disertacija godišnje, koje mlađi istraživači odbrane na Univerzitetu u Beogradu.

U ovom radu se razmatra broj publikovanih naučnih radova na jedanaest instituta Univerziteta u Beogradu u periodu od 2011. do 2016. godine. Istraživanje je obuhvatilo broj radova i citiranost radova svih jedanaest instituta Beogradskog Univerziteta. Instituti se mogu podeliti u pet grupacija, prirodno – matematička, prirodna, medicinska, društvena, tehničko – tehnološka na sledeći način:

- Prirodno – matematičke nauke
 1. Institut za nuklearne nauke „Vinča“
 2. Institut za biološka istraživanja „Siniša Stanković“
 3. Institut za molekularnu genetiku i genetičko inženjerstvo
 4. Institut za primenu nuklearne energije
 5. Institut za fiziku u Beogradu
 6. Institut za hemiju, tehnologiju i metalurgiju
- Prirodne nauke
 7. Institut za multidisciplinarna istraživanja
- Medicinske nauke
 8. Institut za medicinska istraživanja
- Društvene nauke
 9. Institut za filozofiju i društvenu teoriju
- Tehničko – tehnološke nauke
 10. Institut „Mihajlo Pupin“
 11. Elektrotehnički institut „Nikola Tesla“

Od ukupnog broja zaposlenih (1338) na svim institutima prema zvanjima najveći broj čine stručni saradnici – 433, a nešto manji broj naučni saradnici – 426.

Istraživanje je pokazalo da najveći broj publikovanih radova ima Institut za nuklearne nauke „Vinča“ (4509) i Institut za biološka istraživanja „Siniša Stanković“ (4048). Dakle, dominiraju instituti prirodno – matematičke grupacije.

Sa druge strane, prema rezultatima istraživanja se može zaključiti da društvene nauke beleže najslabiji rezultat s obzirom da Institut za filozofiju i društvenu teoriju ima najmanji broj radova i citata. U ovom institutu broj publikovanih radova u posmatranom periodu od 2011. do 2016. godine ne prelazi 10, dok je u 2016. publikovan samo jedan rad. U 2015. godini je zabeležen broj od samo 11 naučnih radova.

Ako se u razmatranje uzme broj publikovanih radova i citata po naučnim zvanjima može se zapaziti da najveće zalaganje pripada Institutu za nuklearne nauke „Vinča“. Od ukupno 336 zaposlenih istraživača na ovom institutu, najvećem broju radova doprinelo je 143 stručnih saradnika. Stručnim saradnicima takođe pripada najveći doprinos velikom broju

radova na Institutu za biološka istraživanja, dok citiranosti doprinose naučni savetnici ovog instituta.

Opšta analiza stanja nauke u Republici Srbiji, njenih ostvarenih ciljeva i rezultata, pokazuje da Republika Srbija ima naučni i istraživački potencijal i da je u uslovima ekonomske krize uspjela da ostvari u mnogim oblastima značajne rezultate [19]. Pre svega, radi se o kvalitetu naučnih istraživanja, broju objavljenih naučnih radova u međunarodnim časopisima.

Sa druge strane, nedostatak se javlja zbog nedovoljnog broja naučnika u naučno – istraživačkim organizacijama, niskog nivoa ukupnih budžetskih ulaganja u istraživanje.

Određene mogućnosti koje se vezuju za našu zemlju treba iskoristiti na najbolji mogući način. Npr. potrebna je stalna težnja istraživačke zajednice za pokretanje određenih promena, definisanje programa razvoja ljudskih resursa u nauci i inovacijama i sl.

Ukoliko se uspešno savladaju prepreke i navedene mogućnosti realizuju sprečiće se opasnosti kao što je npr. odlazak visokoobrazovanih ljudi iz države, nedovoljna opremljenost istraživačkom opremom, nedovoljno ulaganje u naučni rad.

Podršku za razvoj nauke daće na prvom mestu naučni instituti i univerziteti. Znanje koje nastaje na institutima i univerzitetima doprineće da se posebno vrednuju rezultati objavljeni u vrhunskim međunarodnim časopisima (časopisi sa visokim vrednostima impakt faktora). Takođe, unaprediće se bitan parametar nauke, a to je citiranost.

Nedostatak ovog istraživanja može se javiti zbog neadekvatne promene podataka na sajtovima instituta sa kojih je preuzet spisak saradnika i njihovih zvanja potrebnih za analizu.

5. ZAKLJUČAK

S porastom intenziteta istraživanja kao i broja naučnika, povećavao se i broj naučnih radova koji su donosili veliki deo novih informacija.

Istraživanja u Srbiji su kvalitetna i pokrivaju široke naučne oblasti, ali nisu dovoljno fokusirana na primenu istraživačkih rezultata u praksi. Za brži razvoj zemlje potrebno je obezbediti značajniji uticaj nauke i naučnih istraživanja.

Bibliometrija predstavlja primenu kvantitativne analize i statistike u publikacijama kao što su časopisi i njihovi citati. Na prvi pogled možda deluje da je ova analiza jednostavna za realizaciju, međutim stvarnost je potpuno drugačija.

Uprkos malim ulaganjima države u nauku, povećanje nivoa znanja istraživača na institutima se može izmeriti povećanim brojem publikovanih naučnih radova. Dokaz za to jesu rezultati bibliometrijske analize koji pokazuju da broj publikovanih radova na većini instituta iz godine u godinu raste. Iz ovog rada se može videti ukupan broj radova istraživača svih instituta Univerziteta u Beogradu za period od 2011. do 2016. godine, kao i citata i ukupan broj radova i citata istraživača po naučnim zvanjima.

Poznato je da kultura citiranja svakog naučnog područja nije ista, pa tako je recimo u prirodnim naukama prisutna mnogo veća citiranost nego npr. u društvenim naukama, što se na osnovu rezultata istraživanja ovog rada može i potvrditi.

Primarni cilj svakog istraživanja sastoji se u traganju za novim znanjima kojim se rešavaju novi ili postojeći naučni problemi, dokazuju nove ideje i razvijaju nove teorije. Istraživanja će biti usmerena ka obrazovanju visokokvalitetnog naučnog i stručnog kadra.

Nova informaciona tehnologija svakako omogućava mnogo brže i lakše povezivanje ljudi, cirkulaciju i distribuciju ideja i rezultata istraživanja. Da li će svi njeni potencijali biti iskorišćeni za dobrobit celog čovečanstva, zavisiće od želje da društvo evoluiru u zajednicu kreativnih i stručnih ljudi.

REFERENCE

- [1] Pehar, F., Od statističke bibliografije do bibliometrije. Povijest razvoja kvantitativnog pristupa istraživanju pisane riječi, Sveučilište u Zadru, (2010), 12-20.
- [2] Pritchard, A., Statistical Bibliography of Bibliometrics, Journal of Documentation 25(4), (1969), 349.
- [3] Patra, S. K., Bhattacharya, P., Verma, N., Bibliometric study of literature on bibliometrics. DESIDOC Journal of Library & Information Technology, (2006), 26(1).
- [4] Preuzeto sa sajta : (<http://arhiva.unilib.rs/unilib/edukacija/NaucneinformacijeuSrbiji.pdf>), 20.04.2018.
- [5] Elektrotehnički institut „Nikola Tesla“ web sajt: <http://www.ieent.org/prototip/pocetna.aspx>
- [6] Institut za biološka istraživanja „Siniša Stanković“ web sajt: <http://www.ibiss.bg.ac.rs/index.php/sr-yu/>
- [7] Institut za medicinska istraživanja web sajt: <http://www.imi.bg.ac.rs/>
- [8] Institut za molekularnu genetiku i genetičko inženjerstvo web sajt: <https://imgge.bg.ac.rs/index.php/yu/>
- [9] Institut za multidisciplinarna istraživanja web sajt: <http://www.imsi.bg.ac.rs/sr/>
- [10] Institut za nuklearne nauke „Vinča“ web sajt: <https://www.vin.bg.ac.rs/>
- [11] Institut za primenu nuklearne energije web sajt: <http://www.inep.co.rs/>
- [12] Institut za fiziku u Beogradu web sajt: <http://www.bg.ac.rs/sr/clanice/instituti/IF.php>
- [13] Institut za filozofiju i društvenu teoriju web sajt: <http://www.instifdt.bg.ac.rs/>
- [14] Institut za hemiju, tehnologiju i metalurgiju web sajt: <https://www.ihtm.bg.ac.rs/index.php/sr/>
- [15] Institut „Mihajlo Pupin“ web sajt: <http://www.pupin.rs/>
- [16] Preuzeto sa sajta: (http://nub.rs/Citiranje_literature_u_naucnom_radu.pdf), 30.04.2018.
- [17] Preuzeto sa sajta: (<https://www.elsevier.com/solutions/scopus>), 30.04.2018.
- [18] Hirsch, Jorge E. "An index to quantify an individual's scientific research output." Proceedings of the National academy of Sciences of the United States of America 102, no. 46 (2005): 16569.
- [19] Strategija naučnog i tehnološkog razvoja Republike Srbije za period od 2016. do 2018.godine – „Istraživanje za inovacije“, URL: <http://www.mpn.gov.rs/wp-content/uploads/2015/08/Strategija-nauka-za-inovacije-17-NOVO.pdf> , 05.05.2018.



THE IMPLEMENTATION OF THE HYBRID SWOT-AHP MODEL IN THE CASE OF STRATEGIC DECISION MAKING IN THE INFORMATICS INDUSTRY: A CASE STUDY

Dušan Bogdanović, Sandra Ljubić, Sandra Blagojević, Natalija Tomić, Danijel Bogosavljević

*University of Belgrade, Technical Faculty in Bor, Engineering Management Department,
Bor, Serbia*

Abstract: Developed hybrid management information systems and tools can serve as a support to the companies in their business and to the scientific and educational institutions in their scientific researches. The quality in the development of the software applications and their adaptation to the needs of the users are the basis for the successful business of specialized IT companies. The development of the branch of the economy for improving the management tools is in full swing, and, therefore, the launch of such software companies can be considered justified. One of the most important activities in the future development of the new IT company is the strategic decision making and the application of appropriate tools and methods of strategic management, which will enable a clear definition of strategic goals and formulation of relevant strategies. This paper presents a model for the implementation of the SWOT-AHP method in order to prioritize the generated alternative strategies, which could be considered the most effective in their implementation in the case of a future software company. The weight ranking list of the strategies was obtained as the final result of the applied methodology of the SWOT analysis and the AHP method, where the basic problems in the business and financing of the future company could be solved by realization of these strategies according to the priorities. Of course, these problems are recognized as such in the process of strategic analysis.

Keywords: SWOT-AHP, strategic decision making, strategic management, software company.

1. UVOD

Razvoj hibridnih menadžment softverskih aplikacija implementiranih u privredne i naučno-istraživačke svrhe osnovna su *delatnost* kompanije „DNS Group“. Naime, datim softverskim paketima kompanija bi trebalo da obezbedi uspešan prodor na tržiše menadžment informacionih tehnologija i stvori relevantan ambijent za razvoj novih sistema i alata shodno potrebama tržišta. Osnovni cilj kompanije je da se posredstvom odgovarajućeg predloga projekta razvije probni softver (ABC-AHP) i sagleda reakciju tržišta na korišćenje istog, a kako bi se analizirala opravdanost i tražnja za hibridnim modelima aplikacija koje integrišu različite menadžment alate u sebi. Projektnim pristupom kasnije bi se razvijali i ostali softverski alati.

Naime, **problem** kojim se kompanija bavi jeste primena softvera hibridnih menadžment modela, a kojih trenutno na tržištu nema u obliku u kome ih kompanija nudi. Dakle, kupcima se trenutno prodaju menadžment alati, gde svaki od njih predstavlja zasebnu celinu, nezavisnu od postupka implementacije sa drugim alatima. Time bi se popunila praznina na tržištu, a privredi i naučno-istraživačkoj sferi ponudila opsežna analiza za koju bi im bila potrebna samo jedna aplikacija, a ne više njih kao do sada. Inače, ovakve i slične hibridne metode razvijane su od strane naučnika, koji su za potrebe svojih istraživanja primenjivali takvu metodologiju u cilju kompleksnijih analiza. Sada, ovakvom i sličnim aplikacijama, nudi se mogućnost prevođenja hibridnih menadžment metoda u relevantne aplikativne softvere, prijemčive širokoj upotrebi, bez potrebe znanja metodološkog koncepta. Naravno, sama ideja kompanije bi se putem odgovarajućih pravnih mehanizama zaštitila od potencijalnog preuzimanja od strane trećih lica i postala intelektualna svojina samih tvoraca.

Rešenje koje kompanija DNS Group nudi, shodno opisanom problemu, već je donekle i dato u prethodnom podnesku. Naime, potencijalnim interesentima i potrošačima koji već koriste slične programe, razvojem hibridnog modela nudi se mogućnost da svoje probleme poslovnog ili naučno-istraživačkog karaktera reše na daleko jednostavniji način, kombinovanjem dva alata i izbegnu eventualne rizike koje sa sobom netemeljno odlučivanje nosi.

1.1. MISIJA KOMPANIJE DNS GROUP

Pod misijom se podrazumevaju razlog i svrha poslovanja preduzeća. Njome se jasno ukazuje na namere preduzeća i definišu poslovne aktivnosti posmatrane kompanije. [1]

Mi smo odgovoran IT tim u kome vlada korporativni i timski duh, gde su pravila harmonično određena, a visoko kvalitetan i funkcionalan softver za naše klijente vrednost je koja nas izdvaja od drugih.

Poznati smo kao tim pun novih ideja, sa beskonačnom kreativnošću. Svoje ciljeve ispunjavamo zajedno, otkrivajući nove šanse koje proističu isključivo iz našeg rada i fleksibilnog pristupa potrebama kupaca.

Poslovni partneri sa kojima saradujemo dolaze iz različitih krajeva širom regiona i prepoznaju jedinstvenu vrstu našeg angažmana koji im olakšava poslovanje i omogućava postizanje boljih performansi.

Okruženje u kome funkcionišemo promenljivog je karaktera, a naši proizvodi dokazuju da je sa usavršenim informatičkim i programerskim znanjima sve moguće.

1.2. VIZIJA KOMPANIJE DNS GROUP

Vizija se može definisati kao slika onoga kakve bi mogle, ili trebale biti stvari u budućnosti u pogledu poslovanja, odnosno rasta i razvoja jednog preduzeća. [1]

Biti jedan od najvećih proizvođača hibridnih menadžment informacionih sistema i softvera u regionu zapadnog Balkana cilj je kome težimo, uz kontinuelno stremljenje ka širenju područja poslovanja na nova, za nas nepoznata tržišta. Zadovoljne kompanije i naučno-istraživačke institucije najbolji su promoteri kvaliteta vrednosti koju DNS Group nudi, a njihove preporuke obezbediće nam buduće korisnike naših proizvoda i omogućiti postizanje liderske pozicije na spomenutom regionalnom tržištu.

1.3. STRATEŠKI CILJEVI KOMPANIJE DNS GROUP

U nastavku definisani su osnovni strateški ciljevi kompanije za proizvodnju hibridnih menadžment informacionih sistema i alata za primenu u privredne i naučno-istraživačke svrhe.

Tabela 1. Strateški i operativni ciljevi preduzeća

R.B.	Strateški ciljevi	Kratak opis	Operativni ciljevi
1.	<i>Razvoj ABC-AHP softvera</i>	Cilj je razviti navedeni softver i plasirati ga na tržište do marta 2019.	1. Izrada dokumentacije i apliciranje za sredstva kod lokalne samouprave i NSZ 2. Dizajn softvera do kraja navedenog roka 3. Izlazak i probaj na tržište Srbije i regiona 4. Minimalno 5 prodana paketa softvera u prvih godinu dana
2.	<i>Razvoj ABC-ANP softvera</i>	Cilj je unaprediti ABC-AHP hibridni softver i time rešiti problem koji nastaje zbog hijerarhijske ustrojenosti AHP metodologije. ABC-ANP aplikaciju potrebno je razviti u roku od 1 meseca od izlaska prethodnog softvera na tržište	1. Analiza mogućnosti za 100% integraciju ANP metode u softver 2. Pronalaženje specifične ciljne grupe korisnika 3. Dizajn softvera do kraja navedenog roka 4. Minimalno 5 prodana paketa softvera u prvih godinu dana
3.	<i>Razvoj QFD-AHP-PROMETHEE softvera</i>	Cilj je datim modelom obezbediti dobro upravljanje kvalitetom u kontekstu donošenja adekvatnih odluka. Kao rok za ostvarenje cilja uzima se maj 2019. dok se za prvi šestomesečni period očekuju minimalno 4 prodana paketa softvera	1. Pronalaženje partnera kome će biti obezbeđeno probno korišćenje softvera za upravljanje kvalitetom zarad kasnije pomoći u iznalaženju krajnjih korisnika 2. Dizajn softvera do kraja navedenog roka 3. Izlazak i probaj na tržište Srbije i regiona (ulazak na tržište sertifikovanih tela radi lakšeg uvođenja sistema kvaliteta u kompanijama klijentima) 4. Minimalno 4 prodana paketa softvera u prvom šestomesečnom periodu
4.	<i>Razvoj SWOT-AHP/ANP softvera</i>	Cilj je da se datim softverom omogući adekvatno koordinisanje i odlučivanje u postizanju strateških ciljeva. Softver je potrebno izraditi i plasirati na tržište do početka jula 2019.	1. Ostvariti saradnju i zadobiti kao korisnika softvera Tehnički fakultet u Boru 2. Dizajn softvera do kraja navedenog roka 3. Definisane strategije za plasman softvera na tržište Srbije i regiona 4. Minimalno 5 prodana paketa softvera u prvih godinu dana poslovanja preduzeća
5.	<i>Liderska pozicija na teritoriji Srbije i</i>	Cilj je ostvariti primat kroz inovativnost u smislu razvoja softvera kakvi ne postoje	1. Razvoj hibridnih menadžment softvera koji do sada nisu razvijeni

	<i>zapadnog Balkana</i>	na tržištu, a za kojima je iskazana odg. potreba. Težnja je da se konkurentnost ostvari kroz specifičan pristup korisnicima, nižu cenu u odnosu na konkurente i stvaranje imidža odgovorne kompanije. Dominantnu leadersku poziciju treba postići do kraja 2021. godine	i ne postoje na tržištu 2. Izrada uputstava, priručnika i tutorijala za korisnike softvera 3. Praćenje cena konkurencije i definisanje cena nižih za 10% u odnosu na neposredne konkurente 4. Poseta jednom mesečno određenim kompanijama i naučnim institucijama 5. Učešće na sajmovima privrede, tehnike i tehnologije 6. Učešće na naučnim konferencijama i simpozijumima 7. Ostvarenje udela u ukupnoj prodaji od minimum 60% preko interneta i internet marketinga
6.	<i>Zadovoljenje specifičnih zahteva klijenata uz kontinuirano ispitivanje njihovih potreba za novim ili modifikovanim proizvodom</i>	Cilj je prilagoditi se zahtevima i problemima potrošača u procesu dizajna i izrade hibridnih menadžment informacionih sistema	1. Razvoj softvera prema potrebama potrošača 2. Prikupljanje i analiza povratnih informacija potrošača na šestomesečnom nivou po prodaji softvera, a u ukupnom periodu od 2 godine 3. Postizanje lojalnosti potrošača u smislu vraćanja minimalno 20% klijenata proizvodima preduzeća

Na osnovu svega navedenog, cilj ovog rada jeste da ukaže na mogućnost primene hibridnog SWOT-AHP modela na primeru strateškog odlučivanja u softverskoj industriji, te da ukaže na mogućnost da se kroz implementaciju celokupne SWOT metodologije dođe do strategija relevantnih za ostvarenje navedenih strateških ciljeva kompanije DNS Group, a u konačnici i same vizije ovog preduzeća.

2. METODOLOGIJA

2.1. SWOT ANALIZA

SWOT analiza predstavlja kombinovanu analizu internih i eksternih uticajnih faktora na preduzeće, omogućava da se dobije odgovor na pitanje gde se u sadašnjoj situaciji nalazi preduzeće, koje su mu glavne prednosti (snage) i kakve su mu šanse (mogunosti) i koje su prepreke (pretnje) da se stigne do planiranih ciljeva u budućnosti. [2]

Osnovna ideja SWOT analize je da se omogući takvo razvojno ponašanje organizacije koje će obezbediti maksimalno korišćenje šansi i snaga organizacije, s jedne strane i minimiziranje slabosti i pretnji tokom razvoja, sa druge strane. Dakle, rezultati SWOT analize čine polaznu osnovu za definisanje i izbor mogućih strategija koje treba da omoguće rast i razvoj kompanije. [3]

Sama metodologija celokupne SWOT analize sastoji se iz nekoliko osnovnih koraka, koji su sprovedeni i u ovom elaboratu na primeru kompanije DNS Group [4]:

1. Definisanje SWOT matrice i identifikovanje podfaktora u okviru svakog SWOT faktora;

2. Rangiranje podfaktora primenom Likertove petostepene skale uz određivanje težinskih koeficijenata svakog od elemenata;
3. Redukovanje SWOT matrice putem ABC analize i generisanje potencijalnih strategija;
4. Definisanje strategijskih opcija kroz izradu TOWS matrice;
5. Prioritizacija strategija;

TOWS matrica predstavlja varijaciju SWOT analize. U njoj se identifikuju različiti podfaktori, koji se zatim udružuju (npr. podfaktori šansi sa snagama), s namerom formulisanja odgovarajućih strategija, kojima se želi rešiti određeni problem. Dakle, skup varijabli u TOWS matrici nije novitet u odnosu na SWOT matricu, već njihovo združivanje na odgovarajući način. [3]

Da bi se TOWS matrica kvalitetno izradila potrebno je prethodno sistemski istražiti unutrašnje i spoljašnje okruženje, definisati informacioni input koji će se koristiti u analizi i identifikovanju ključnih odnosa između varijabli okruženja, a kako bi se zatim formulisala konkurentna strategija. [5]

Strategije po TOWS matrici temelje se na kombinaciji *snaga*, *slabosti*, *šansi* i *pretnji*. U literaturi se identifikuju četiri kombinacije strategija, i to: *maks-maks* (snage - šanse), *maks-min* (snage - pretnje), *min-maks* (slabosti - prilike) i *min-min* (slabosti - pretnje) strategije. Dakle, postoje četiri kombinacije strategija koje se mogu formulisati posredstvom TOWS matrice [5]:

1. (S-O) kombinacija ukazuje na snage i šanse posmatranog subjekta, tj. ukazuje na to kako je postojećim snagama moguće iskoristiti prilike u okruženju.

2. (S-T) kombinacija strategija uključuje snage i pretnje (npr. od strane konkurenata) i njima se teži iskorišćenju snaga kako bi se otklonile pretnje iz eksterne okoline, ili se svele na minimum.

3. (W-O) kombinacija integriše slabosti i šanse, s obzirom na to da je potrebno prevladati slabosti, kako bi se mogle iskoristiti prilike na tržištu.

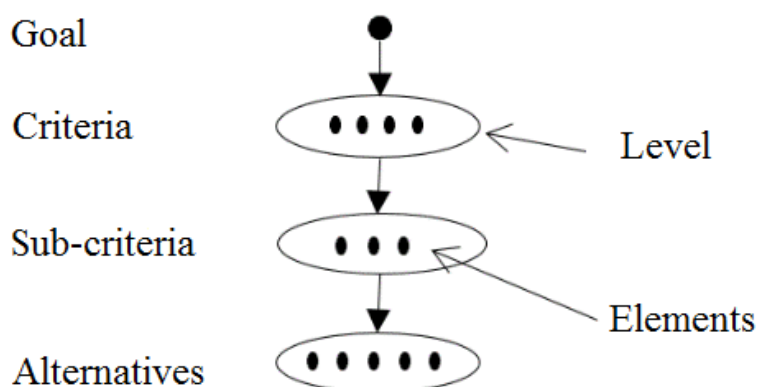
4. (W-T) kombinacija je krajnje odbrambena kombinacija strategija, koja ima za cilj smanjenje slabosti, a kako bi se izbegle identifikovane pretnje u okruženju.

2.2. AHP METODA

Analitička hijerarhijska metoda (AHP metoda) predstavlja jednu od najkorišćenijih metoda višekriterijumske analize, koja posredstvom svoje hijerarhijske ustrojenosti obezbeđuje mogućnost rangiranja alternativa prema precizno definisanim kriterijumima.

AHP metoda omogućava donosiocima odluka da postave odgovarajuće prioritete i odaberu najbolju alternativu u postupku sagledavanja kvalitativnih i kvantitativnih aspekata procene. [6].

Inače, analitički hijerarhijski proces intuitivan je metod za formulisanje i analiziranje odluka, baziran na hijerarhijskoj problematici strukturiranja i poređenja parova odlučivanja posredstvom primene skale za komparaciju od 1 do 9. [7]



Slika 1. AHP hijerarhijska struktura [8]

Numerical scale	Verbal scale
1	Equal importance
3	Moderate importance
5	Strong importance
7	Very strong importance
9	Extreme importance
2,4,6,8	Intermediate values

Slika 2. Satijeva devetostepena skala [9]

Procedura implementacije AHP metode za selekciju strategija generisanih pomoću TOWS matrice sprovedena je kroz nekoliko sledećih koraka [3]: 1) *razvijanje AHP hijerarhijskog modela*, 2) *određivanje značaja kriterijuma i potkriterijuma* i 3) *evaluacija dobijenih rezultata primene AHP metode i krive životnog ciklusa strategija*.

3. ANALIZA I REZULTATI

Kao što je već navedeno u prethodnom poglavlju, *SWOT* analiza predstavlja kombinovanu analizu internih i eksternih uticajnih faktora na kompaniju, koja omogućava da se dobije odgovor na pitanje gde se u sadašnjoj situaciji nalazi preduzeće, koje su mu glavne prednosti i nedostaci (snage i slabosti), kakve su mu šanse (mogunosti) i koje prepreke (pretnje) mu eventualno stoje na putu da stigne do planiranih ciljeva u budućnosti. [2]

Na osnovu toga, praćenjem definisanih koraka *SWOT* metodologije, a u cilju generisanja relevantnih strategija i određivanja njihovih prioriteta, te redosleda implementacije kojim bi kompanija DNS Group trebalo date strategije da realizuje, u postpunosti je ispoštovana determinisana procedura i prikazana u nastavku rada.

3.1. KREIRANJE SWOT MATRICE

U ovom odeljku prikazana je *SWOT* matrica sa identifikovanim podfaktorima. Dakle, u Tabeli 2 na osnovu analize internih i eksternih faktora determinisani su osnovni podfaktori koji se smatraju značajnim za samu softversku kompaniju DNS Group i koji će biti ključni u

daljem formulisanju strategija koje će doprineti ostvrenju strateških ciljeva preduzeća opisanih u uvodu.

Tabela 2. SWOT matrica

SWOT analiza	
SNAGE (S)	SLABOSTI (W)
<ul style="list-style-type: none"> • Jedinstven proizvod na tržištu (S1) • Niži troškovi oglašavanja putem interneta (S2) • Matrična organizaciona struktura (S3) • Timsko odlučivanje (S4) • Kvalitetan programerski i grafičko-dizajnerski kadar (S5) • Stalna dostupnost proizvoda i usluga, čak i u vreme kada druge kompanije ne rade (S6) • Fleksibilnost i jednostavna mogućnost preusmeravanja na nove proizvode/software (S7) • Ažurnost i brzina u odgovoru na zahteve klijenata (mogućnost daljinskog i fizičkog rešavanja problema sa kupljenim proizvodima) (S8) • Popusti i dobra komunikacija sa kupcima (S9) • YouTube tutorijali i priručnici za upotrebu softvera (S10) • Moderan dizajn proizvoda (S11) • Fleksibilna lokacija (S12) • Postojeća partnerstva (S13) 	<ul style="list-style-type: none"> • Neefikasno korišćenje finansijskih resursa (W1) • Nedovoljna kompetentnost projektnog tima (W2) • Neadekvatan poslovni prostor (W3) • Postoji izvesna hijerarhija u odnosu na direktora preduzeća (W4) • Minimalan broj kadrova programerske i dizajnerske struke u firmi (W5) • Visoki troškovi zarada programera i grafičkih dizajnera (W6) • Nestabilan trenutni način finansiranja (W7) • Visoki troškovi direktnog marketinga, koji uključuje posete kompanijama (W8)
ŠANSE (O)	PRETNJE (T)
<ul style="list-style-type: none"> • Potreba za softverima na tržištu centralne Evrope (Mađarska, Slovačka, Češka, Poljska) (O1) • Potreba za hibridnim menadžment softverskim proizvodima kao novitetom u razvoju MIS-a (O2) • Veća tražnja za menadžment softverskim alatima u Srbiji (O3) • Unapređene tehnologije za razvoj IT alata u svetu sa većim mogućnostima u dizajnu (O4) • Šire potrebe kupaca sa ciljnih tržišta u pravcu boljeg poslovanja i sprovođenja istraživanja (O5) • Olakšana procedura za zaštitu ideje i dobijanje licenci za softverske proizvode (O6) • Potreba za softverima na teritoriji zapadnog Balkana (O7) • Brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje (O8) 	<ul style="list-style-type: none"> • Ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata (T1) • Smanjeni broj korisnika softverskih paketa zbog ekonomske krize (T2) • Povoljniji uslovi prodaje naših konkurenata (T3) • Pogoršani politički i trgovinski odnosi u državama regiona zapadnog Balkana (T4) • Brzi razvoj biznisa drugih kompanija iz oblasti menadžment informacionih sistema (T5) • Veća stopa siromaštva u zemljama zapadnog Balkana i uticaj ekonomske krize na poslovanje naših kupaca iz redova privrednih subjekata i naučno-istraživačkih institucija (T6) • Nedostatak kadrova na tržištu iz ugla daljeg širenja firme (T7) • Rizik od ulaganja u hibridne menadžment softvere u kontekstu prihvatanja proizvoda od strane kupaca (T8)

3.2. TOWS MATRICA

TOWS matrica razvijena je 1993. godine od strane Weihricha i predstavlja matricu koja sa aspekta SWOT metodologije prioritet u razmatranju i generisanju strategijskih opcija

daje pretnjama (T – Threats) i šansama (O - Opportunities), kao faktorima budućnosti (faktorima koji određuju buduće događaje u odnosu na snage) i slabostima (W - Weaknesses) kao faktorima prošlosti. [4]

U nastavku, prikazana je TOWS matrica pomoću koje su generisane strategijske opcije koje se determinišu kao relevantne za buduće poteze kompanije DNS Group.

Tabela 3. TOWS matrica

	Snage (S)	Slabosti (W)
Mogućnosti (O)	<p>SO1 – <i>Strategija razvoja tržišta</i> (širenje softverskih proizvoda na nova tržišta zarad obezbeđivanja veće tražnje)</p> <p>SO2 – <i>Strategija prodora na tržište zapadnog Balkana</i></p> <p>SO3 – <i>Strategija razvoja proizvoda</i> (orijentacija na to da se kroz popuste i bolju komunikaciju sa kupcima uveća potreba i tražnja za softverima i razvije proizvod prema njihovim potrebama)</p> <p>SO4 – <i>Strategija partnerstva zarad lakše zaštite ideje i dobijanja licenci za softvere</i></p>	<p>WO1 – <i>Strategija vođstva u troškovima</i> (umanjenjem najveće stavke u ukupnim troškovima i stabilnim finansiranjem iz odg. izvora, obezbeđuju se niži troškovi u odnosu na konkurente)</p> <p>WO2 – <i>Strategija finansiranja</i> (obezbeđenje stabilnih izvora finansiranja)</p>
Pretnje (T)	<p>ST1 - <i>Strategija diferenciranja</i> (jedinostvenošću softverskih alata smanjiće se eventualni uticaj novih konkurenata na poslovanje)</p> <p>ST2 – <i>Strategija fokusiranog diferenciranja</i> (regrutacija kvalifikovanih kadrova, čime bi se umanjila pretnja od ulaska novih konkurenata na tržište)</p>	<p>WT1 – <i>Strategija penetracije tržišta</i></p> <p>WT2 – <i>Strategija ekspanzije kadrovskih kapaciteta</i></p>

Strategije:

SO1 – *Strategija razvoja tržišta* (S1O3: jedinstven proizvod na tržištu – veća tražnja za menadžment softverskim alatima u Srbiji)

SO2 – *Strategija prodora na tržište zapadnog Balkana* (S1O7: jedinstven proizvod na tržištu - potreba za softverima na teritoriji zapadnog Balkana)

SO3 – *Strategija razvoja proizvoda* (S9O2: popusti i dobra komunikacija sa kupcima - potreba za hibridnim menadžment softverskim proizvodima kao novitetom u razvoju MIS-a)

SO4 – *Strategija partnerstva zarad lakše zaštite ideje i dobijanja licenci za softvere* (S13O6: postojeća partnerstva - olakšana procedura za zaštitu ideje i dobijanje licenci za softverske proizvode)

ST1 - *Strategija diferenciranja* (S1T1: jedinstven proizvod na tržištu - ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata)

ST2 – *Strategija fokusiranog diferenciranja* (S5T1: kvalitetan programerski i grafičko-dizajnerski kadar - ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata)

WO1 – *Strategija vođstva u troškovima* (W6O8: visoki troškovi zarada programera i grafičkih dizajnera - brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje)

WO2 – *Strategija finansiranja* (W7O8: nestabilan trenutni način finansiranja -brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje)

WT1 – *Strategija penetracije tržišta* (W2T8: nedovoljna kompetentnost projektnog tima - rizik od ulaganja u hibridne menadžment softvere u kontekstu prihvatanja proizvoda od strane kupaca)

WT2 – *Strategija ekspanzije kadrovskih kapaciteta* (W5T1: minimalan broj kadrova programerske i dizajnerske struke u firmi - ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata).

Sam finalni produkt analize sprovedene u cilju dobijanja TOWS matrice prikazan je u nastavku.

3.2.1. Rangiranje podfaktora SWOT matrice primenom Likertove petostepene skale

U nastavku, usmenim Brainstorming-om autora, definisani su težinski parametri svakog od podfaktora SWOT matrice u skladu sa petostepenom Likertovom skalom [10]:

1. Apsolutno se ne slažem,
2. Ne slažem se,
3. Neutralan stav,
4. Slažem se,
5. Apsolutno se slažem.

Po završenom težinskom vrednovanju podfaktora u okviru svakog SWOT faktora, izračunata je i srednja vrednost težinskog faktora za odgovarajući podfaktor, što je i prikazano u Tabeli 4.

Tabela 4. Ocene definisane od strane pet učesnika usmenim Brainstorming-om

Snage (S)	I	II	III	IV	V	MEAN	Slabosti (W)	I	II	III	IV	V	MEAN
S1	4	5	5	5	5	4,80	W1	3	2	5	3	3	3,20
S2	3	4	4	4	4	3,80	W2	4	4	4	4	5	4,20
S3	2	3	5	3	2	3,00	W3	2	2	3	3	4	2,80
S4	4	3	4	3	4	3,60	W4	3	4	5	4	3	3,80
S5	5	5	5	5	5	5,00	W5	5	5	4	4	5	4,60
S6	3	3	4	3	4	3,40	W6	4	4	5	4	4	4,20
S7	3	3	5	3	4	3,60	W7	4	5	4	4	4	4,20
S8	4	4	5	4	5	4,40	W8	4	4	4	4	3	3,80
S9	5	5	4	5	5	4,80							
S10	4	4	5	5	4	4,40							
S11	3	4	3	4	4	3,60							
S12	3	3	4	4	3	3,40							
S13	5	4	5	5	4	4,60							
Šanse (O)	I	II	III	IV	V	MEAN	Pretnje (T)	I	II	III	IV	V	MEAN
O1	4	4	5	5	4	4,40	T1	5	5	4	4	5	4,60
O2	4	5	5	4	3	4,20	T2	4	3	2	3	3	3,00
O3	4	5	5	4	3	4,20	T3	4	4	4	3	3	3,60
O4	3	3	4	3	4	3,40	T4	2	3	4	2	3	2,80
O5	3	2	4	2	1	2,40	T5	3	2	5	2	4	3,20
O6	4	5	5	5	5	4,80	T6	4	4	4	3	4	3,80
O7	4	4	5	4	4	4,20	T7	4	5	5	4	5	4,60
O8	4	4	5	4	3	4,00	T8	5	4	5	5	4	4,60

3.2.2. Redukovanje SWOT matrice putem ABC analize i generisanje potencijalnih strategija

Opređenjem za Pareto analizu sa verovatnoćom A uticaja od 75%, B uticaja od 20% i C uticaja od 5%, a s obzirom na petostepeni raspon skale težinskih parametara, zaključuje se da će se u A uticaju uzeti podfaktori u okviru svakog SWOT faktora sa srednjim težinskim parametrom iznad 3.75.

Sa druge strane, u B uticaju raspon će se kretati od 2.75 do 3.75, dok će C uticaju pripasti podfaktori sa srednjim težinskim parametrom ispod 2.75.

$$\text{Broj podfaktora u grupi A sa najvećim uticajem} = 75\% \cdot 5 = 3.75$$

(1)

U Tabeli 4 žutom bojom prikazani su podfaktori svakog SWOT faktora koji su redukovani pomoću ABC (Pareto) analize, a čime je dobijena tzv. redukovana SWOT matrica, prikazana u Tabeli 5.

Tabela 5. Redukovana SWOT matrica

SWOT analiza	
SNAGE (S)	SLABOSTI (W)
<ul style="list-style-type: none"> • Jedinstven proizvod na tržištu (S1) • Niži troškovi oglašavanja putem interneta (S2) • Kvalitetan programerski i grafičko-dizajnerski kadar (S5) • Ažurnost i brzina u odgovoru na zahteve klijenata (mogućnost daljinskog i fizičkog rešavanja problema sa kupljenim proizvodima) (S8) • Popusti i dobra komunikacija sa kupcima (S9) • YouTube tutorijali i priručnici za upotrebu softvera (S10) • Postojeća partnerstva (S13) 	<ul style="list-style-type: none"> • Nedovoljna kompetentnost projektnog tima (W2) • Postoji izvesna hijerarhija u odnosu na direktora preduzeća (W4) • Minimalan broj kadrova programerske i dizajnerske struke u firmi (W5) • Visoki troškovi zarada programera i grafičkih dizajnera (W6) • Nestabilan trenutni način finansiranja (W7) • Visoki troškovi direktnog marketinga, koji uključuje posete kompanijama (W8)
ŠANSE (O)	PRETNJE (T)
<ul style="list-style-type: none"> • Potreba za softverima na tržištu centralne Evrope (Mađarska, Slovačka, Češka, Poljska) (O1) • Potreba za hibridnim menadžment softverskim proizvodima kao novitetom u razvoju MIS-a (O2) • Veća tražnja za menadžment softverskim alatima u Srbiji (O3) • Olakšana procedura za zaštitu ideje i dobijanje licenci za softverske proizvode (O6) • Potreba za softverima na teritoriji zapadnog Balkana (O7) • Brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje (O8) 	<ul style="list-style-type: none"> • Ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata (T1) • Veća stopa siromaštva u zemljama zapadnog Balkana i uticaj ekonomske krize na poslovanje naših kupaca iz redova privrednih subjekata i naučno-istraživačkih institucija (T6) • Nedostatak kadrova na tržištu iz ugla daljeg širenja firme (T7) • Rizik od ulaganja u hibridne menadžment softvere u kontekstu prihvatanja proizvoda od strane kupaca (T8)

Na osnovu redukovane SWOT matrice, generisane su potencijalne strategije, posredstvom kojih su i definisane konačne strategijske opcije, date u TOWS matrici (Tabela 3).

Maks-maks strategije

S1 – S1O3 (Jedinstven proizvod na tržištu – Veća tražnja za menadžment softverskim alatima u Srbiji)

S2 – S1O7 (Jedinstven proizvod na tržištu - Potreba za softverima na teritoriji zapadnog Balkana)

S3 – S9O2 (Popusti i dobra komunikacija sa kupcima - Potreba za hibridnim menadžment softverskim proizvodima kao novitetom u razvoju MIS-a)

S4 – S13O6 (Postojeća partnerstva - Olakšana procedura za zaštitu ideje i dobijanje licenci za softverske proizvode)

Maks-min strategije

S5 – S1T1 (Jedinstven proizvod na tržištu - Ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata)

S6 – S5T1 (Kvalitetan programerski i grafičko-dizajnerski kadar - Ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata)

Min-maks strategije

S7 – W6O8 (Visoki troškovi zarada programera i grafičkih dizajnera - Brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje)

S8 – W7O8 (Nestabilan trenutni način finansiranja - Brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje)

Min-min strategije

S9 – W2T8 (Nedovoljna kompetentnost projektnog tima - Rizik od ulaganja u hibridne menadžment softvere u kontekstu prihvatanja proizvoda od strane kupaca)

S10 – W5T1 (Minimalan broj kadrova programerske i dizajnerske struke u firmi - Ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata)

Konačna lista imenovanih strategija na osnovu prethodno izlistanih potencijalnih, data je u TOWS matrici (Tabela 3).

3.3. PRIORITIZACIJA STRATEGIJA

Prioritizacija strategija generisanih TOWS matricom izvršena je primenom AHP metode uz dodatak proračunu u smislu primene Jukselovog pristupa prioritizaciji [11]. Na osnovu već navedenog o AHP metodi u teorijsko-metodološkom delu, primenjena procedura implementacije AHP metode za selekciju strategija generisanih pomoću TOWS matrice sprovedena je kroz nekoliko sledećih koraka [3]: 1) *razvijanje AHP hijerarhijskog modela*, 2) *određivanje značaja kriterijuma i potkriterijuma* i 3) *evaluacija dobijenih rezultata primene AHP metode i krive životnog ciklusa strategija*.

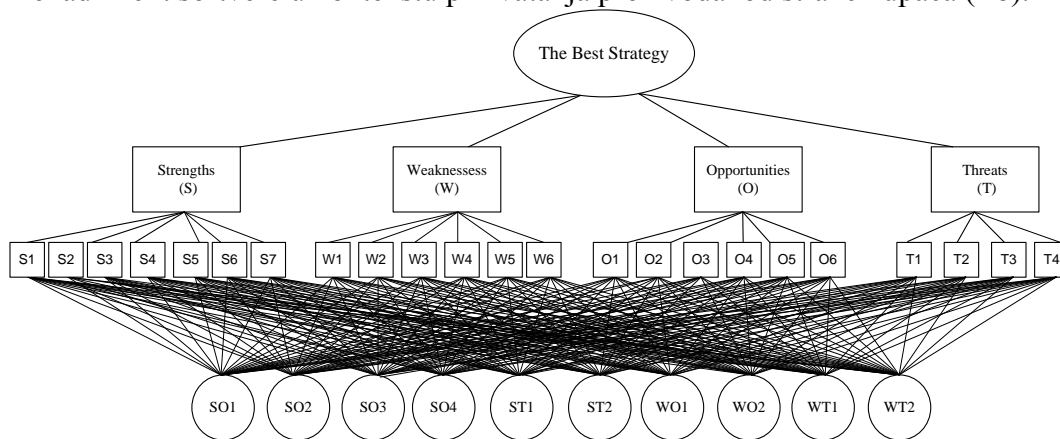
3.3.1. Razvijanje hijerarhijske AHP strukture modela

Osnovne alternative na osnovu kojih je definisana rang lista ogledaju se u strategijama generisanim pomoću TOWS matrice, i to: **SO1** – *Strategija razvoja tržišta*, **SO2** – *Strategija prodora na tržište zapadnog Balkana*, **SO3** – *Strategija razvoja proizvoda*, **SO4** – *Strategija partnerstva zarad lakše zaštite ideje i dobijanja licenci za softvere*, **ST1** – *Strategija diferenciranja*, **ST2** – *Strategija fokusiranog diferenciranja*, **WO1** – *Strategija vođstva u troškovima*, **WO2** – *Strategija finansiranja*, **WT1** – *Strategija penetracije tržišta*, **WT2** – *Strategija ekspanzije kadrovskih kapaciteta*.

Kriterijumi u procesu prioritizacije definisani su kao osnovni faktori SWOT matrice, odnosno: **S** - *snage*, **W** - *slabosti*, **O** - *šanse*, **T** - *pretnje*.

Kao potkriterijumi date strukture javljaju se podfaktori redukovane SWOT matrice, i to: **S1** - *jedinstven proizvod na tržištu*, **S2** - *niži troškovi oglašavanja putem interneta*, **S3** - *kvalitetan programerski i grafičko-dizajnerski kadar (S5)*, **S4** - *ažurnost i brzina u odgovoru na zahteve klijenata (mogućnost daljinskog i fizičkog rešavanja problema sa kupljenim proizvodima) (S8)*, **S5** - *popusti i dobra komunikacija sa kupcima (S9)*, **S6** - *YouTube*

tutorijali i priručnici za upotrebu softvera (S10), **S7** - postojeća partnerstva (S13), **W1** - nedovoljna kompetentnost projektnog tima (W2), **W2** - postoji izvesna hijerarhija u odnosu na direktora preduzeća (W4), **W3** - minimalan broj kadrova programerske i dizajnerske struke u firmi (W5), **W4** - visoki troškovi zarada programera i grafičkih dizajnera (W6), **W5** - nestabilan trenutni način finansiranja (W7), **W6** - visoki troškovi direktnog marketinga, koji uključuje posete kompanijama (W8), **O1** - potreba za softverima na tržištu centralne Evrope (Mađarska, Slovačka, Češka, Poljska), **O2** - potreba za hibridnim menadžment softverskim proizvodima kao novitetom u razvoju MIS-a, **O3** - veća tražnja za menadžment softverskim alatima u Srbiji, **O4** - olakšana procedura za zaštitu ideje i dobijanje licenci za softverske proizvode (O6), **O5** - potreba za softverima na teritoriji zapadnog Balkana (O7), **O6** - brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje (O8), **T1** - ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata, **T2** - veća stopa siromaštva u zemljama zapadnog Balkana i uticaj ekonomske krize na poslovanje kupaca iz redova privrednih subjekata i naučno-istraživačkih institucija (T6), **T3** - nedostatak kadrova na tržištu iz ugla daljeg širenja firme (T7), **T4** - rizik od ulaganja u hibridne menadžment softvere u kontekstu prihvatanja proizvoda od strane kupaca (T8).



Slika 3. Razvijena hijerarhijska AHP struktura modela

3.3.2. Određivanje značaja kriterijuma i potkriterijuma i prioritizacija alternativa

U drugom koraku izvršeno je određivanje značaja kriterijuma i potkriterijuma primenom AHP metodologije, a uz korišćenje softverskog paketa Expert Choice pomoću koga su izvršena poređenja parova kriterijuma i potkriterijuma i izračunate pripadajuće težine, uz proveru stepena konzistentnosti u komparaciji.

Tabela 6. Poređenje parova kriterijuma SWOT grupe u odnosu na cilj

Cilj	S	W	O	T	w_j
S	1	6	2	5	0.489
W	1/6	1	1/5	3	0.104
O	1/2	5	1	5	0.335
T	1/5	1/3	1/5	1	0.062
<i>Stepen konzistentnosti u odnosu na cilj: CR = 0.09</i>					

Iz prethodne tabele sledi da je: $w_j = \begin{bmatrix} S \\ W \\ O \\ T \end{bmatrix} = \begin{bmatrix} 0.489 \\ 0.104 \\ 0.335 \\ 0.062 \end{bmatrix}$ (2)

Dobijeni rezultati daju informacije o međusobnom značaju pojedinačnih SWOT faktora. U ovom slučaju najveći značaj imaju *snage* (0.489), potom *šanse* (0.335), slede *slabosti* (0.104) i na kraju *pretnje* (0.062).

U narednom koraku izvršeno je poređenje svakog SWOT potkriterijuma u odnosu na pripadajući SWOT kriterijum i određeni su njihovi težinski koeficijenti. Vrednosti težina i ocene na osnovu kojih su date težine dobijene date su u narednim tabelama.

Tabela 7. Poređenje parova SWOT potkriterijuma SNAGE

Snage (S)	S1	S2	S3	S4	S5	S6	S7	w_j
S1	1	4	1/5	4	4	6	2	0.216
S2	1/4	1	1/5	3	2	4	1/3	0.089
S3	5	5	1	4	5	6	1	0.360
S4	1/4	1/3	1/4	1	1	3	1/5	0.055
S5	1/4	1/2	1/5	1	1	3	1/3	0.057
S6	1/6	1/4	1/6	1/3	1/3	1	1/3	0.033
S7	1/2	3	1	5	3	3	1	0.190
<i>Stepen konzistentnosti: CR = 0.09</i>								

Tabela 8. Poređenje parova SWOT potkriterijuma SLABOSTI

Slabosti (W)	W1	W2	W3	W4	W5	W6	w_j
W1	1	6	1/4	3	1/4	4	0.161
W2	1/6	1	1/5	1/4	1/7	1/3	0.033
W3	4	5	1	5	1	3	0.322
W4	1/3	4	1/5	1	1/4	3	0.094
W5	4	7	1	4	1	4	0.327
W6	1/4	3	1/3	1/3	1/4	1	0.064
<i>Stepen konzistentnosti: CR = 0.09</i>							

Tabela 9. Poređenje parova SWOT potkriterijuma ŠANSE

Šanse (O)	O1	O2	O3	O4	O5	O6	w_j
O1	1	1/4	1/5	1/5	1/4	1/5	0.037
O2	4	1	1	3	5	1/4	0.198
O3	5	1	1	2	4	1/3	0.181
O4	5	1/3	1/2	1	3	1/4	0.115
O5	4	1/5	1/4	1/3	1	1/4	0.067
O6	5	4	3	4	4	1	0.402
<i>Stepen konzistentnosti: CR = 0.09</i>							

Tabela 10. Poređenje parova SWOT potkriterijuma PRETNJE

Pretnje (T)	T1	T2	T3	T4	w_j
T1	1	4	1/3	1/3	0.178
T2	1/4	1	1/3	1/4	0.081
T3	3	3	1	1	0.361
T4	3	5	1	1	0.380
<i>Stepen konzistentnosti: CR = 0.08</i>					

Međusobnim množenjem dobijenih težinskih faktora iz prethodnih koraka, dobija se globalni značaj SWOT potkriterijuma, što je predstavljeno u Tabeli 11.

Tabela 11. Značajnost kriterijuma i sveukupna značajnost potkriterijuma

SWOT grupe kriterijumi	Značajnost SWOT faktora	Potkriterijumi	Lokalna značajnost potkriterijuma	Globalna značajnost potkriterijuma
Snage (S)	0.489	S1 - jedinstven proizvod na tržištu, S2 - niži troškovi oglašavanja putem interneta, S3 - kvalitetan programerski i grafičko-dizajnerski kadar, S4 - ažurnost i brzina u odgovoru na zahteve klijenata, S5 - popusti i dobra komunikacija sa kupcima, S6 - YouTube tutorijali i priručnici za upotrebu softvera, S7 - postojeća partnerstva	0.216 0.089 0.360 0.055 0.057 0.033 0.190	0.106 0.044 0.176 0.027 0.028 0.016 0.093
Slabosti (W)	0.104	W1 - nedovoljna kompetentnost projektnog tima, W2 - postoji izvesna hijerarhija u odnosu na direktora preduzeća, W3 - minimalan broj kadrova programerske i dizajnerske struke u firmi, W4 - visoki troškovi zarada programera i grafičkih dizajnera, W5 - nestabilan trenutni način finansiranja, W6 - visoki troškovi direktnog marketinga, koji uključuje posete kompanijama	0.161 0.033 0.322 0.094 0.327 0.064	0.017 0.003 0.033 0.009 0.034 0.007

Šanse (O)	0.335	<p>O1 - potreba za softverima na tržištu centralne Evrope, O2 - potreba za hibridnim menadžment softverskim proizvodima kao novitetom u razvoju MIS-a, O3 - veća tražnja za menadžment softverskim alatima u Srbiji, O4 - olakšana procedura za zaštitu ideje i dobijanje licenci za softverske proizvode, O5 - potreba za softverima na teritoriji zapadnog Balkana, O6 - brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje</p>	<p>0.037 0.198 0.181 0.115 0.067 0.402</p>	<p>0.012 0.066 0.061 0.039 0.022 0.135</p>
Pretnje (T)	0.062	<p>T1 - ulazak na tržište velikog broja kompanija koje se bave razvojem sličnih softverskih alata, T2 - veća stopa siromaštva u zemljama zapadnog Balkana i uticaj ekonomske krize na poslovanje kupaca iz redova privrednih subjekata i naučno-istraživačkih institucija, T3 - nedostatak kadrova na tržištu iz ugla daljeg širenja firme, T4 - rizik od ulaganja u hibridne menadžment softvere u kontekstu prihvatanja proizvoda od strane kupaca</p>	<p>0.178 0.081 0.361 0.380</p>	<p>0.011 0.005 0.022 0.024</p>

Dobijeni rezultati u Tabeli 11 ukazuju da dominantan uticaj imaju sledeći potkriterijumi:

1. *Pozitivni potkriterijumi*: **S3** - kvalitetan programerski i grafičko-dizajnerski kadar (0.360 – lokalni značaj i 0.176 – globalni značaj), **O6** - brojni izvori finansijskih sredstava i subvencija države Srbije i EU za stabilno finansiranje (0.402 – lokalni značaj i 0.135 – globalni značaj),

2. *Negativni potkriterijumi*: **W5** - nestabilan trenutni način finansiranja (0.327 – lokalni značaj i 0.034 – globalni značaj), **T4** - rizik od ulaganja u hibridne menadžment softvere u kontekstu prihvatanja proizvoda od strane kupaca (0.380 – lokalni značaj i 0.024 – globalni značaj).

Iz ovakve analize sledi da su pozitivni potkriterijumi nešto većih jačina uticaja od negativnih potkriterijuma, što itekako ima značaja za konačni izbor i rangiranje strategija.

$$w_2 = W_{SWOTsubfactors(global)} = \begin{bmatrix} 0.106 \\ 0.044 \\ 0.176 \\ 0.027 \\ 0.028 \\ 0.016 \\ 0.093 \\ 0.017 \\ 0.003 \\ 0.033 \\ 0.009 \\ 0.034 \\ 0.007 \\ 0.012 \\ 0.066 \\ 0.061 \\ 0.039 \\ 0.022 \\ 0.135 \\ 0.011 \\ 0.005 \\ 0.022 \\ 0.024 \end{bmatrix} \quad (3)$$

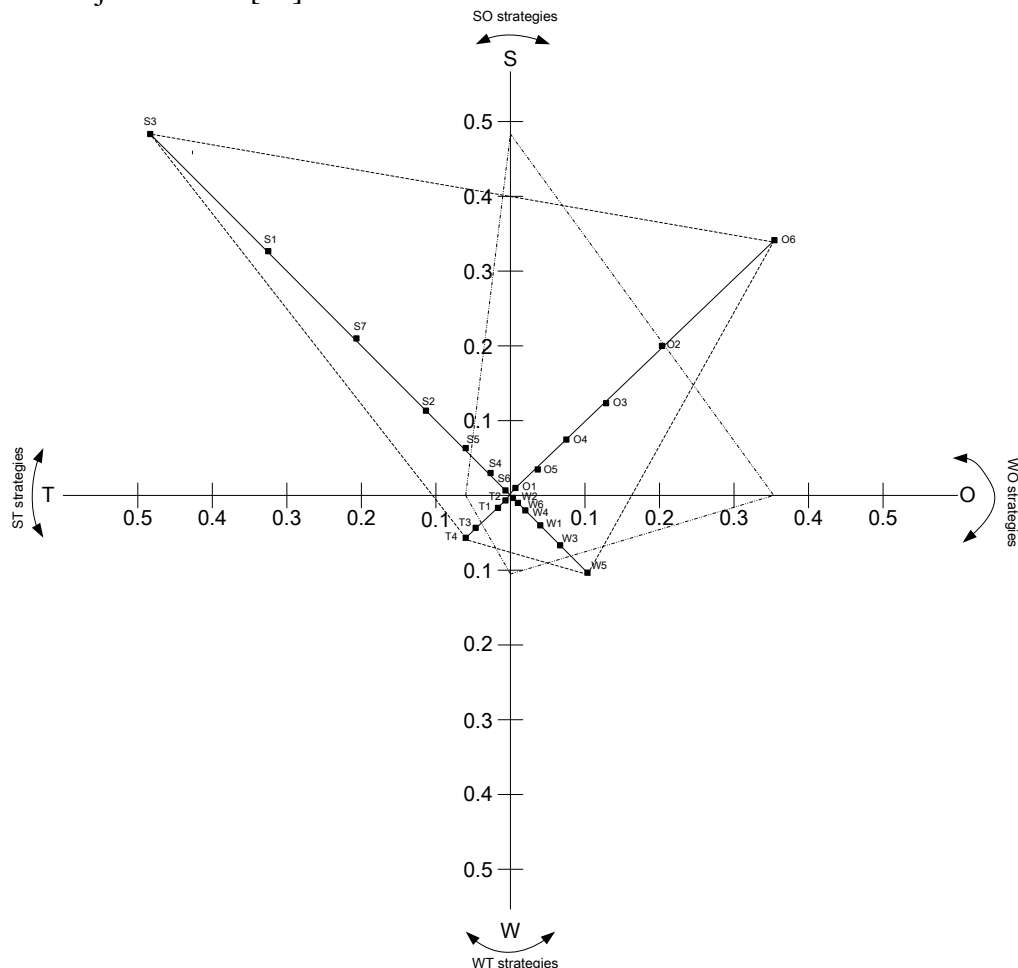
Na Slici 4 grafički je prikazana situaciona analiza SWOT rezultata na osnovu podataka iz Tabele 11. Dobijeni rezultati ukazuju na veličinu uticaja SWOT kriterijuma u opadajućem nizu: S→O→W→T. Vrednosti sveukupne značajnosti SWOT potkriterijuma sa najvećim značajem u okviru jednog faktora, takođe, u opadajućem nizu dat je na sledeći način: O6→T4→S3→W5.

S obzirom na dominantan rezultat težinskog značaja snaga u razmatranom modelu, kao i šansi, za očekivati je da će strategije koje su generisane sagledavanjem snaga i šansi imati prioritet u odnosu na preostale strategije u modelu.

Rezultati dobijenih težinskih parametara SWOT kriterijuma i potkriterijuma iz Tabele 16 prikazani su i grafičkim putem. Naime, ovakva vizuelizacija predstavlja situacionu analizu SWOT rezultata i omogućava donosiocu odluke da jasno sagleda uticaj, tj. težinsku vrednost svakog SWOT kriterijuma ili potkriterijuma u razmatranom višekriterijumskom modelu. Težinski značaj SWOT kriterijuma (snage, slabosti, šanse i pretnje) na grafiku se projektuje odgovarajućim pozicijama tačaka na apscisi i ordinati (x i y ose). [12]

Pozicije težinskih značaja internih SWOT kriterijuma (snaga i slabosti) nalaze se u suprotnim smerovima na y ordinati, dok pozicije težinskih značaja eksternih SWOT

kriterijuma (šanse i pretnje) nalaze se, takođe, u suprotnim smerovima na x apscisi. Unutar četiri kvadranta koje formiraju prethodno definisane ose SWOT kriterijuma vrši se projektovanje pozicija težinskih vrednosti SWOT potkriterijuma pod uglom od 45% po svakoj grupi, pri čemu dužina svake projekcije za određeni potkriterijum predstavlja njegov globalni značaj u modelu. [12]



Slika 4. Situaciona analiza težinskog odnosa SWOT kriterijuma i sveukupne značajnosti SWOT potkriterijuma na osnovu AHP procedure

U narednom koraku određen je težinski značaj svake alternativne strategije (SO1, SO2, SO3, SO4, ST1, ST2, WO1, WO2, WT1, WT2) u odnosu na definisane SWOT potkriterijume, pri čemu je dobijena rezultujuća matrica w_3 .

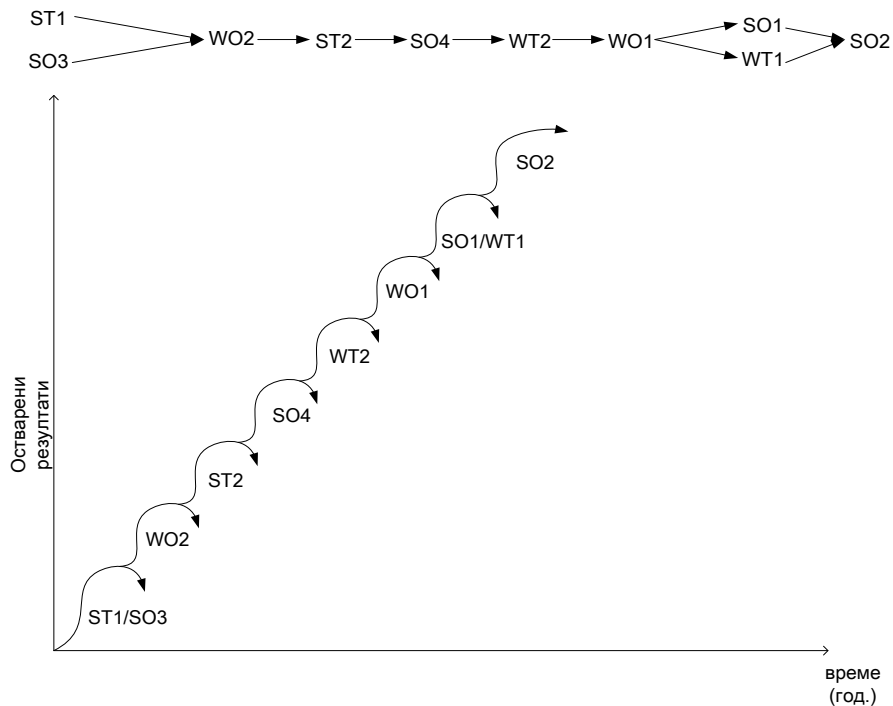
$$w_3 = \begin{bmatrix} 0.066 & 0.046 & 0.019 & 0.043 & 0.205 & 0.192 & 0.095 & 0.055 & 0.051 & 0.059 & 0.057 & 0.065 & 0.064 & 0.273 & 0.122 & 0.263 & 0.098 & 0.061 & 0.091 & 0.056 & 0.061 & 0.059 & 0.062 \\ 0.028 & 0.032 & 0.021 & 0.030 & 0.123 & 0.069 & 0.047 & 0.039 & 0.025 & 0.034 & 0.038 & 0.044 & 0.028 & 0.098 & 0.034 & 0.027 & 0.033 & 0.310 & 0.032 & 0.038 & 0.043 & 0.030 & 0.031 \\ 0.162 & 0.017 & 0.057 & 0.058 & 0.124 & 0.277 & 0.187 & 0.051 & 0.059 & 0.027 & 0.049 & 0.088 & 0.143 & 0.191 & 0.280 & 0.206 & 0.197 & 0.198 & 0.078 & 0.089 & 0.054 & 0.061 & 0.210 \\ 0.065 & 0.129 & 0.062 & 0.080 & 0.047 & 0.042 & 0.282 & 0.021 & 0.046 & 0.089 & 0.053 & 0.073 & 0.054 & 0.063 & 0.054 & 0.073 & 0.269 & 0.058 & 0.148 & 0.038 & 0.023 & 0.038 & 0.140 \\ 0.222 & 0.035 & 0.105 & 0.178 & 0.321 & 0.153 & 0.077 & 0.088 & 0.138 & 0.067 & 0.133 & 0.092 & 0.085 & 0.140 & 0.242 & 0.176 & 0.159 & 0.088 & 0.079 & 0.160 & 0.066 & 0.099 & 0.094 \\ 0.217 & 0.041 & 0.260 & 0.286 & 0.063 & 0.081 & 0.029 & 0.179 & 0.078 & 0.153 & 0.069 & 0.028 & 0.036 & 0.054 & 0.051 & 0.052 & 0.056 & 0.028 & 0.027 & 0.235 & 0.041 & 0.213 & 0.029 \\ 0.026 & 0.265 & 0.091 & 0.071 & 0.027 & 0.018 & 0.055 & 0.096 & 0.053 & 0.078 & 0.282 & 0.190 & 0.308 & 0.030 & 0.057 & 0.040 & 0.43 & 0.053 & 0.205 & 0.186 & 0.152 & 0.072 & 0.057 \\ 0.072 & 0.259 & 0.064 & 0.056 & 0.031 & 0.061 & 0.171 & 0.060 & 0.158 & 0.111 & 0.196 & 0.244 & 0.203 & 0.085 & 0.048 & 0.069 & 0.081 & 0.056 & 0.270 & 0.104 & 0.251 & 0.103 & 0.077 \\ 0.045 & 0.075 & 0.030 & 0.054 & 0.036 & 0.042 & 0.034 & 0.243 & 0.059 & 0.023 & 0.064 & 0.141 & 0.047 & 0.027 & 0.089 & 0.072 & 0.042 & 0.130 & 0.053 & 0.046 & 0.266 & 0.094 & 0.271 \\ 0.097 & 0.100 & 0.290 & 0.144 & 0.023 & 0.066 & 0.023 & 0.167 & 0.334 & 0.359 & 0.058 & 0.035 & 0.032 & 0.038 & 0.022 & 0.023 & 0.021 & 0.018 & 0.016 & 0.048 & 0.043 & 0.232 & 0.029 \end{bmatrix} \quad (4)$$

U poslednjem koraku izračunat je sveukupni prioritet razmatranih strategija i dat je u sledećoj matrici.

$$W_{\text{alternatives}} = w_3 \cdot W_{\text{SWOTsubfactors(global)}} = \begin{bmatrix} 0.086 \\ 0.041 \\ 0.127 \\ 0.106 \\ 0.133 \\ 0.119 \\ 0.097 \\ 0.123 \\ 0.065 \\ 0.103 \end{bmatrix} \quad (5)$$

Dobijeni rezultati definišu prioritizaciju predloženih alternativnih strategija u opadajućem nizu: **ST1** (strategija diferenciranja) → **SO3** (strategija razvoja proizvoda) → **WO2** (strategija finansiranja) → **ST2** (strategija fokusiranog diferenciranja) → **SO4** (strategija partnerstva zarad lakše zaštite ideje i dobijanja licenci za softvere) → **WT2** (strategija ekspanzije kadrovskih kapaciteta) → **WO1** (strategija vođstva u troškovima) → **SO1** (strategija razvoja tržišta) → **WT1** (strategija penetracije tržišta) → **SO2** (strategija prodora na tržište zapadnog Balkana).

Na osnovu veličine dobijenih normalizovanih težina može se definisati niz promena strategija, s tim da strategije sa približno istim težinskim faktorom treba istovremeno primenjivati (Slika 3).



Slika 5. Kriva životnog ciklusa strategija

4. EVALUACIJA I DISKUSIJA REZULTATA

Određena prioritizacija definisanih alternativnih strategija izvršena je prema veličini normalizovanih težinskih faktora W i izgleda na sledeći način: $ST1=0.133$, $SO3=0.127$, $WO2=0.123$, $ST2=0.119$, $SO4=0.106$, $WT2=0.103$, $WO1=0.097$, $SO1=0.086$, $WT1=0.065$, $SO2=0.041$.

Dinamička uloga strategije podrazumeva da se posle ostvarivanja određenog rezultata primenom izabrane strategije ulazi u novu fazu rasta i razvoja organizacije, što zahteva primenu nove strategije. [12]

Na osnovu dobijenih rezultata i krive životnog ciklusa strategija jasno se može zaključiti da prioritet primene imaju $ST1$ i $SO3$ strategije (Slika 5). Istovremenom primenom ovih dveju strategija kompanija DNS Group teži da se već na samom startu njihove implementacije *diferencira* jedinstvenošću softverskih alata, kako bi se smanjio eventualni uticaj novih i postojećih konkurenata na poslovanje kompanije, kao i da se posredstvom *strategije razvoja proizvoda*, kroz orijentaciju na popuste i bolju komunikaciju sa tražnjom, uveća potreba i razvije svest na tržištu o softverima koji se nude, te razvije proizvod prema potrebama ciljnih kupaca. Time se doprinosi sveukupnom diferenciranju kompanije od sličnih konkurenata i stvara daleko bolja tržišna pozicija. Upravo je zbog takve komplementarnosti datih dveju strategija i odlučeno da se one implementiraju zajedno. Takođe, ovim skupom strategija ostvaruju se gotovo svi strateški ciljevi kompanije. Naime, diferenciranje u odnosu na konkurenciju se upravo i ogleda u ostvarenju strateških ciljeva razvoja ABC-AHP, ABC-ANP, QFD-AHP-PROMETHEE i SWOT-AHP/ANP softvera, koji će preduzeće načiniti jedinstvenim u odnosu na direktne i indirektno konkurente. Naravno, i strategijom razvoja proizvoda prema potrebama kupaca, takođe se ostvaruju navedena četiri strateška cilja, što je donekle i logično, jer ova strategija podrazumeva razvoj novog proizvoda za plasman na postojeće tržište. Sa druge strane, i strategija diferenciranja i strategija razvoja proizvoda imaju veliki značaj i za postizanje liderske pozicije u razvoju MIS-a na teritoriji Srbije, a kasnije i zapadnog Balkana, što se upravo može postići jedinstvenošću u odnosu na novorazvijene proizvode koje konkurencija nema.

Primenom navedenih dveju strategija stvara se uslov da kompanija u narednom koraku primeni i treću strategiju po važnosti - *strategiju finansiranja* ($WO2$). Ona kompaniji u dugom roku treba da obezbedi stabilne izvore dotoka svežeg kapitala u cilju rasta i razvoja firme, uz konstantnu težnju da se finansijska sredstva pragmatično ulažu u nove proizvode i ostvarenje osnovnih strateških ciljeva firme. Naime, sa početkom implementacije ove strategije, koja uključuje iznalaženje različitih izvora i fondova pomoći novootvorenim malim softverskim kompanijama, otpočeće se i pre završetka implementacije prethodne dve opcije, shodno tome da je obrtni kapital za nastavak rada neophodan u svakom trenutku poslovanja. Takođe, strategija finansiranja je strategija kojom se doprinosi ostvarenju svih strateških ciljeva preduzeća, i to u domenu obezbeđivanja sredstava za razvoj svake navedene softverske aplikacije, zatim postizanja liderske pozicije na tržištu Srbije, a potom i na tržištu celokupnog zapadnog Balkana, jer je bez stabilnih finansija liderstvo za kompaniju DNS Group praktično neostvarivo, a doprinosi se i ostvarenju cilja zadovoljenja specifičnih zahteva klijenata uz kontinuelno ispitivanje njihovih potreba.

Strategija fokusiranog diferenciranja ($ST2$) ima za cilj da obezbedi regrutaciju kvalifikovanih kadrova, čime bi se umanjila pretnja od ulaska novih konkurenata na tržište menadžment informacionih sistema. Naime, kao što je već i naglašeno, širenjem poslovanja kompanije DNS Group, što će se obezbediti kroz punu primenu prethodnih alternativnih strategija, dati razvoj mora da prati i odgovarajuće optimalno povećanje kvalitetnih kadrova

informatičke struke. S obzirom na njihov konstantan deficit na tržištu rada, ova će strategija biti poseban izazov za rukovodstvo kompanije. Ipak, ohrabruje činjenica da su njihov kvalitet i kvalifikovanost na visokom nivou. Mesto koje ova strategija zauzima na krivoj srazmerno je neophodnosti protoka vremena da se uopšte dođe do tačke razvoja gde bi fokusirana kadrovska ekspanzija koja će obezbediti usku diferenciranost bila opravdana. Ovom strategijom obezbeđuje se postizanje strateških ciljeva razvoja ABC-AHP, ABC-ANP, QFD-AHP-PROMETHEE i SWOT-AHP/ANP softvera, koje je nemoguće razviti bez kvalitetnih kadrova usmerenih ka postizanju kvalitetnih rezultata i performansi, ali se doprinosi i ostvarenju strateškog cilja zadovoljenja specifičnih zahteva klijenata uz kontinuirano ispitivanje njihovih potreba za novim ili modifikovanim proizvodima.

Strategija partnerstva zarad lakše zaštite ideje i dobijanja licenci za softvere (SO4) dolazi u trenutku kada je kompaniji neophodno da usled bržeg razvitka zaštiti svoju ideju razvoja hibridnih menadžment alata i dobije licence za širu distribuciju. Takođe, navedenom strategijom doprinosi se i direktnoj realizaciji strateškog cilja postizanja liderske pozicije na tržištu Srbije i zapadnog Balkana, jer datom pravnom zaštitom preduzeće štiti svoje novorazvijene proizvode od konkurencije.

Širenjem poslovanja, kompanija treba da obezbedi i širi opseg *ekspanzije kadrovskih kapaciteta (WT2)* u trenutku kada tržište menadžment alata zaživi sa novim hibridnim proizvodima, jer se očekuje i brza reakcija konkurenata da sa svojim aplikacijama i u ovoj grani pokušaju da ostvare primat. Stoga, logično je zaključiti da osnovni strateški cilj koji se ovom strategijom ostvaruje jeste upravo cilj postizanja i zadržavanja strateške i liderske pozicije na ciljnim tržištima kompanije.

Kada kompanija obezbedi odgovarajući tržišni kvalitet i kvantitet u prodaji i kadrovima, fokusiranost na *vođstvo u troškovima (WO1)* biće joj od ključnog značaja da održi komparativnu prednost, s obzirom na moguću veću zainteresovanost konkurencije da prodre tamo gde je DNS Group već ostvarila rezultate. To će značiti da kompanija umanjnjem najveće stavke u ukupnim troškovima i stabilnim finansiranjem može da obezbedi veću ekonomičnost poslovanja u odnosu na konkurente. Takođe, ona vođstvom u troškovima može ostvariti i strateške ciljeve razvoja svih svojih aplikativnih softvera, koji su već pomenuti, ali može i da ostvari strateški cilj zadovoljenja zahteva korisnika, jer bi imlementacijom ove strategije kompanija u redovnom poslovanju mogla da postigne značajne uštede u odnosu na konkurente.

Tek kada se stvore svi preduslovi za stabilno i rastuće poslovanje, kompanija bi trebalo da u isto vreme implementira *strategije razvoja i penetracije tržišta (SO1 i WT1)*, koje podrazumevaju širenje postojećih hibridnih softverskih proizvoda na nova tržišta, najpre u Republici Srbiji, a potom i na celom zapadnom Balkanu, ali i plasman postojećih proizvoda na postojeća tržišta, uz težnju za stalnim povećanjem konkurentskog učešća i stvaranjem poboljšane pozicije. Zaključuje se da bi ovim dvema strategijama DNS Group poseban akcenat dao zadovoljenju strateškog cilja postizanja liderske pozicije u razvoju MIS-a na teritoriji Srbije, a kasnije i zapadnog Balkana.

Posebno važna strategija koja je ostavljena kao poslednja u ciklusu jeste i *strategija prodora na tržište zapadnog Balkana (SO2)*, koja je neostvariva bez dobro razvijenog domaćeg tržišta i generalno dobrih rezultata koje kompanija na njemu postiže. Njome se akcenat stavlja na dostizanju dela strateškog cilja ostvarenja liderske pozicije na teritoriji Srbije i zapadnog Balkana, i to onog koji se upravo i odnosi na zapadni Balkan.

5. ZAKLJUČAK

Na osnovu rezultata dobijenih primenom hibridnog SWOT-AHP modela može se zaključiti da je primenjena metodologija dala odgovarajuće rezultate iskazane kroz prioritizaciju strategija generisanih posredstvom TOWS matrice. Naime, dobijena rang lista alternativnih strateških opcija odgovara mogućnosti realizacije strateških ciljeva, kao što je i opisano u diskusiji, gde bi se njihovim ostvarenjem u procesu strateškog upravljanja u konačnici moglo doprineti i ostvarenju same vizije.

Jasno je da bi se prvorangiranim strategijama diferenciranja i razvoja proizvoda kompanija izdvojila svojom jedinstvenošću po hibridnim menadžment softverskim paketima, što bi bio njen prvi korak ka ostvarenju vizije da postane lider na teritoriji Srbije, a kasnije i zapadnog Balkana.

Autori zaključuju da bi kompanija DNS Group, držeći se definisanih strategija i implementacijom po redosledu utvrđenim u procesu prioritizacije, mogla da ostvari značajan rast i razvoj, te postigne rezultate generisane strateškim ciljevima, kao i da ostvari značajnu konkurentsku prednost na ciljnim područjima. Sa postignutim rezultatima, ovo preduzeće trebalo bi da kasnije ponovo otpočne novi ciklus strateškog menadžmenta, a u cilju sagledavanja daljih mogućnosti za unapređenje poslovanja.

REFERENCE

- [1] Živković, Ž., Jelić, M., Popović, N., Muhić, Š. (2004): *Strategijski menadžment*, Tehnički fakultet u Boru, Bor, p. 21, 30.
- [2] Đelić, Đ. (2004): *SWOT i PEST analiza*, Fakultet tehničkih nauka, Novi Sad, p. 4.
- [3] Živković, Ž., Nikolić, Đ. (2016): *Osnove matematičke škole strateškog menadžmenta*, Tehnički fakultet u Boru, Bor, p. 61.
- [4] Živković, Ž. et al. (2012): *SWOT analiza Tehničkog fakulteta u Boru*, Izveštaj Komisije za obezbeđenje i unapređenje kvaliteta, Tehnički fakultet u Boru, Bor, p. 1, 2
- [5] Božac, G., M. (2008): SWOT analiza i TOWS matrica – sličnosti i razlike, *Ekonomska istraživanja 21(1)*, Fakultet za ekonomiju i turizam "Dr Mijo Mirković", Pula, pp. 19-34
- [6] Cakmak, E., Cakmak Irlayici P. (2013): *An analysis of causes of disputes in the construction industry using analytical network process*, 2nd World Conference On Business, Economics and Management - WCBEM 2013, Antalya, Turkey, pp. 183-187
- [7] Mimović, P., Krstić, A. (2016): The integrated application of the AHP and the DEA methods in evaluating the performances of higher education institutions in the Republic of Serbia, *Economic Horizons 18(1)*, Ekonomski fakultet, Kragujevac, pp. 73-86
- [8] Da Silveira Guimarãesa, J., L., Pamplona Salomonb, V., A. (2015): *ANP applied to the evaluation of performance indicators of reverse logistics in footwear industry*, Information Technology and Quantitative Management (ITQM 2015), Procedia-Computer Science 55 (2015), Rio de Janeiro, pp. 139 – 148
- [9] Passos, Aderson, C., Souza, Castro, R. (2013): Defining a quality index for electric power utilities using multiple criteria decision support and time series analysis, *Gestão & Produção 20(1)*, São Carlos, Brazil, pp. 1 – 12

- [10] Bogdanović, D., Božinović, S. (2017): *The impact of different types of incentives of employees of Technical Faculty in Bor on their work motivation level: A Case Study*, International May Conference on Strategic Management 2017, Tehnički fakultet u Boru, Bor, pp. 692-710
- [11] Yüksel, I., Dağdeviren, M. (2007): Using the analytic network process (ANP) in a SWOT analysis – A case study for a textile firm, *Information Sciences* 177(16), Elsevier, Amsterdam, pp. 3364–3382
- [12] Milošević, I. (2017): *Praktikum iz strategijskog menadžmenta za izradu studije slučaja*, Tehnički fakultet u Boru, Bor, pp. 21-25.



ANALYSIS OF EXPERIENCE OF USERS OF ERAZMUS PLUS PROGRAM FOR THE EXAMINATION OF STUDENTS

Marija Orlović, Maja Stanujkić

Technical Faculty in Bor, University of Belgrade, Bor, Serbia

Abstract: The Erasmus program is a student exchange program that is implemented within the framework of cooperation between higher education institutions of the European Union and candidate countries. The program is supported by the European Union. The program was launched with the aim of providing students with the opportunity to spend part of their studies at another university within the European Union, not only to supplement their knowledge, but also to get to know different cultures. This paper will analyze the experiences of students who are currently on the exchange of Obuda University in Budmipesta. Some of the items to be examined are satisfaction with the relationship and treatment of the professor of the University with Erasmus students, the degree of difference in learning methods in relation to local universities, the relationship of the coordinator during the application and many other topics. The research will include students from different countries. The first part of the paper will explain the basic goals of the Erasmus plus program and which are the main beneficiaries for the users, while in the second part of the paper the results of the research will be presented and analyzed.

Keywords: Erasmus program, students

1.UVOD

Erazmus+ program omogućava stipendiran boravak i studiranje na nekoj od visokoškolskih institucija iz programskih zemalja zemlje Evropske unije, Island, Norveška, Lihtenštajn, Makedonija i Turska) u okviru studentske razmene na svim nivoima studija (osnovne, master, doktorske). To praktično znači boravak u trajanju od ili jednog ili dva semestra, u okviru kojeg se slušaju predavanja i polažu ispiti koji će biti priznati po povratku na matičnu instituciju u Srbiji. Program ima zacilj da obezbedi odlaznim studentima nove sposobnosti i različita iskustva. Program razmene takođe ima za cilj da poboljša mogućnost I zapošljavanja odlazećim studentima. Program je ušao u upotrebu u Selcuk Univerzitetu u 2005. godini i 465 studenata su poslata da studiraju u inostranstvu, kao Erasmus studenti u poslednje tri godine.

2. VRSTE I NIVOI STUDIA

Studie u Evropi mo\emo podeliti na dve osnovne vrste, a to su:

1. Akademske studije

2. Strukovane studije

- *Akademске studije dele se na:*

1. Osnovne akademske studije (prvi stepen)
2. Master akademske studije (drugi stepen)
3. Specijalističke akademske studije (drugi stepen)
4. Doktorske akademske studije (treći stepen)

Svaki nivo studija nosi određen broj bodova (ESPB) i traje određen broj semestara.

Osnovne akademske studije traju tri do četiri godine i nose od 180 do 240 ESPB bodova. Studenti koji završe tri godine osnovnih studija sa ostvarenih 180 bodova stiču stručni naziv sa naznakom zvanja prvog stepena akademskih studija iz odgovarajuće oblasti.

Studenti koji završe četiri godine osnovnih studija sa ostvarenih 240 bodova stiču naziv "diplomirani" sa naznakom prvog stepena akademskih studija iz odgovarajuće oblasti.

Master akademske studije traju od jedne do dve godine i nose od 60 do 120 ESPB bodova. Prvi i drugi stepen akademskih studija nosi ukupno 300 bodova. Studenti koji uspešno završe master studije nose naziv "master" sa naznakom drugog stepena akademskih studija iz odgovarajuće oblasti. Specijalističke studije traju najmanje jednu godinu i nose najmanje 60 ESPB bodova. Studenti koji uspešno završe specijalističke studije nose naziv "specijalista" sa naznakom drugog stepena studija iz određene oblasti. Doktorske studije traju najmanje 3 godine i nose najmanje 180 ESPB bodova. Studenti koji završe doktorske studije imaju ukupno 480 ESPB bodova i nose naziv "doktor nauka" iz određene oblasti. Posebno se izdvajaju akademske studije iz medicine jer prvi nivo studija traje najmanje 6 godina i predstavlja integrisane osnovne i master studije. Nose ukupno 360 bodova.

- *Strukovne studije*

Strukovne studije pripremaju studente za određene profesije i fokusiraju se na praktičan rad i praktičnu analizu, za razliku od akademskih studija koje se zasnivaju na teorijskoj nastavi i istraživanju. Većina profesija sa strukovnih studija zahteva licencu, odnosno dozvolu za rad. Dakle, studenti prvo završe strukovne studije iz određene oblasti pa zatim dobijaju licencu kako bi mogli da se zaposle u odgovarajućoj struci. Neki od primera ovakvog sistema su:

1. Arhitektura
2. Stomatologija
3. Audiologija
4. Inženjering
5. Pravo
6. Medicina
7. Terapija muzikom
8. Fizička terapija
9. Optometrija
10. Psihologija
11. Farmacija
12. Radiografija
13. Socijalni rad
14. Urbanizacija

15. Veterina
16. Strukovne studije se dele na:
17. Osnovne strukovne studije (prvi stepen)
18. Specijalističke strukovne studije (drugi stepen)

Osnovne strukovne studije traju tri godine i nose ukupno 180 ESPB bodova. Studenti koji završe osnovne strukovne studije stiču stručni naziv iz odgovarajuće oblasti.

Specijalističke strukovne studije traju najmanje godinu dana i nose najmanje 60 ESPB bodova. Studenti koji završe ovaj stepen studija stiču stručni naziv "specijaliste" iz određene oblasti. [1]

3. NASTANAK ERASMUS PROGRAMA

Razlog zašto ljudi preferiraju druge zemlje za obrazovanje je u osnovi želja da se obrazuju na boljem univerzitetu, i želja da diplomiraju na univerzitetu opremljeni kvalitetima koje zahteva globalno tržište rada. Inostrano obrazovanje učenika doprinosi formiranju međunarodnog razumevanja i interkulturalne interakcije [2]. Jedan od programa koji omogućava studentima da studiraju u inostranstvu jeste Erasmus program razmene. Dve vrste mobilne aktivnosti, uključujući osoblje i mobilnosti studenata, obavljaju se u okviru Erasmus Programa razmene. Studenti dobijaju priliku da studiraju u inostranstvu u okviru Erasmus Student Mobility programa. Erasmus Student Mobility je program razmene koji se sprovodi u okviru projekta bilateralnog sporazuma između institucija visokog obrazovanja. Erasmus program se sprovodi u Evropi od 1987. godine. [3]

4. CILJEVI ERASMUS PROGRAMA

Podsticanje ministucijaviso kog obrazovanja da sarađuju jedni s drugima, Erasmus program razmene ima za cilj:

- da omogući studentima da studiraju u inostranstvu i da prepoznaju evropske zemlje i kulture, doprinoseći jačanju komunikacije i saradnje između zemalja;
- razvoju i popularizaciji evropskih standarda u obrazovanju;
- poboljšavajucikvalitetvisokogobrazovanja.

Program takođe ima za cilj podizanje pojedinca na nivo koji će ispuniti očekivanja poslovnog sveta i univerziteta koji pružaju kvalifikovane više usluge obrazovanja.

Programom Erasmus+ doprinosi se ostvarenju:

- ✓ Ciljeva strategije Europa 2020., uključujući vodeći cilj u području obrazovanja ;
- ✓ Ciljeva strateškog okvira za evropsku saradnju u obrazovanju i osposobljavanju (ET 2020.), uključujući odgovarajuća merila;
- ✓ Održivog razvoja partnerskih država u području visokog obrazovanja;
- ✓ Ukupnih ciljeva obnovljenog okvira za evropsku saradnju u području povezanim s mladima (2010. – 2018.);
- ✓ Cilja razvijanja evropske dimenzije u sportu, posebno sportu na lokalnoj razini, u skladu s programom rada EU-a za sport;
- ✓ Promicanja evropskih vrednosti u skladu s članom 2. Ugovora o Evropskojuniji [4]

5. KO SPROVODI I KO MOŽE UČESTVOVATI U PROGRAMU ERAZMUS+?

Za sprovođenje programa Erasmus+ nadležne su:

- Evropska komisija
- Izvršna agencija za programe u oblasti obrazovanja, kulture i medija (EACEA)
- Nacionalne agencije u programskim zemljama
- Nacionalne Erasmus+ kancelarije u partnerskim zemljama. Fondacija Tempus je nacionalna Erasmus+ kancelarija u Srbiji [5]

U programu mogu učestvovati: pojedinci – studenti, naučnici, učenici, odrasli polaznici, mladi ljudi, volonteri, profesori, učitelji, voditelji osposobljavanja, osobe koje rade s mladima, stručnjaci u organizacijama koje deluju u području obrazovanja, i osposobljavanja mladih, glavna ciljna populacija Programa. Međutim, programom se dolazi do tih pojedinaca putem organizacija, ustanova, skupina ili pojedinaca koje organizuju takve aktivnosti. Uslovi pristupa program odnose se na 2 aktera: učesnike (pojedince koji učestvuju u Programu) i „organizacije učesnike” (uključujući grupe od najmanje četvoro mladih ljudi aktivne u radu s mladima, ali ne nužno u kontekstu organizacija za mlade, koje se često nazivaju i neformalnim grupama mladih ljudi). Uslovi učešća učesnika i organizacija učesnica zavise od države u kojoj se nalaze. [6]

6. NAJČEŠĆE POTREBNA DOKUMENTA ZA PRIJAVU ZA ERAZMUS+ I ERAZMUS MUNDUS MOBILNOSTI

U tekstu konkursa za Erasmus+ mobilnosti ili na sajtu same mreže za razmenu u okviru Erasmus Mundus programa uvek je naznačen tačan spisak potrebne dokumentacije. Najčešće tražena dokumenta za obe vrste programa su:

1. Za studente:

- CV,
- motivaciono pismo,
- pisma preporuke (naznačen je tačan broj),
- diploma (uverenje o diplomiranju),
- transkript ocena,
- sertifikat o poznavanju jezika izvođenja nastave (često engleski; ipak, za razmenu na nivou osnovnih studija neretko se nastava izvodi na jeziku države u kojoj se univerzitet nalazi, te je potreban sertifikat o poznavanju tog jezika);
- ugovor o učenju (Learning agreement) – potpisan od studenta i obe visokoškolske institucije, u kojem se definišu predmeti koje će student na razmeni slušati i polagati i koji će mu biti priznati po povratku na matičnu instituciju u Srbiji;
- plan istraživanja (Research plan) – važi za studente doktorskih studija, ukoliko se na mobilnosti ne slušaju predavanja, već realizuje istraživačka aktivnost.

2. Za nastavno i administrativno osoblje:

- CV,
- motivaciono pismo,
- prihvatno pismo univerziteta na kome se mobilnost realizuje,
- predlog plana aktivnosti koje bi se realizovale tokom boravka na partnerskom univerzitetu (Activity plan),
- dokaz o poznavanju jezika (najčešće engleski, ponekad i/ili jezik zemlje u kojoj se mobilnost realizuje). [7]

7. OBRAZOVNI PROCES STUDENATA U OKVIRU PROGRAMA ERASMUS

Obrazovni procesi studenata počinju e-mail-om poslatom od strane Kancelarije za koordinaciju Erasmus, navodeći da studenti zaslužuju da imaju koristi od Erasmus Student Mobility. Predloženi studenti ispitiuju web sajtove škola koje će studirati, i dobijaju neophodne informacije. Orijentacioni program je organizovan u Kancelariji za koordinaciju Erasmus. Nakon orijentacije programa imenovani studenti moraju da ispune aplikaciju, i sporazumni obrazac objavljenih na internet stranicama škole. Nakon popunjavanja dokumenata, oni moraju da biti potpisani od strane koordinatora odeljenja i institucionog koordinatora. Posle procesa potpisivanja, dokumenti se šalju poštom u kancelariju institucije koja ih prima. Ustanova za prijem ispituje dokumente i šalje prihvatjuća pisma studenata. Nakon što studenti dobiju prihvatajuće pismo, oni moraju pripremiti i poslati sporazum o učenju. Studenti moraju steći 30 ECTS za jedan semestar i 60 ECTS za dva semestra. Studenti, koji se pripreme i dostave sporazum o učenju, dokaz o priznavanju, broj računa, ugovor o stipendiji, mogu početi sa procesima pasoša i vize. Studenti koji dobiju pasoš i vizu, spremni su da idu u inostranstvo u instituciju za prijem.

Period obrazovanja, u kojima će studenti ostati na prijemu institucije, obračunava se i množi mesečnim iznosom stipendije, i 80% od ovog iznosa se stavlja u račune studenata. Studenti koji završe školovanje i vrata se u Srbiju, moraju da isporuče povratne dokumente. Učenici trebaju da pripreme i dostave sertifikat o pohađanju, transkript, kartu, fotokopiju pasoša i završni izveštaj. Nakon što se dokumenti isporuče, stipendije učenika su registrovane na sistemu, i 20% od stipendije se plaća studentima. Tako, studenti upotpunjuju i završavaju svoje mobilne aktivnosti.

8. STUDIJA SLUČAJA

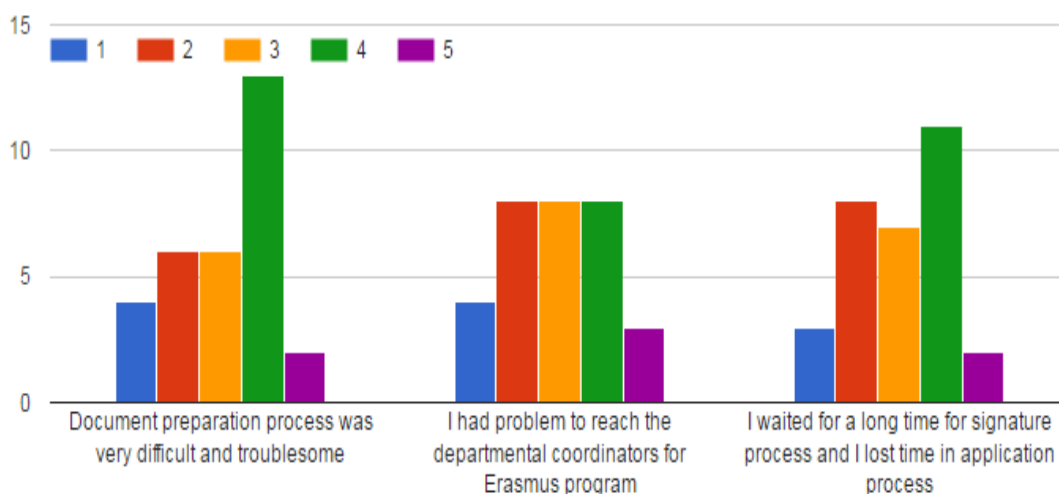
U ovoj studiji, istraživanje zadovoljstva Erasmus studenata (Erasmus Students Satisfaction Survey) je primenjeno na X gostujućih studenata na Univerzitetu Obuda u Budimpešti 31 odlazećih studenata. Problemi sa kojima se susreću odlazni studenti u njihovom obrazovanju su utvrđeni; iskustva koja su učenici stekli u različitom obrazovnom životu i kulturis, i takođe su određeni doprinosi Erasmus programa na lični razvoj, i razvoj karijere odlaznih učenika. Komentari i sugestije su izjavljene prema podacima o rezultatima dobijenih iz istraživanja na osnovu mišljenja odlaznih studenata.

Ovo istraživanje ima za cilj da osvesti studente da studiraju u inostranstvu naredne školske godine, nabazi znanja i iskustva, i da se minimiziraju problem sa kojima se susreću. Da se utvrde glavni nedostaci u pripremi I realizaciji Erasmus programa, što bi doprinelo njegovom poboljšanju.

Na postavljene ankete je odgovorio 31 ispitanik od čega 48,8% muškaraca i 51,2% žena. Većina ispitanika koje se nalaze na razmeni jesu upravo na osnovnim akademskim studijama. Na osnovu postavljenih pitanja se može videti da se studenti susreću sa problemima oko prikupljanja dokumentacije i slanja iste za dobijanje dozvole. To je dug proces koji zahteva puno čekanja do pristuzanja dozvole. Još je komplikovanije ukoliko studenti nemaju odgovarajuću pomoć od strane profesora kako bi ih uputili na pravi način.

Na slici 1.se može videti grafik o mišljenju ispitanika o samom procesu apliciranja. Oni su ocenjevanje vršili ocenama od 1 do 5 gde 1 pretstavlja da se ne slažu a 5 da se u potpunosti slažu.

Document preparation process

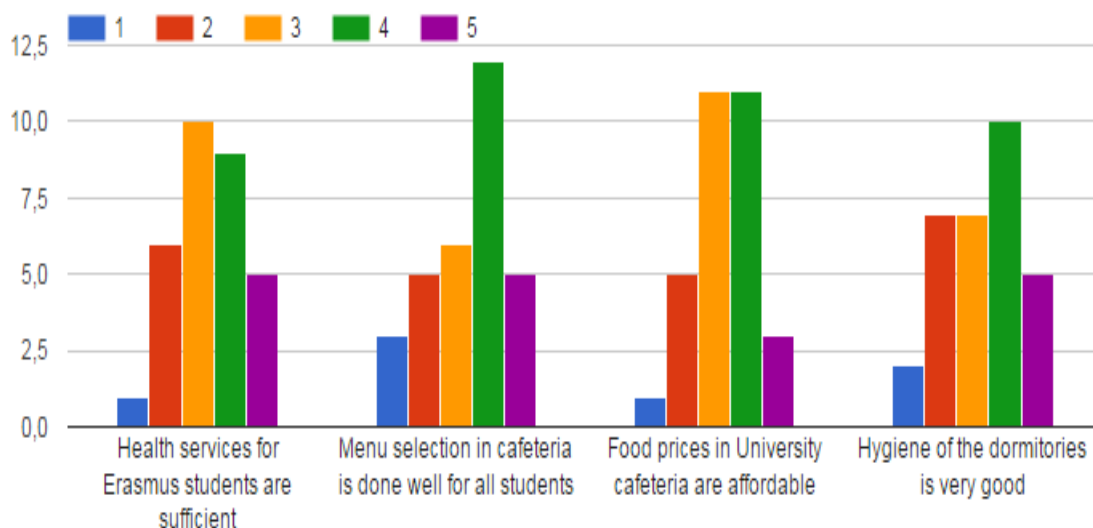


Slika 1. Prikaz odgovora o procesu apliciranja

Osim ovih problem , studenti se susreću I sa problemima praćenja nastave zbog nepoznavanja maternjeg jezika zemlje u kojoj se nalaze, ili slabijeg poznavanja engleskog jezika kao I različitosti u kursevima I nastavi kojoj su pratili u svojim zemljama I zemlje gde se trenutno nalaze. Problemi praćenja nastavae nisu jedini problem sa kojima se susreću odlazeći student, kao problem se mogu javiti I finansije ili loše uklapanje društvenog života

Na narednoj slici se vidi zadovoljstvo studenata higijenom I ljubaznošću profesora. Studenti koji se nalaze na Univerzitetu Obuda su više nego zadovoljni higijenom koja se održava tamo. Većina studenata smatra da je biblioteka koja se nalazi u sklopu fakulteta I više nego odlična I da tamo mogu pronaći svu potrebnu literature. Osim toga većina profesora je veoma ljubazno I izlaze im u susret za sve nejasnoće I pitanja koja imaju.

Health services, accommodation and hygiene



Slika 2. Zadovoljstvo studenata higijenom I uslugama

Međutim, student koji se reše da odu imaju jaku motivaciju I želju da uspu. Motivacija jeste njihov glavni pokretač I pomaže im da prevaziđu krizne periode koje imaju. Upoznavanje nove culture, mogućnost boljeg zapošljenja, socijalzacija, putovanja, sticanje novih iskustva I napredovanje jeste ono što pokreće ove studente.

9. ZAVRŠNA RAZMATRANJA

Erasmus + je program koji obećava. Sa sobom nosi određene strahove I napore, ali se na kraju svakako ispalti. Studenti koji su učestvovali u razmeni vraćaju se zadovoljni I puni novih iskustva. Svako ko se odlučio na ovaj korak postao je bogatiji za jedno iskustvo, a možda I više. Kada se sagledaju svi problem koje nosi, zanemarljivi su u odnosu na ono što se ovim programom dobija. Što veći broj studenata se treba upustiti I pokušati. Proširenje sopstvenih gledišta, sticanje novih znanja, upoznavanje novih ljudi I nove kulture čine nas uspešnijim I otvareaju nova gledišta I mogućnost napretka.

REFERENCE

- [1] <http://fakulteti.edukacija.rs/vrste-i-nivoi-studija>
- [2] Vossensteyn, H., Beerkens, M., Cremonini, L., Besanc, on, B., Focken, N., Leurs, B., et al. (2010). Improving the participation in the ERASMUS programme. Brussels, Belgium: Directorate-General for Internal Policies of the European Parliament.
- [3] Krzaklewska, E., & Krupnik, S. 2005 The experience of studying abroad for exchange students in Europe. Brussels: Petrus Communication.
- [4] (http://ec.europa.eu/programmes/erasmus-plus/sites/erasmusplus/files/files/resources/erasmus-plus-programme-guide_hr.pdf)
- [5] (http://erasmusplus.rs/wp-content/uploads/2016/01/Brosura_Stipendije2016.pdf)
- [6] (http://ec.europa.eu/programmes/erasmus-plus/sites/erasmusplus/files/files/resources/erasmus-plus-programme-guide_hr.pdf)
- [7] Brošura- stipendijezastudente i osobljevisokoškolskih institucija iz Srbije, 2016



METHODS OF EVALUATION, RANKING AND TECHNOLOGY SELECTION - AHP METHOD

Jelena Paunović, Nenad Ljubisavljević

Technical Faculty in Bor, University of Belgrade, Bor, Serbia

Abstract: In this document I am going to present forms of communication, which will be ranked with the use of the AHP method in order to choose the most efficient communication. The method allows the decision maker to incorporate subjective attitude, experience, knowledge, and intuition into the decision-making process. AHP considers quantitative and qualitative data and combines them with the decomposition of complex problems into a model in the form of a hierarchy. Communication is the process of transmitting a message from one to the other. It can also be defined as an exchange of opinions or attitudes between two or more persons with the aim of understanding in order to perform the desired activity. It implies the exchange of information with expressed words or symbols.

Keywords: AHP method, communication, organisation, alternatives

1. UVOD

U uslovima dinamičnog okruženja stvara se sve veći pritisak na organizacije i nameće se potreba za njihovo brzo reagovanje. S toga je poslovno odlučivanje vrlo važan segmenat u poslovanju svakog preduzeća ili organizacije.

Odličivanje na poslovnom nivou je uglavnom višekriterijumskog, a čestog i kolektivnog tipa: mnogi faktori se uzimaju u obzir, a više interesnih grupa učestvuje u procesu odlučivanja.

Neke od najpoznatijih metoda za podršku višekriterijumskom odlučivanju su: PROMETHEE I i II metoda, PROMETHEE DSS, ELECTRE, AHP/ANP, (metoda analitičkih hijerarhijskih procesa) i slične.

Komunikacija je vrlo važan deo poslovanja i organizacije. Prenošenje poruka, razmena i obrada informacija, izdavanje i primanje naloga među strukturama u organizaciji, sve to čini sastav komuniciranja, bez kojeg organizacija ne bi mogla poslovati.

Nastojeći da svoje poslovanje što više poboljša, kompanija “ Central H “ definiše osnovni problem- loša poslovna komunikacija.

U ovom radu biće prikazani oblici komunikacije, koji će primenom AHP metode biti rangirani u cilju odabira što efikasnijeg komuniciranja.

2. AHP METODA

Analitički hijerarhijski proces- AHP (*engl. Analytic Hierarchy Process*) je metoda čiju je idejnu i matematičku postavku dao T. Saaty, 1980. Vlasnik licence za softversku realizaciju, u verzijama za pojedinačno i grupno donošenje odluka, je firma Expert Choice.

Metoda omogućava donosiocu odluke da uključi subjektivni stav, iskustvo, znanje i intuiciju u proces odlučivanja. AHP razmatra kvantitativne i kvalitativne podatke i kombinuje ih kroz dekompoziciju složenih problema u model u obliku hijerarhije.

AHP tehnika je pogodna za rešavanje kompleksnih problema koji zahtevaju selekciju optimalne alternative iz skupa alternativa. AHP metoda se sprovodi na osnovu četiri koraka.

1. Struktuiranje modela
2. Komparativna procena alternativa i atributa
3. Sinteza relativnih prioriteta
4. Test konzistentnosti

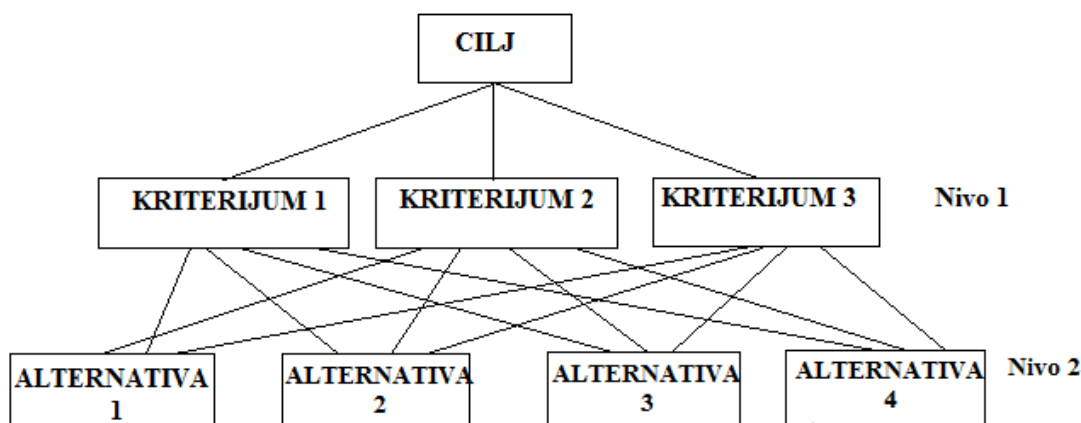
Prednosti AHP metode su sledeće:

- omogućava sveobuhvatnije razumevanje problema i sistemski pristup za procenu potencijalnih alternativa,
- uključuje u analizu preferencije, lične presude i iskustva različitih aktera uključenih u rešavanje problema,
- fokusira se na cilj odlučivanja, razmatra sve relevantne atribute sve dok se ne ostvari konačan izbor alternative, jednostavnost u proračunima i korišćenju. [1]

3. METODOLOŠKI OSNOVI AHP-A

Analitički hijerarhijski proces spada u klasu metoda za meku optimizaciju. U osnovi se radi o specifičnom alatu za formiranje i analizu hijerarhija odlučivanja. AHP najpre omogućava interaktivno kreiranje hijerarhije problema kao pripremu scenarija odlučivanja, a zatim vrednovanje u parovima elemenata hijerarhije (ciljeva, kriterijuma i alternativa) u top down smeru. Na kraju se vrši sinteza svih vrednovanja i po strogo utvrđenom matematičkom modelu određuju težinski koeficijenti svih elemenata hijerarhije. Zbir težinskih koeficijenata elemenata na svakom nivou hijerarhije jednak je 1 što omogućava donosiocu odluka da rangira sve elemente horizontalnom i vertikalnom smislu.

Metodološki posmatrano, AHP je višekriterijumska tehnika koja se zasniva na razlaganju složenog problema u hijerarhiju. Cilj se nalazi na vrhu hijerarhije, dok su kriterijumi, podkriterijumi i alternative na nižim nivoima. Kao ilustracija, na Slici 1.1. data je hijerarhija koju čine cilj, tri kriterijuma i četiri alternative. Hijerarhija ne mora da bude kompletna; npr. Element na nekom nivou ne mora da bude kriterijum za sve elemente u podnivou, tako da se hijerarhija može podeliti na podhijerarhije kojima je zajednički jedino element na vrhu hijerarhije. [2]



Slika 2.1. Primer hijerarhije u AHP-u

3.1. PRIMENA AHP METODE

Kao što se može videti na Slici 1.1., cilj je na vrhu hijerarhije i on se ne poredi sa drugim elementima. Na sledećem nivou su kriterijumi koji se porede, svaki sa svakim u odnosu na cilj koji je neposredno iznad. Isti postupak se primenjuje idući kroz hijerarhiju prema dole, sve dok se na poslednjem nivou ne izvrše poređenja alternativa, svaka sa svakom u odnosu na određene kriterijume na prethodnom nivou. Nakon poređenja elemenata formiraju se matrice poređenja po parovima za svaki nivo hijerarhije. Poređenje se vrši na osnovu Saatyjeve skale poređenja, kao što je prikazano u Tabeli 3.1. [3]

Tabela 3.1. Saaty-jeva skala poređenja

Dominatnosti	
Opis	Ocena
Jednako	1
Slaba dominacija	3
Jaka dominacija	5
Vrlo jaka dominacija	7
Apsolutna dominacija	9
2,4,6,8 su međuvrednosti	

4. IZBOR NAJBOLJEG OBLIKA KOMUNIKACIJE U ORGANIZACIJI „CENTRAL H,,

4.1. DEFINISANJE KOMUNIKACIJE

Komunikacija je proces prenošenja poruke od jedne do druge. Može se definisati i kao razmena mišljenja ili stavova između dveju ili više osoba sa ciljem razumevanja radi izvršenja željene aktivnosti. Podrazumeva razmenu informacija izraženim rečima ili simbolima.

Komunikacija obuhvata sposobnost slanja i primanja informacija i prenošenja i razumevanja tuđih misli, osećaja i stavova. Uspešna komunikacija podrazumeva da je informacija tačno primljena u pogledu sadržaja i značenja koje je odredio pošiljalac. Različito obrazovanje, iskustvo i lične potrebe utiču na:

- sposobnost da se shvate poruke koje se primaju od drugih ljudi i
- značenje koje se pridaje rečima ili izrazima lica.

4.2. KOMUNIKACIJA U POSLOVNOM OKRUŽENJU

Bilo koje društvo, zajednica, organizacija, preduzeće, mora imati i poštovati određena pravila i odnose da bi funkcionisala. Kvalitet odnosa u jednoj zajednici i njena efikasnost zavise od mnogo faktora, ali osnov svega čini komunikacija članova zajednice. Komunikacija između njih samih i prema spoljnjem svetu.

Način komuniciranja, komunikacioni kanali, pravila komuniciranja mogu biti određeni, manje ili više detaljno i strogo definisani, i uglavnom i jesu u dobro organizovanim zajednicama, ali samo od ljudi, pojedinaca zavisi hoće li dobrom međusobnom komunikacijom ostvariti veću harmoniju odnosa i bolju efikasnost organizacije.

Termin *poslovna komunikacija* se koristi za sve poruke koje šaljemo i primamo za službene potrebe, kao što: su pokretanje poslova, upravljanje organizacijom, formalno vođenje poslova organizacije, itd. Kvalitetna, jasna i ciljana komunikacija odavno je, ne samo prednost, već osnov uspešnog poslovanja.

4.3. BARERIJERE U POSLOVNOJ KOMUNIKACIJI

Problemi koji se javljaju u poslovnoj komunikaciji odnose se na loše prenošenje informacija, slanje i primanje poruka između različitih organizacionih nivoa. Najčešće barijere u komunikaciji su:

- ***Preopterećenje informacijama*** – svakodnevno bombardovanje sa svih strana. Nove tehnologije nisu zamenile stare, nego su ih samo dopunile. Direktan pristup informacijama u ljudima stvara osećaj zatrpanosti,
- ***Konkurencija poruka*** – količina informacija sa kojima se svakodnevno suočavamo tera nas da biramo između onoga što je bitno i onoga što možemo da ignorišemo,
- ***Iskrivljavanje informacija*** - u višim strukturama informacija mora da prođe kroz više odeljenja i ljudi pre no što stigne do odredišta. U takvim okolnostima i zbog

pogrešnog shvatanja može doći do iskrivljavanja informacija. Informacija se može pogrešno interpretirati ili čak namerno blokirati,

- **Filtriranje poruka** – menadžeri filtriranjem ili pregledanjem biraju komunikacije na koje će obratiti pažnju. Kada prosleđuju informacije, menadžeri ih još jednom filtriraju ili ih reprodukuju u skraćenom obliku. Takvim načinom se komunikacija može iskriviti ili smanjiti,
- **Kontradiktorne poruke** – mogu da potkopaju komunikaciju i njenu verodostojnost. Voditelji i menadžeri moraju biti sigurni da su njihove poruke dosledne,
- **Komunikaciona klima** – organizacije treba da otvore vertikalne i horizontalne komunikacione kanale. Previše kanala vodi iskrivljavanju poruka, a premalo blokiranju poruka,
- **Razlike u statusu** – važnost organizacione strukture za komunikaciju i koordinaciju promatramo u okviru geografske metafore. Što je veća udaljenost (fizička, društvena ili kulturna) između 2 tačke, informaciji će duže trebati da stigne od jedne do druge tačke. Isto tako, što je više hijerarhijskih nivoa kroz koje informacija mora da protekne, za to će joj biti potrebno više vremena. [4]

4.4. KOMUNIKACIJA U ORGANIZACIJI “ CENTRAL H “

Direktor kompanije “ Central H “ zapazio je da u poslednje vreme dolazi do loše komunikacije među zaposlenima, što pokazuju sami poslovni rezultati. Naime, važne organizacione odluke i ostale informacije od strane srednjeg i nižeg nivoa menadžmenta ne bivaju saopštene na adekvatan način radnicima, jer vrlo često jedan deo zaposlenih bude informisan a drugi ne. Još jedan problem koji nastaje u poslovnoj komunikaciji jeste iskrivljavanje informacija, odnosno do loše interpretacije informacija i poruka koje dolaze sa viših nivoa do radnika.

Osnovni problem ovakve poslovne komunikacije leži upravo u lošem obavljanju poslovnih zadataka, što se odražava i na same poslovne rezultate.

4.5. PREDLAGANJE ALTERNATIVA I DEFINISANJE KRITERIJUMA

Da bi se ovi problemi u poslovnom komuniciranju u ovoj organizaciji prevazišli predložene su tri alternative, odnosno tri različita oblika komunikacije, koji će biti rangirani kako bi se najpre primenio onaj koji se može smatrati najefikasnijim:

Alternativa 1

„**Jedan na jedan**“ **komunikacija (A1)**- ovaj oblik komunikacije obuhvata komuniciranje između dvoje učesnika: licem u lice, putem elektronske pošte, slanje poruka, video poziva, prenošenjem informacija na ostale učesnike, ali samo između dvoje lica;

Alternativa 2

„**Jedan prema mnogima**“ **komunikacija (A2)**- ovakav oblik komunikacije podrazumeva prenošenje informacija sa jednog učesnika na više njih; sprovodi se javnim obraćanjem auditorijumu, putem blogova, specijalizovanih sajtova ili putem društvenih mreža;

Alternativa 3

„*Mnogi prema mnogima*“ **komunikacija (A3)**- podrazumeva prenošenje informacija između većeg broja ljudi, najčešće se primenjuje na javnim skupovima, društvenim mrežama, online diskusijama, forumima i sl. gde više osoba komuniciraju međusobno o nekoj temi. [5]

Kriterijumi sadrže najvažnije parametre za rangiranje promena koje bi trebalo uvesti u ovoj kompaniji, a to su:

1. **Vreme (C1)** je očigledno veoma uticajan faktor za rangiranje alternativa. Svaka od predloženih alternativa iziskuje različito vreme koje je potrebno da bi se komunikacija odvijala, što se neposredno održava i na njen sam kvalitet. Iz tog razloga se smatra da je ovaj faktor uticajan pri izboru alternative.
2. **Viši kvalitet rada (C2)** je kriterijum koji se može očekivati od uvođenja nekog od oblika komuniciranja, jer bi se kvalitetnija komunikacija odrazila i na kvalitet poslovanja.
3. **Efikasnost komunikacije (C3)** predstavlja jedan od najvažnijih kriterijuma jer se odnosi na mogućnost ostvarenja što bolje komunikacije, kao jednog od osnovnih ciljeva svake kompanije. S toga ovaj kriterijum ima veliki uticaj prilikom rangiranja alternativa.
4. **Složenost alternative (C4)** odnosi se na samu strukturu komuniciranja, odnosno na način odvijanja bilo kog oblika komunikacije. Vrlo je važno proceniti koji bi oblik komunikacije mogao najviše da utiče na barijere komunikacije i iz tog razloga je ovaj kriterijum definisan kao značajan prilikom rangiranja predloženih alternativa.
5. **Otpor učesnika (C5)** javlja se gotovo uvek kada se uvodi neka nova promena u kompaniji. U zavisnosti od nivoa otpora koji bi učesnici mogli pružiti, ovaj kriterijum će imati određene posledice prilikom rangiranja alternativa.

5. PRAKTIČNA PRIMENA AHP METODE

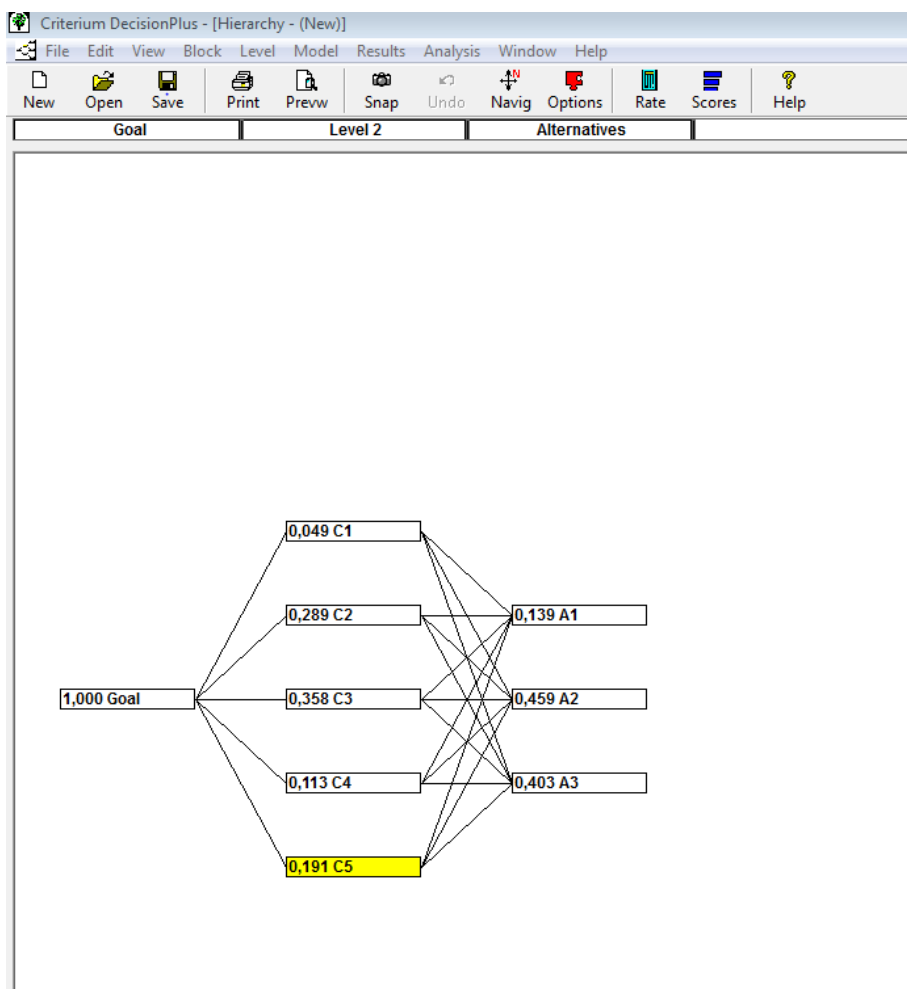
Nakon definisanja alternativa (oblika komunikacije) i kriterijuma vrši se njihova ocena i rangiranje primenom AHP metode. Pri tome, za proračun je korišćen softver Criterium DecisionPlus:

1. U prvom koraku se vrši određivanje težinskih koeficijenata kriterijuma uz pomoć Saaty-jeve skale poređena, koja je data u Tabeli 2.1.
2. U narednom koraku vrši se upoređivanje alternativa u odnosu na svih pet definisanih kriterijuma.
3. Zatim se vrednosti upoređivanih elemenata unose u softverski program Criterium DecisionPlus, na osnovu kojih se dobijaju sledeći rezultati, koji su predstavljeni na Slici 4.1.
4. Na kraju, dobijeni su rezultati rangiranja –Tabela 5.1. Rezultati pokazuju da je alternativa koju bi trebalo najpre uvesti alternativa A2 (“jedan prema mnogima“

komunikacija). Na drugom mestu je alternativa A3 (“mnogi prema mnogima” komunikacija), na trećem mestu je alternativa A1 (“jedan na jedan“ komunikacija).

Tabela 5.1. Konačni rang uvođenja alternativa

Red.br.	Model ISM-a	Rezultat
1.	A2 ("Jedan prema mnogima" komunikacija)	0.459
2.	A3 ("Mnogi prema mnogima" komunikacija)	0.403
3.	A1 ("Jedan na jedan" komunikacija)	0.139



Slika 5.1. Hijerarhija odlučivanja(Criterium DecisionPlus softver)

6. ANALIZA DOBIJENIH REZULTATA

Pri analizi kriterijuma akcenat je na vrednosti njihovih težinskih koeficijenata. Naime, težinski koeficijenti kriterijuma predstavljaju njihovu meru uticaja na rezultat rangiranja alternativa, odnosno oblika komunikacije.

Sa slike 4.1. se vidi da kriterijum C3 (efikasnost komunikacije) ima najveći uticaj na rezultat rangiranja jer njegov težinski koeficijent iznosi 0.358. To pokazuje da je kod rangiranja alternativa najvažnije uzeti u obzir efikasnost koja se očekuje od datog oblika. Sasvim je logično da je ovaj faktor najbolje rangiran, zato što je osnovni cilj rangiranja različitih oblika komunikacije upravo taj da se odabere ona alternativa koja može najviše pospešiti poslovnu komunikaciju.

Na drugom mestu po uticaju je kriterijum C2 (viši kvalitet rada), koji utiče sa 0.289 na rezultat rangiranja. To ukazuje na značaj ostvarenja određenog nivoa kvaliteta, koji je potreban kako bi se postigli što bolji poslovni rezultati.

Treće i četvrto mesto po značaju zauzimaju kriterijumi C5 (otpor učesnika) i C4 (složenost alternative), koji utiču sa težinskim koeficijentima 0.191 i 0.113 na ovaj proces. Ovi kriterijumi imaju manje više jednak značaj za rangiranje promena.

Na kraju, najmanje uticajan kriterijum je C1 (vreme) koji ima težinski koeficijent od 0.049. To pokazuje da je vreme potrebno za odvijanje komunikacije, iako važno, u drugom planu u odnosu na ostale kriterijume.

Kod analize konačnog ranga alternativa (oblici komunikacije) polazi se od najvažnije promene. To je alternativa A2 („*jedan prema mnogima*“ komunikacija) koja ima najveću vrednost rezultata od 0.459. Razlog je u tome što se smatra da je ovaj način komunikacije najefikasniji, s toga bi najbolje rešenje bilo da se najpre upoznaju svi zaposleni u ovoj kompaniji sa načinom na koji će se prenositi poslovne odluke, a nakon toga ukazati im i da se očekuje da rezultati direktno utiču i na povećanje kvaliteta rada i produktivnost.

Na drugom mestu po rangiranju nalazi se alternativa A3 („*mnogi prema mnogima*“ komunikacija). Vrednost ove alternative iznosi 0.403, što ukazuje na to da je najbolje rangirana alternativa blaže efikasnija od ove.

Na trećem mestu je alternativa A1 („*Jedan na jedan*“ komunikacija) sa težinskim koeficijentom 0.139, što znači da ovaj oblik komunikacije treba u potpunosti izbeći, jer najviše ugrožava međuljudske odnose unutar ove organizacije

7. ZAKLJUČAK

Na osnovu svega navedenog može se zaključiti da je poslovna komunikacija od velikog značaja za svaku organizaciju: ona određuje harmoničnu klimu i snažnu organizacionu kulturu jedne organizacije i kvalitet odnosa zaposlenih.

Direktor kompanije “ Central H “ uočava da je jedan od osnovnih problema ove organizacije upravo loša poslovna komunikacija, što mu pokazuju i sami poslovni rezultati.

Za prevazilaženje ovog problema u toj kompaniji, predložene su tri alternative (oblici komunikacije) i pet kriterijuma, koji mogu imati najveći uticaj na njihov izbor.

Za rangiranje alternativa korišćena je AHP metoda višekriterijumskog odlučivanja i na osnovu rezultata može se zaključiti da je najbolje primeni oblik komunikacije “ *jedan prema mnogima* “ .

Ovaj oblik komunikacije smatra se najboljim za rešavanje problema organizacije “ Central H ”, jer on podrazumeva da samo jedan nadređeni saopštava svim svojim podređenima informacije, poruke, odluke, itd. Na taj način svi zaposleni će uvek biti obavešteni na isti način i o istim stvarima, bez stvaranja barijera u poslovnoj komunikaciji.

Kvalitetna, jasna i ciljana komunikacija odavno je ne samo prednost, već osnov uspešnog poslovanja. [6]

REFERENCE

- [1] Podvezko, V. (2009). “Application of AHP Technique”, *Journal of Business Economics and Management* (181-189).
- [2] Prvulović, S., Manasijević, D. *Teorija odlučivanja sa primerima*, Bor 2007.
- [3] Saaty, T. L. (1994). “How to Make a Decision : The Analytic Hierarchy Process”, *Management Science*, Vol: 24(6), November-December, 19-43.
- [4] Avramović, M. (2007). Uticaj informacione i komunikacione tehnologije na sistem marketing komuniciranja preduzeća. *Zbornik radova Tehničkog fakulteta, Leskovac*, (17), 65-73.
- [5] Blakstad, M., Cooper, A. (1995). *The communicating organisation*. IPD, London.
- [6] Jacobs, D., Homburger, A.: *Making Business Competitive*, Kogan Page, London, 1990.

CONTENTS:

**XIV INTERNATIONAL MAY CONFERENCE ON STRATEGIC MANAGEMENT
– IMCSM18 –**

Plenary papers

EVALUATION OF THE MINING PROJECTS UNDER ECONOMIC UNCERTAINTIES USING REAL OPTION VALUATION	
Hesam Dehghani	1
MANAGEMENT OF AGRICULTURAL AND RURAL DEVELOPMENT IN THE REPUBLIC OF SERBIA	
Lela Ristić	13
CONSENSUS MODEL IN ANALYTIC HIERARCHY PROCESS	
Petra Grošelj.....	24
COMPARATIVE ANALYSIS OF BUSINESS ENVIRONMENT IN CEE AND SEE COUNTRIES USING THE PROMETHEE METHOD	
Aleksandra Fedajev.....	36

Conference papers

TOP MANAGEMENT TEAMS DIVERSITY IMPACT ON COMPANY PERFORMANCE: EVIDENCE FROM THE AUTOMOTIVE CZECH SMALL AND MEDIUM-SIZED ENTERPRISES	
Emil Velinov, Vasko Vassilev	52
NEW GENERATION APS SYSTEMS FOR DEMANDING PLANNING ENVIRONMENTS	
Konvicka Dalibor, Solodovnikov Vitaly Vitalievich.....	60
THE FIVE STAGES OF BUSINESS PROCESS MANAGEMENT MATURITY MODEL	
Ernad Kahrović, Nada Vignjević-Đorđević	70

INFLUENCE OF COST MANAGEMENT TOOLS ON THE EFFICIENCY OF ACTIVITY OF ENTERPRISE STRUCTURES	
Alexander Miller.....	75
STRATEGIC SECURITY MANAGEMENT	
Dusko Tomic, Maryam Al Saabri.....	83
ULOGA NOVOG BEZBEDNOSNOG MENADZMENTA I INVENTIVNIH TEHNOLOGIJA U ZAŠTITI KRITIČNE INFRASTRUKTURE - AERODROM “NIKOLA TESLA”	
Eldar Saljic, Duško Tomić, Igor Konjović.....	84
IMPACT OF ORGANIZATIONAL STRUCTURE ON FINANCIAL RESULT OF THE COMPANY	
Krešimir Starčević, Branislav Peleš.....	91
WHY DO ORGANIZATIONS FAIL IN IMPLEMENTING MANAGEMENT PRACTICES? AND HOW DEPLOYING SUCCESSFUL TQM PROGRAMS IMPROVE THEIR OPERATIONAL PERFORMANCE?	
Islam Bolbol.....	102
HOW IS CORPORATE ENTREPRENEURSHIP INTERCONNECTED TO ENTREPRENEURSHIP? AND HOW CORPORATE ENTREPRENEURSHIP DIMENSIONS WOULD IMPROVE THE ORGANIZATIONS' FINANCIAL PERFORMANCES?	
Islam Bolbol.....	114
MULTI-CRITERIA ANALYSIS OF THE ENVIRONMENT DESTRUCTION BY THE OPEN PITS	
Dejan Bogdanović, Ivan Jovanović, Nenad Milijić.....	125
ENTREPRENEURIAL INTENTIONS OF STUDENTS IN RELATION TO FAMILY BUSINESS EXPERIENCE: EVIDENCE FROM MACEDONIA AND SLOVENIA	
Emilija Egger, Makedonka Dimitrova, Ana Tomovska Misoska.....	131
TOURISM POLICY AND LEGAL FRAMEWORK OF RURAL TOURISM IN MACEDONIA	
Ljupcho Janevski, Dejan Metodijeski, Oliver Filiposki.....	141
EMPLOYEE SATISFACTION, ALBANIAN ELECTRICITY DISTRIBUTION NETWORK SECTOR	
Ardita BORIČI, Frensis SHKJEPANA.....	151

FOREIGN DIRECT INVESTMENTS IN THE ECONOMIC DEVELOPMENT OF BULGARIA	
Sibel Ahmedova.....	158
MORAL HAZARD AND NATIONAL HEALTH INSURANCE SCHEME PENETRATION IN LAGOS, NIGERIA	
Onafalajo, Akinwunmi Kunle.....	166
HUMAN RESOURCES AND THE ROLE OF ETHICS IN THE FRAMEWORK OF INDUSTRIAL SECURITY	
Dragan Igić, Milovan Vuković.....	176
THE ROLE OF A MOBILE PHONE AS A LIFESTYLE ELEMENT OF YOUNG CONSUMERS	
Lazar Vukadinović, Karolina Perčić.....	190
AN EMPIRICAL STUDY OF LIFE INSURANCE AGENT’S INFLUENCE ON RURAL CUSTOMER’S LIFE INSURANCE BUYING BEHAVIOR: AN INDIAN PERSPECTIVE	
Abhinav Nigam.....	200
DIGITAL TECHNOLOGIES IN AGRO-FOOD SPHERE	
Yulia Syaglova.....	211
THE IMPACT OF CULTURE ON GLOBAL MANAGEMENT	
Marija Stojanova, Katerina Dukoska, Stojan Dukoski.....	218
APPLICATION OF STATISTICAL MODELS FOR FORECASTING THE FINANCIAL CRISIS IN THE ENTERPRISES	
Frosina Nikolovska, Mila Zibak Dimkovska, Marija Stojanova.....	223
ANALYSIS OF THE ROLE PROFILE OF STUDENTS INVOLVED IN VOLUNTEER ACTIVITIES	
Alexey Urubkov, Natalia Safronova, Natalia Minajeva, Tatiana Maslevich	232
THE CHANGING DYNAMICS OF CUSTOMER RELATIONSHIP MANAGEMENT IN INDIAN BANKING WITH THE ADVENT OF TECHONOLOGY	
Nishtha Pareek.....	244
PLANNING APPROACH FOR LOGISTICS	
Polina Arshinina, Albina Kiseleva.....	255

IMPLEMENTATION OF INFORMATION SYSTEMS: WEAKNESS IN HUMAN FACTORS AS CRITICAL SUCCESS FACTORS	
Savo Efremovski, Stojan Dukoski, Katarina Dukoska.....	263
IS THERE AN END TO THE DIALECTICS: THE ONGOING CONFLICT BETWEEN THE POST-STRUCTURALIST AND NEO-MARXIST THEORY	
Petrushevski Ljubisha.....	268
FROM QUANTITIES TO QUALITIES – THE EXCESSES AND THE LIMITS OF THE ECONOMY	
Petrushevski Ljubisha.....	274
THE GENERATION DIFFERENCES IN EVERYDAY TRANSPORT	
Regina Zsuzsánna Reicher, Anita Kolnhofner-Derecskei.....	280
ORGANIZATIONAL STRUCTURE OF SPORT	
Vladan Mihajlović, Milan Mihajlović.....	289
INFRASTRUCTURE MORTGAGE AS AN INSTRUMENT OF CLUSTER PROJECTS' IMPLEMENTATION IN THE SPHERE OF PUBLIC-PRIVATE PARTNERSHIP	
Albina M. Kiseleva, Kirill A. Samodinskiy.....	296
THE ROLE OF SOCIAL CORPORATE RESPONSIBILITY IN THE FORMATION OF LOYALTY OF EMPLOYEES AND CUSTOMERS ON THE EXAMPLE OF THE ROBERT BOSCH COMPANY	
Ksenia Perminova, Ulia Siaglova.....	305
ANALYSIS OF WORKING ENVIRONMENT AND CONDITIONS OF WORK IN PRODUCTION ORGANIZATIONS WITH ASPECT OF THE INFLUENCE OF HARMFUL IN THE WORKING PROCESS	
Violeta Stefanović, Snežana Urošević, Ivana Mladenović-Ranisavljević	312
POST-USE OF PRODUCTS - ENVIRONMENT MANAGEMENT TOOL	
Saša Raletić Jotanović, Dragan Janjušić, Valerija Večei Funda.....	322
A CONTRIBUTION TO THE IMPROVEMENT OF A MANAGEMENT PROCESSES IN MAINTENANCE OF RAILWAY VEHICLES	
Zoran Antić, Zoran Nešić, Đorđe Mihailović	331
MANAGEMENT OF ECOLOGICAL PROCESSES IN RAILWAY TRANSPORTATION OF HAZARDOUS MATERIALS	
Zoran Antić, Zoran Nešić	340

THE INFLUENCE OF SOME SOCIO-DEMOGRAPHIC CHARACTERISTICS AMONG HIGH SCHOOL STUDENTS FROM R. MACEDONIA ON THE SELECTION OF EXTRA-CURRICULAR SPORTS TOURISM ACTIVITIES	
Liza Pantekovska, Dalibor Dimkovski	348
STUDY OF THE ENERGY CONSUMPTION AND THE WETTED AREA USING DRIPPERS WITH DIFFERENT FLOW RATE	
Dimitar Georgiev, Yordan Gerinski.....	357
OPPORTUNITIES FOR SUSTAINABLE TOURISM DEVELOPMENT OF SERBIA	
Jelena Premović, Predrag Vukadinović, Violeta Milićević.....	363
INTANGIBLE VALUE OF CULTURE IN THE FUNCTION OF TOURIST OFFERS	
Predrag Vukadinović, Jelena Premović, Nebojša Đokić	372
INVESTIGATION ON THE INFLUENCE OF CORPORATE SOCIAL RESPONSIBILITY DIMENSIONS ON BUSINESS PERFORMANCES OF THE COMPANY	
Anđelka Stojanović, Sanela Arsić, Isidora Milošević, Snežana Urošević, Ivan Mihajlović.....	381
BENCHMARKING AS A TOOL FOR COMPARISON OF FROZEN PASTRY PRODUCTS BETWEEN LOCAL PRODUCER AND “BEST-IN-CLASS” PRODUCERS	
Andrea Dobrosavljević, Snežana Urošević	395
POSITION OF AGRICULTURAL BUSINESS ENTITIES IN SERBIA AND FUTURE TRENDS OF THEIR DEVELOPMENT	
Saša Krstić, Aleksandra Fedajev.....	405
TOTAL QUALITY MANAGEMENT (TQM) IN HIGHER EDUCATION	
Damir Ilić, Tatjana Ilić-Kosanović, Vladimir Tomašević.....	419
INTEGRATED INCIDENT MANAGEMENT MODEL FOR DATA PRIVACY AND INFORMATION SECURITY	
Sándor Dombora	430
COMPARATIVE ANALYZIS OF HRM IN PUBLIC ADMINISTRATION	
Jadranka Denkova, Jovan Ananiev, Strasko Stojanovski	440
DEFINING SIGNIFICANCE OF NETWORK INTELLIGENCE ELEMENTS FOR DECISION MAKING SUCCESS	
Savo Stupar, Elvir Šahić, Mirha Bičo Ćar.....	448

MEASUREMENT OF THE QUALITY OF BANKING SERVICES IN MONTENEGRO BY APPLYING THE SERVQUAL MODEL	
Milica Raičević, Dijana Medenica Mitrović	460
SATISFACTION OF EMPLOYEES - SOURCE OF EFFICIENCY	
Mirha Bičo Ćar, Stupar Savo, Elvir Šahić, Munira Šestić, Omar Hodžić.....	472
MEASURING NATIONAL INNOVATION SYSTEM EFFICIENCY: A CASE STUDY OF THE CZECH REPUBLIC	
Eva Jurickova, Michal Pilik.....	483
PERFORMANCE MANAGEMENT TRANSPORT ORGANIZATION - ESTABLISHMENT CRITERIA FOR BUSINESS SUCCES	
Nena Tomović, Ištvan Bodolo, Pavle Galić.....	484
STAKEHOLDER ANALYSIS APPLICATION FOR RENEWABLE ENERGY PROJECT PLANNING: CASE MUNICIPALITY OF ŠTRPCE	
Bojan Stojčetočić, Đorđe Nikolić, Dejan Bogdanović, Živče Šarkoćević.....	496
ROLE AND SUPPORT OF THE STATE FOR INNOVATION AS A FACTOR FOR THE DEVELOPMENT OF THE ECONOMY	
Irena Ashtalkoska, Emilija Nasteska	498
CONCEPTUAL MODELING AND EVALUATION OF E-BUSINESS PROCESSES USING CLOUD BASED FRAMEWORK INSIGHT MAKER	
Ramona Markoska, Petra Bilic	507
SWOT ANALYSIS BASED STRATEGIES DEVELOPMENT TO ENERGY SECURITY IMPROVEMENT: CASE MUNICIPALITY OF ŠTRPCE	
Bojan Stojčetočić, Đorđe Nikolić, Dejan Bogdanović, Ruža Marković.....	518
GEOGRAPHICAL DISPERSION PATTERNS OF UNIVERSITY SPIN-OFF COMPANIES IN THE REGION TWENTE IN THE NETHERLANDS	
Jacques Bazen.....	519
FINANCIAL ANALYSIS OF OPERATIONS OF PUBLIC ENTERPRISES IN THE TERRITORY OF THE MUNICIPALITY OF BOR	
Saša Krstić, Dejan Riznić, Aleksandra Fedajev.....	520
RESTRUCTURING OF A LEGAL ENTITY BY SPIN-OFF AND CREATION SUBSIDIARY ENTERPRISES AS A BUSINESS DEVELOPMENT	
Victor Dubolazov, Arina Zakirova	533

**INNOVATIVE APPLICATION OF IOT AND CLOUD COMPUTING TO
MANAGEMENT INFORMATION SYSTEMS**

Vito Leggio, Lyudmila Zharova, Ivica Stankovic, Radomir A. Mihajlovic541

IOT POWERED MODERN ENTERPRISE AND ZERO TRUST MANAGEMENT

Lyudmila Zharova, Vito Leggio, Jelena Mihajlovic, Radomir A. Mihajlovic542

**RULES ON INTEGRATION OF ORGANIZATIONS USING
AGRICULTURAL LAND – AN OBSTACLE FOR COMPETITION**

Minko Georgiev, Aneta Roycheva543

**SCIENTIFIC INTELLIGENCE AND ROBOTICS OF WELDING IN
TECHNICAL SYSTEMS IN PRODUCTION PROCESSES OF MINING**

Slobodan Radosavljević, Nikola Ille, Milan Radosavljević, Jovana Radosavljević555

**THE ECOLOGICAL SCOPE OF DESTRUCTION OF LAND DAMAGES IN
PRODUCTION PROCESSES OF THE REPUBLIC OF SERBIA**

Slobodan Radosavljević, Nikola Ille, Milan Radosavljević, Jovana Radosavljević565

**PECULIAR PROPERTIES OF URBAN PLANNING ON ALLUVIAL FANS
LOCATED IN THE STEPPE ZONE (ON THE EXAMPLE OF ASTANA – THE
CAPITAL OF KAZAKHSTAN)**

Marat Ishankulov, Aktlek Nurgazinov576

A LEAN MANAGEMENT APPROACH IN LIGHTING TECHNOLOGY

Luminita Parv588

**DOES GENDER MAKE A DIFFERENCE IN THE LEADERSHIP
PREFERENCES IN THE CONSTRUCTION INDUSTRY**

Teodora Klincharova, Makedonka Dimitrova, Marjan Bojadjiev596

**ATTENTION ON SOCIAL MEDIA: EVIDENCE FROM THE MACEDONIAN
START UPS**

Makedonka Dimitrova, Dimce Micevski, Ilijana Petrovska597

**STRATEGIC CORPORATE SOCIAL RESPONSIBILITY AS A FACTOR OF
ATTRACTING CUSTOMERS**

Isidora Milošević, Sanela Arsić, Anđelka Stojanović, Danijela Voza, Ivan Mihajlović606

QUALITY OF SERVICES IN BANKING IN EASTERN SERBIA

Sanela Arsić, Isidora Milošević, Anđelka Stojanović607

**SMES, RESOURCE EFFICIENCY AND GREEN MARKETS – ASPECTS OF
THE TRANSITION OF SMES IN THE REPUBLIC OF CROATIA**

Sofija Turjak, Ivana Unukić, Dina Liović616

COMPARATIVE ANALYSIS OF SAFETY CLIMATE ON CONSTRUCTION PROJECTS IN SERBIA IN 2014 AND 2017	
Nenad Milijić, Ivan Mihajlović, Ivan Jovanović, Dejan Bogdanović, Anđelka Stojanović.....	626
MULTIGROUP ANALYSIS OF THE ELEMENTS OF KNOWLEDGE MANAGEMENT IN PROJECT-BASED ORGANIZATIONS	
Ivan Jovanović, Nenad Milijić, Dejan Bogdanović, Anđelka Stojanović.....	638
THE IMPACT OF CREATIVITY, SELF-EFFICIENCY AND TEAMWORK ON INNOVATION OF MSMES	
Ivan Jovanović, Milica Arsić.....	649
THE INFLUENCE OF LEADERSHIP ON THE SUCCESS OF STRATEGIC MANAGEMENT	
Taip Jakupi, Marija Kotevska-Dimovska.....	658
CHALLENGES OF PUBLISHING FOR SCIENTIFIC WORKERS IN DEVELOPING COUNTRIES: THE CASE OF SERBIAN ACADEMICS	
Milica Arsić, Ivan Jovanović.....	666
MODELLING ELECTRONIC TRUST USING BAYESIAN NETWORKS	
Jelena D. Velimirovic, Aleksandar Janjic, Lazar Z. Velimirovic	674
THE INFLUENCE OF ENTERPRISE RISK MANAGEMENT ON THE PERFORMANCE OF THE COMPANIES IN SERBIA	
Marija Panić, Milica Arsić, Danijela Voza, Živan Živković	680
POSSIBILITIES FOR DEVELOPMENT OF RURAL AREAS IN SERBIA	
Danijela Voza, Sanela Arsić, Đorđe Nikolić, Živan Živković.....	691
CORPORATE IMAGE AS A STRATEGIC RESOURCE OF MARKETING COMMUNICATIONS IN ORGANIZATION	
Anđela Mikić, Sonja Milojević.....	692
MANAGING DECISION-MAKING PROCESS IN "RADEMO-TRANS" LTD.	
Radostina Emilova Yuleva	701
EVALUATION OF SUPPLIERS CRITERIA IN TEXTILE COMPANY USING ROUGH SWARA APPROACH	
Marko Vasiljević, Željko Stević, Dragan Pamučar, Gordan Stojić.....	709
WHAT ARE THE TRANSMITTING CHANNELS OF 2007-2008 GLOBAL FINANCIAL CRISIS TO THE ECONOMY OF PALESTINE? AND HOW THE LAST IS INFLUENCED AND SURVIVED?	
Islam Bolbol.....	720

XIV Students Symposium on Strategic Management

THE PROTECTION OF DATA ON THE NETWORK AND THE IMPLEMENTATION OF THE XML DIGITAL SIGNATURE IN CRYPTOGRAPHY

Dušan Bogdanović733

THE IMPLEMENTATION OF THE SIMPLEX METHOD OF THE LINEAR PROGRAMMING IN MIXED MATRIX GAMES

Dušan Bogdanović752

FEASIBILITY OF THE PROJECT DLS APPLICATION PLATFORM FOR EDUCATION IN INTERNET ENTREPRENEURSHIP

Jelena Kovačević769

BIBLIOMETRIC ANALYSIS OF THE WRITTEN PUBLICATIONS IN INSTITUTES OF UNIVERSITY IN BELGRADE 2011-2016

Nina Ilić, Ivana Veličkovska777

THE IMPLEMENTATION OF THE HYBRID SWOT-AHP MODEL IN THE CASE OF STRATEGIC DECISION MAKING IN THE INFORMATICS INDUSTRY: A CASE STUDY

Dušan Bogdanović, Sandra Ljubić, Sandra Blagojević, Natalija Tomić, Danijel Bogosavljević790

ANALYSIS OF EXPERIENCE OF USERS OF ERAZMUS PLUS PROGRAM FOR THE EXAMINATION OF STUDENTS

Marija Orlović, Maja Stanujkić814

METHODS OF EVALUATION, RANKING AND TECHNOLOGY SELECTION - AHP METHOD

Jelena Paunović, Nenad Ljubisavljević822