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INTRODUCTION

Department of Management and Technical faculty "Mihajlo Pupin" from Zrenjanin have started the organization of International Symposium Engineering Management and Competitiveness (EMC) in 2011. Since 2013 the organization EMC symposium has been supported by the following foreign partners: Szent István University, Faculty of Economics and Social Sciences, Gödöllő, Hungary, Voronezh State University, Faculty of Economics, Voronezh, Russia and University of Montenegro, Maritime Faculty, Kotor, Montenegro.

The objectives of the Symposium EMC are: presentation of current knowledge and the exchange of experiences from the field of Engineering management, consideration of development tendencies and trends in Serbia and the world as well, gathering researchers from this field with the aim of expanding regional and international cooperation, raising the level of professional and scientific work at Technical faculty "Mihajlo Pupin" from Zrenjanin, expanding cooperation with economic and educational institutions and encouraging young researchers within this field. Taking into account that this Symposium is international, the importance of this event is obvious for the town of Zrenjanin, Banat region, Vojvodina and Serbia. Organization of EMC by Technical faculty "Mihajlo Pupin" from Zrenjanin represents this scientific-educational institution as one of the major representatives of economic and social development in Banat.

Within this Proceedings are presented all accepted papers received for VI International Symposium Engineering Management and Competitiveness (EMC 2016). This year at the symposium we have 59 papers and 3 abstracts. The authors come from 15 countries: Albania, Bosnia and Herzegovina, Canada, Croatia, Hungary, Iran, Italy, Libya, Lithuania, Macedonia, Montenegro, Russia, Slovenia, USA and Serbia. The papers are divided into seven sessions: Plenary session, Session A: Management and operation management, Session B: Human resource management, Session C: Marketing and marketing management, Session D: Economy and financial management, Session E: IT management, Session F: Abstracts.

We wish to thank Technical faculty "Mihajlo Pupin" from Zrenjanin and the dean Prof. Ph.D Dragica Radosav for their active role concerning the organization of the Symposium. We are also expressing our gratitude to all authors who have contributed with their papers to the organization of our sixth Symposium EMC.

Symposium EMC become a traditional meeting of researchers in June, every year. We are open and thankful for all useful suggestions which could contribute that the next, VII International Symposium Engineering Management and Competitiveness (EMC 2017) become better in organizational and program sense.

President of the Programming Committee
Associate professor Dragan Ćoćkalo, Ph.D.

Zrenjanin, June 2016.

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VI International Symposium Engineering Management and Competitiveness 2016 (EMC 2016)
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Plenary session

Papers (pp. 3-42):

LINGUISTIC EVALUATING THE EMPLOYEE'S PERFORMANCE

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ABSTRACT

The purpose of this research is that suggests a fuzzy multiple criteria decision making (MCDM) approach to evaluate employee performance. Fuzzy MCDM is an application of fuzzy set theory to MCDM model, in which ratings of alternatives versus subjective criteria as well as the importance weights of different criteria are assessed in linguistic terms, such as very good, good, very important and important, represented by fuzzy numbers. Membership functions of all the final fuzzy evaluation indices for all employees can be clearly developed. A numerical example is used to demonstrate the feasibility of the suggested model.

Key words: Linguistic variables, Performance appraisal, Employee performance, Fuzzy MCDM.

INTRODUCTION

Human resource management has been developing for many years, and day by day it plays an importance role in each organization. Employee performance appraisal, whereby a superior evaluates and judges the work performance of subordinates, is one of the most common management practices using in organization. Performance appraisal systems that are directly tied to an organization's reward system provide a power incentive for employees to work diligently and creatively toward achieving organization objectives.

However, fuzziness seems to pervade most human perception and thinking processes. It is the argument of this study, therefore, that the theory of fuzzy sets is highly suitable to the tasks of employee evaluation and decision-making. To be considering the ratings which can be satisfied both employees and supervisors that avoid conflicting evaluate performance process. Using the theoretical evaluating performance in Human Resource Management for my study and using the mathematical method to evaluate employees, specific apply fuzzy theory for evaluating workers that help managers can make exactly decisions for developing employees and with exactly evaluation leads motivating workers do job with full potential, being satisfied their physical and sense needs that help organizations archive the goals.

Fuzzy models have supplanted more conventional technologies in many scientific applications, especially in the realms of decision making and system analysis. Many attempts have been made to include fuzzy decision making case in business and management disciplines. Applications of fuzzy decision making models have been widely investigated, such as personnel selection in human resource management (Liang & Wang, 1994), fuzzy logic modeling for performance appraisal systems (Shaout & Al-Shammari, 1998), military officer performance appraisal system (Chang, Cheng, & Chen, 2007), as well as compentency-based employee evaluation and selection (Golec & Kahya, 2007).

Many criteria must be considered for developing an employee performance appraisal method. Some of these criteria may be quantitative, such as productivity; some may be qualitative, such as cooperation. Moreover, criteria may be conflicting and may have different importance weights for different decision makers. How to, thus, properly aggregate these criteria is an important issue.

The purpose of this research is that suggests a fuzzy multiple criteria decision making (MCDM) approach to evaluate employee performance. Fuzzy MCDM is an application of fuzzy set theory (Zadeh, 1965) to MCDM model, in which ratings of alternatives versus subjective criteria as well as the importance weights of different criteria are assessed in linguistic terms (Zadeh, 1975), such as very good, good, very important and important, represented by fuzzy numbers. Final fuzzy evaluation indices for all employees can be obtained. These indices can take into account the ambiguities involved in the evaluation process for various subjective criteria and the importance of criteria. These final fuzzy evaluation indices are then defuzzified into crisp values through a ranking approach for final decision making.

METHODOLOGY

Fuzzy Set Theory: Fuzzy set theory was introduced to deal with problems in which fuzzy phenomena exists. The concept of fuzzy numbers presented by Dubois and Prade (1978) is applied to improve the representation of the fuzzily defined system. In a universe of discourse X, the fuzzy subset A of X described by a membership function $f_A(x)$ which associates a set of elements x in X to numbers in the interval [0,1]. The function value of $f_A(x)$ indicates the grade of membership of element x in set A. The larger the function value of $f_A(x)$ is, the stronger the degree of membership for x in A will be.

Fuzzy Number Definition: A real fuzzy number A is described as any fuzzy subset of the real line R with membership function f_A which possesses the following properties:
(a) f_A is a continuous mapping from R to the closed interval [0, 1];
(b) $f_A(x) = 0, \forall x \in (-\infty, a]$;
(c) f_A is strictly increasing on $[a, b]$;
(d) $f_A(x) = 1, \forall x \in [b, c]$;
(e) f_A is strictly decreasing on $[c, d]$;
(f) $f_A(x) = 0, \forall x \in [d, \infty)$,

α -cut Definition: The α -cut of fuzzy number A can be described as Kaufinann and Gupta (1991). $A^\alpha = \{x f_A(x) \geq \alpha,\}$, where $x \in R, \alpha \in [0,1]$. A^α is a non-empty bounded closed interval contained in R and it can be denoted by $A^\alpha = [A_l^\alpha, A_u^\alpha]$, where f_l^α and f_u^α are the lower and upper bounds of the closed interval respectively. For example, if triangular fuzzy number $A = (a, b, c)$, then the α -cut of A can be expressed as: $A^\alpha = [A_l^\alpha, A_u^\alpha] = [(b - a)\alpha + a, (b - c)\alpha + c]$. some main operations of A and B can be expressed as follows:

$(A \oplus B)^\alpha = [A_l^\alpha + B_l^\alpha, A_u^\alpha + B_u^\alpha]$,
$(A(-)B)^\alpha = [A_l^\alpha - B_u^\alpha, A_u^\alpha - B_l^\alpha]$,
$(A \otimes B)^\alpha = [A_l^\alpha . B_l^\alpha, A_u^\alpha . B_u^\alpha]$,
$(A \otimes r)^\alpha = [A_l^\alpha .r, A_u^\alpha .r], r \in R^+$

Methodology for Evaluating Employee Performance:

The First Stage: An Evaluation and Selection Degree

−   **Step1.1. Determine the organization's strategic goals:** Manager should make sure that the employee's goals and performance standards make sense in terms of the company's broader goals. Goals are useful to the extent that employees are motivated to achieve.
−   **Step1.2. Identify the performance factor for the evaluating employee:** This step determines which criteria are to be used by the evaluation teams. For the goal, analyze how employees perform the job and this performance should met the organization's goal. Such as, job knowledge, quality of work, quantity of work or productivity, initiative and resourcefulness, communication, cooperation, planning and organizing effectiveness, attendance and punctuality.
−   **Step1.3. Establish the evaluation degree:** Set proper linguistic scale (e.g. very high, high, medium,

low, very low), and ask the employees rate themselves, supervisors and peers are also rating employees. The linguistic importance set for measure indicators for an organization's goal is:

$Y = \{y_1, y_2, y_3, y_4, y_5\}$
  = {Unimportance, Less importance, Importance, More importance, Most importance}
  = {UI, LI, I, MRI, MI}

These linguistic values can be quantified by triangular fuzzy numbers as presented in Figure 1.
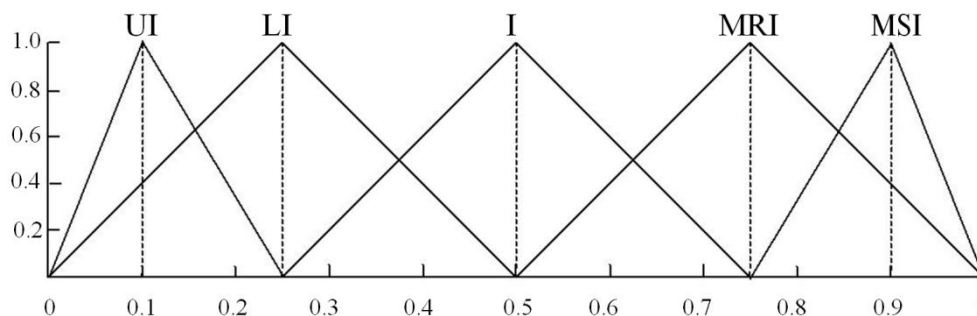
Figure 1: Membership Function for Importance of the Measure Indicators

- Unimportance (UI) = {0.00, 0.10, 0.25}
- Less importance (LI) = {0.00, 0.25, 0.50}
- Importance (I) = {0.25, 0.50, 0.75}
- More importance (MRI) = {0.50, 0.75, 1.00}
- Most importance (MSI) = {0.75, 0.90, 1.00}

Furthermore, the linguistic evaluation set for measuring employees versus qualitative criteria can be defined as follows:

$X = \{x_1, x_2, x_3, x_4, x_5\}$
  = {Poor, Fair, Average, Good, Superior}
  = {P, F, A, G, S}

The membership function for these linguistic values can be defined as presented in Figure 2.
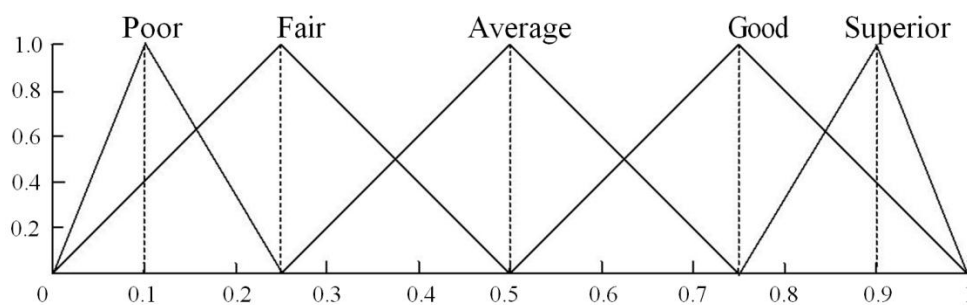
Figure 2: Membership Function for the Employee's Performance

- Poor (P) = {0.00, 0.10, 0.25}
- Fair (F) = {0.00, 0.25, 0.50}
- Average (A) = {0.25, 0.50, 0.75}
- Good (G) = {0.50, 0.75, 1.00}
- Superior (S) = {0.75, 0.90, 1.00}

- **Step1.4. Validity to the employee evaluation performance degree:** The correct evaluation is therefore of crucial importance and correct evaluation must mean that employee and supervisor, to the evaluation decision are satisfied in all circumstances for the right decisions has been made.

The Second stage: Establish a Finding Algorithm Based on the Use of Fuzzy Linguistic Variables

To obtain an objective evaluation of alternatives versus criteria involved in decision-making, the following three steps are necessary.

- **Step2.1. Form the heuristic algorithm for the employee performance:**The first step for evaluating the performance of an employee is to determine the criteria to measure whether this employee performs well or not.
- **Step2.2. Evaluate employee performance by the heuristic algorithm**
- **Step2.3. Determine the fuzzy factor scores for every employee**

The Third Stage: Fuzzy MCDM Approach

- **Step 3.1. Form the fuzzy MCDM model for the employee performance to be selected.**
- **Step3.2. Evaluate employee performance by the fuzzy MCDM model**

NUMERICAL EXAMPLE

Dimensions for evaluating employees are presented with rating explanations to display the employee performance. In the numerical example, we suppose a committee of four decision-makers (one production manager and three production engineers) is responsible for evaluating the performance of ten employees with the production department under eight selected criteria. The best employee with the highest performance value can thus be determined by the proposed fuzzy MCDM model for the aggregation of fuzzy weightings and ratings of employees versus criteria. Suppose a manufacturing company wants to use the suggested fuzzy MCDM model to evaluate the performance of the ten employees of its production division for either payment raise, promotions, layoffs or firing. A committee of four decision-makers D_t, t=1~4, including one production manager and three production engineers, is responsible for the evaluation. Further suppose that the six qualitative criteria (Job knowledge (C_1), Quality of work (C_2), Initiative and resourcefulness (C_3), Communication (C_4), Cooperation (C_5), Planning and organizing effectiveness (C_6)) are selected by the committee for the evaluation of ten employees.

The quantitative criteria for each employee are defined by the score of quantity of work (C_7), and the score of employee's attendance (C_8). The Quantity of work is calculated by the number of the products accessing standard quality of product that employee produced last year comparing with the number of standard produced products. Assume in this case, the standard produced products are 1000 products per year. The rating quality of work of employee 1, for example, is 0.898, (0.898 = 898/1000), if the standard producing quality product of employee 1 is 898 products. See Table 5-6. The attendance and punctuality is calculated by the number of employee's available working days. Suppose the available standard working day per year is 300 days. The score of the available attendance of employee is calculated by the ratio of the numbers of working days over the standard working days. Suppose that the score of employee 1 is 0.990, (0.990 = 297/300), which means that the employee 1 has 297 available working days. See Table 6.

Table 2 and Table 3 present the linguistic values for the importance, evaluating employee's performance and their corresponding triangular fuzzy number.

Table 2: Linguistic Values for Importance and Their Corresponding Triangular Fuzzy Numbers

Linguistic values		Triangular fuzzy numbers
Unimportance	(UI)	(0.00, 0.10, 0.25)
Less importance	(LI)	(0.00, 0.25, 0.50)
Importance	(I)	(0.25, 0.50, 0.75)
More importance	(MRI)	(0.50, 0.75, 1.00)
Most importance	(MSI)	(0.75, 0.90, 1.00)

Linguistic values in Figure 1 are applied by decision makers to evaluate the different importance of the eight criteria as shown in Table 4. Convert the linguistic variables into triangle fuzzy number and from Table 4, the averaged weight of each criterion can then be obtained as presented in Table 5.

Table 3: Linguistic Values for Evaluating Employee's Performance and Their Corresponding Triangular Fuzzy Number

Linguistic values		Triangular fuzzy numbers
Poor	(P)	(0.00, 0.10, 0.25)
Fair	(F)	(0.00, 0.25, 0.50)
Average	(A)	(0.25, 0.50, 0.75)
Good	(G)	(0.50, 0.75, 1.00)
Superior	(S)	(0.75, 0.90, 1.00)

Table 4. Linguistic Weights of Each Criterion

Decision-makers	Criteria							
	C1	C2	C3	C4	C5	C6	C7	C8
D1	MSI	MRI	I	LI	I	I	MSI	MSI
D2	MSI	MSI	I	I	LI	LI	MSI	MRI
D3	MRI	MRI	I	I	I	I	MRI	MRI
D4	MRI	I	LI	MRI	MRI	MRI	MSI	MSI

Table 5: The Averaged Weight of Criteria

Criteria	Average weight
C1	(0.63, 0.83, 1.00)
C2	(0.50, 0.73, 0.94)
C3	(0.19, 0.44, 0.69)
C4	(0.25, 0.50, 0.75)
C5	(0.25, 0.50, 0.75)
C6	(0.25, 0.50, 0.75)
C7	(0.69, 0.86, 1.00)
C8	(0.63, 0.83, 1.00)

The quantitative evaluation data of each employee versus each criterion ($C_7 \sim C_8$) is displayed in Table 6. And Table 7 is displayed the scores of each employee according to the data of quantitative criteria.

Table 6: Ratings of Each Employee versus Each Quantitative Criterion

Criteria	Employees									
	1	2	3	4	5	6	7	8	9	10
C7	898	901	903	895	978	957	984	896	935	970
C8	297	298	295	290	298	295	298	299	289	297

Unit: Products per year (C7), Working days per year (C8)

Table 7: The Scores of Each Employee versus Each Quantitative Criterion

Criteria	Employees									
	1	2	3	4	5	6	7	8	9	10
C7	0.898	0.901	0.903	0.895	0.978	0.957	0.984	0.896	0.935	0.970
C8	0.990	0.993	0.983	0.967	0.993	0.983	0.993	0.997	0.963	0.990

Suppose the ratings assigned by decision makers for each employee versus each qualitative criterion ($C_1 \sim C_6$) are displayed in Table 8. Herein, the linguistic values in Figure 2 are applied for the evaluation.

Table 8: Ratings of Each Employee versus Each Qualitative Criterion

Decision-makers	Criteria	Employees									
		1	2	3	4	5	6	7	8	9	10
D1	C1	G	G	A	S	G	S	G	A	A	A
	C2	G	S	G	G	G	S	S	G	G	G
	C3	A	F	F	F	G	A	A	F	A	G
	C4	G	G	G	A	A	G	A	G	G	G
	C5	S	G	G	F	F	F	G	A	A	A
	C6	P	F	P	P	F	P	P	F	A	P
D2	C1	G	S	S	G	A	G	G	G	A	A
	C2	G	A	G	G	G	G	G	G	A	A
	C3	F	G	F	F	G	F	A	A	A	G
	C4	G	A	A	G	F	G	G	G	G	G
	C5	F	F	F	A	A	A	G	A	A	F
	C6	F	F	F	F	G	A	A	A	F	A
D3	C1	G	G	G	G	S	G	G	S	G	G
	C2	S	G	G	A	G	A	G	G	G	G
	C3	G	F	F	A	G	A	A	A	G	G
	C4	F	F	G	A	A	A	G	A	A	A
	C5	A	A	A	A	G	G	G	A	G	A
	C6	A	A	A	G	G	G	A	A	G	G
D4	C1	S	S	G	G	G	G	G	S	S	G
	C2	G	G	G	S	G	G	G	G	G	G
	C3	A	G	A	A	A	G	G	G	G	G
	C4	G	G	S	G	G	G	F	F	A	A
	C5	G	G	F	F	G	G	A	A	G	A
	C6	G	A	A	G	A	A	G	G	A	G

The averaged ratings of employees versus criteria can be produced as presented Table 9.

Table 9: The Averaged Ratings of Employees versus Criterion

Employee	C1	C2	C3	C4
1	(0.56, 0.79, 1.00)	(0.56, 0.79, 1.00)	(0.25, 0.50, 0.75)	(0.38, 0.63, 0.88)
2	(0.63, 0.85, 1.00)	(0.50, 0.73, 0.94)	(0.25, 0.50, 0.75)	(0.31, 0.56, 0.81)
3	(0.50, 0.73, 0.94)	(0.50, 0.75, 1.00)	(0.06, 0.31, 0.56)	(0.50, 0.73, 0.94)
4	(0.56, 0.79, 1.00)	(0.50, 0.73, 0.94)	(0.13, 0.38, 0.63)	(0.38, 0.63, 0.88)
5	(0.50, 0.73, 0.94)	(0.50, 0.75, 1.00)	(0.44, 0.69, 0.94)	(0.25, 0.50, 0.75)
6	(0.56, 0.79, 1.00)	(0.50, 0.73, 0.94)	(0.25, 0.50, 0.75)	(0.44, 0.69, 0.94)
7	(0.50, 0.75, 1.00)	(0.56, 0.79, 1.00)	(0.31, 0.56, 0.81)	(0.31, 0.56, 0.81)
8	(0.56, 0.76, 0.94)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.31, 0.56, 0.81)
9	(0.44, 0.66, 0.88)	(0.44, 0.69, 0.94)	(0.38, 0.63, 0.88)	(0.38, 0.63, 0.88)
10	(0.38, 0.63, 0.88)	(0.44, 0.69, 0.94)	(0.50, 0.75, 1.00)	(0.38, 0.63, 0.88)

Employee	C5	C6	C7	C8
1	(0.38, 0.60, 0.81)	(0.19, 0.40, 0.63)	0.898	0.990
2	(0.31, 0.56, 0.81)	(0.13, 0.38, 0.63)	0.901	0.993
3	(0.19, 0.44, 0.69)	(0.13, 0.34, 0.56)	0.903	0.983
4	(0.13, 0.38, 0.63)	(0.25, 0.46, 0.69)	0.895	0.967
5	(0.31, 0.56, 0.81)	(0.31, 0.56, 0.81)	0.978	0.993
6	(0.31, 0.56, 0.81)	(0.25, 0.46, 0.69)	0.957	0.983
7	(0.44, 0.69, 0.94)	(0.25, 0.46, 0.69)	0.984	0.993
8	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	0.896	0.997
9	(0.38, 0.63, 0.88)	(0.25, 0.50, 0.75)	0.935	0.963
10	(0.19, 0.44, 0.69)	(0.31, 0.53, 0.75)	0.970	0.990

We have the normalizing of the averaged ratings is presented in Table 10.

Table 10: Normalized the Averaged Ratings

Employee	C1	C2	C3	C4
1	(0.56, 0.79, 1.00)	(0.56, 0.79, 1.00)	(0.25, 0.50, 0.75)	(0.40, 0.67, 0.93)
2	(0.63, 0.85, 1.00)	(0.50, 0.73, 0.94)	(0.25, 0.50, 0.75)	(0.33, 0.60, 0.87)
3	(0.50, 0.73, 0.94)	(0.50, 0.75, 1.00)	(0.06, 0.31, 0.56)	(0.53, 0.77, 1.00)
4	(0.56, 0.79, 1.00)	(0.50, 0.73, 0.94)	(0.13, 0.38, 0.63)	(0.40, 0.67, 0.93)
5	(0.50, 0.73, 0.94)	(0.50, 0.75, 1.00)	(0.44, 0.69, 0.94)	(0.27, 0.53 0.80)
6	(0.56, 0.79, 1.00)	(0.50, 0.73, 0.94)	(0.25, 0.50, 0.75)	(0.47, 0.73, 1.00)
7	(0.50, 0.75, 1.00)	(0.56, 0.79, 1.00)	(0.31, 0.56, 0.81)	(0.33, 0.60, 0.87)
8	(0.56, 0.76, 0.94)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.33, 0.60, 0.87)
9	(0.44, 0.66, 0.88)	(0.44, 0.69, 0.94)	(0.38, 0.63, 0.88)	(0.40, 0.67, 0.93)
10	(0.38, 0.63, 0.88)	(0.44, 0.69, 0.94)	(0.50, 0.75, 1.00)	(0.40, 0.67, 0.93)

Employee	C5	C6	C7	C8
1	(0.40, 0.64, 0.87)	(0.23, 0.49, 0.77)	0.913	0.993
2	(0.33, 0.60, 0.87)	(0.15, 0.46, 0.77)	0.916	0.996
3	(0.20, 0.47, 0.73)	(0.15, 0.42, 0.69)	0.918	0.986
4	(0.13, 0.40, 0.67)	(0.31, 0.57, 0.85)	0.910	0.970
5	(0.33, 0.60, 0.87)	(0.39, 0.69, 1.00)	0.994	0.996
6	(0.33, 0.60, 0.86)	(0.31, 0.57, 0.85)	0.973	0.986
7	(0.47,0.73, 1.00)	(0.31, 0.57, 0.85)	1.000	0.996
8	(0.27, 0.53, 0.80)	(0.31, 0.62, 0.92)	0.911	1.000
9	(0.40, 0.67, 0.93)	(0.31, 0.62, 0.92)	0.950	0.911
10	(0.20, 0.47, 0.73)	(0.38, 0.65, 0.92)	0.986	0.993

The membership function of the final fuzzy evaluation value of each alternative can be obtained. The aggregation of weighted ratings G_i for each employee under each criterion evaluation is implemented and from Tables 6 and 10 the triplets of each final fuzzy evaluation value are presented in Table 11.

Table 11:Final Fuzzy Evaluation Values of Alternatives

Employee	C1	C2	C3	C4
1	[0.35, 0.65, 1.00]	[0.28. 0.57, 0.94]	[0.05, 0.22, 0.52]	[0.10, 0.33, 0.70]
2	[0.39, 0.68, 1.00]	[0.25, 0.53, 0.89]	[0.05, 0.22, 0.52]	[0.08, 0.30, 0.65]
3	[0.31, 0.60, 0.94]	[0.25, 0.54, 0.94]	[0.01, 0.14, 0.39]	[0.13, 0.39, 0.75]
4	[0.35, 0.65, 1.00]	[0.28, 0.55, 0.89]	[0.02, 0.16, 0.43]	[0.10, 0.33, 0.70]
5	[0.31, 0.60, 0.94]	[0.25, 0.54, 0.94]	[0.08, 0.30, 0.64]	[0.07, 0.27, 0.60]
6	[0.35, 0.65, 1.00]	[0.25, 0.53, 0.89]	[0.05, 0.22, 0.52]	[0.12, 0.37, 0.75]
7	[0.31, 0.62, 1.00]	[0.28, 0.57, 0.94]	[0.06, 0.25, 0.56]	[0.08, 0.30, 0.65]
8	[0.35, 0.63, 0.94]	[0.25, 0.54, 0.94]	[0.05, 0.22, 0.52]	[0.08, 0.30, 0.65]
9	[0.27, 0.55, 0.88]	[0.23, 0.51, 0.89]	[0.07, 0.28, 0.60]	[0.10, 0.33, 0.70]
10	[0.23, 0.52, 0.88]	[0.23, 0.51, 0.89]	[0.10, 0.33, 0.69]	[0,10, 0.33, 0.70]
Employee	**C5**	**C6**	**C7**	**C8**
1	[0.10, 0.32, 0.65]	[0.06, 0.25, 0.58]	[0.63, 0.79, 0.91]	[0.62, 0.82, 0.99]
2	[0.08, 0.30, 0.65]	[0.04, 0.23, 0.58]	[0.63, 0.79, 0.92]	[0.62, 0.82, 1.00]
3	[0.05, 0.23, 0.55]	[0.04, 0.21, 0.52]	[0.63, 0.79, 0.92]	[0.62, 0.81, 0.99]
4	[0.03, 0.20, 0.50]	[0.08, 0.29, 0.64]	[0.63, 0.78, 0.91]	[0.61, 0.80, 0.97]
5	[0.08, 0.30, 0.65]	[0.10, 0.35, 0.75]	[0.68, 0.86, 0.99]	[0.62, 0.82, 1.00]
6	[0.08, 0.30, 0.65]	[0.08, 0.29, 0.64]	[0.67, 0.84, 0.97]	[0.62, 0.81, 0.99]
7	[0.12, 0.37, 0.75]	[0.08, 0.29, 0.64]	[0.69, 0.86, 1.00]	[0.62, 0.82, 1.00]
8	[0.07, 0.27, 0.60]	[0.08, 0.31, 0.69]	[0.63, 0.79, 0.91]	[0.63, 0.83, 1.00]
9	[0.10, 0.33, 0.70]	[0.08, 0.31, 0.69]	[0.65, 0.82, 0.95]	[0.60, 0.80, 0.97]
10	[0.05, 0.23, 0.55]	[0.10, 0.32, 0.69]	[0.68, 0.85, 0.99]	[0.62, 0.82, 0.99]

The final fuzzy evaluation values of ten employees, G_i, $i = 1 \sim 10$, of the 10 employees are presented as follows:

G_1 = (0.272, 0.493, 0.773, 0.044, 0.130, 0.042, -0.336),
G_2 = (0.268, 0.484, 0.786, 0.046, 0.126, 0.044, -0.334),
G_3 = (0.255, 0.464, 0.774, 0.045, 0.118, 0.043, -0.327),
G_4 = (0.262, 0.471, 0.748, 0.047, 0.120, 0.043, -0.326),
G_5 = (0.274, 0.504, 0.754, 0.045, 0.136, 0.045, -0.355),
G_6 = (0.276, 0.500, 0.814, 0.045, 0.133, 0.044, -0.343),
G_7 = (0.279, 0.508, 0.800, 0.046, 0.136, 0.044, -0.352),
G_8 = (0.266, 0.485, 0.816, 0.047, 0.127, 0.045, -0.340),
G_9 = (0.263, 0.490, 0.780, 0.047, 0.133, 0.045, -0.353),
G_{10} = (0.262, 0.489, 0.797, 0.046, 0.131, 0.045, -0.353).

This research uses the mean of the left and right integral values. Therefore, the final rating of each employee can be defined. The final ranking values of evaluating employees' performance can easily be obtained. Based on these ranking values, the organization can determine the best employees' performance. According to Table 11, ranking of the performance of ten employees can be produced as in the following table. The ranking value of each employee is calculated in Table 12 showing below.

Table 12: Integral Values of Each Employee

	Left interval value	**Right interval value**	**Mean of interval value**
G_1	0.0221	2.9816	1.5018
G_2	0.0441	2.7644	1.4042
G_3	0.0490	2.6602	1.3546
G_4	0.0469	2.6824	1.3647
G_5	0.0207	3.0577	1.5392
G_6	0.0210	3.0115	1.5162
G_7	0.0154	3.1203	1.5678
G_8	0.0393	2.8092	1.4243
G_9	0.0183	2.9910	1.5047
G_{10}	0.0146	3.0237	1.5192

From the Table 12, we can sort employee with high scores to low scores as displayed in Table 13. Suppose this company wants to offer a position of foreman to one of these employees by their performance. By Table 13, employee 7 should be selected for this promotion because this employee has the highest ranking value.

Table 13: The Evaluated Employee Performance Scores

Sort	Evaluated employee	Score of each employee
1	G_7	1.5678
2	G_5	1.5392
3	G_{10}	1.5192
4	G_6	1.5162
5	G_9	1.5047
6	G_1	1.5018
7	G_8	1.4243
8	G_2	1.4042
9	G_4	1.3647
10	G_3	1.3546

CONCLUSION

In this study, a fuzzy MCDM model for evaluating employees' performance has been delineated and implemented. The proposed model considered evaluated criteria and the different importance weights of criteria to evaluate employees' performance in organizations. A numerical example has been illustrated to demonstrate the feasibility of the suggested model

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THE LEADERS' AWARENESS OF INFORMATION SECURITY

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ABSTRACT

The present paper deals with the information security in the digital age, especially the leaders' awareness of information security. Our study is divided into four parts. The first part introduces the social engineering techniques which are well-known and used in Hungary (request for information or assistance, lending, phishing, unauthorized user rights, identity theft, close up, browsing garbage, desk and drawer browsing). The second part contains information on recent results of our research made on the subject. In the third part, we describe an actual case study based on an unnamed Hungarian organization. The fourth part is devoted to the prevention of the human attacks against the information security of the companies (mapping vulnerabilities and weaknesses, audit, inspection, security policies, directives, regulations, controls ethical hacking).

Key words: digital age, leader, information security, social engineering, prevention.

INTRODUCTION

The digital age first had existed parallel with, but later replaced the information age. The most typical feature of digital age (Kollár, 2014) is that the phenomena, reaching us from the outside world and perceived (heard, seen, etc.) or not perceived by our senses, are digitalized at the earliest possible stage of information processing. These products can be shared with much more people and more quickly (contagious spreading) than conventional goods. When a digital date/information gets into a network environment, it becomes practically undeletable. The digital age started in the first decade of the 21st century. Although its antecedents had been described earlier (e.g. Dyson, 1997), the fundamental works were published later (e.g. Saphiro and Varian, 1999, Levine et al., 2001, Kehal and Sing, 2004, and Lessig, 2004). The digital age has brought some new economic and social models and some processes have begun in the information society with the help of which people (including all the aspects of the concept) have started to use IT devices and applications (hardware and software) on a daily level, and they have become connected with each other regardless of their distance in the physical world (wired world Barabasi, 2014).

Perhaps the most important tendency is that besides money (and sometimes even overtaking it) the information (the sacrifice made for obtaining it, the content, the analysis of its content, etc.) has been gaining weight. Data, information and the subsequent knowledge have become valuable, and it has resulted in more and more cyber crimes (Mitnick and Simon, 2005). The targets of these crimes especially the targets of criminal groups are no longer the individuals, but the corporation itself, the employees, leaders and top leaders. The attacks are no longer simply pranks, but criminal acts causing serious damages to the corporation. While at international, and thus at European level, the companies in almost all the countries address the protection and security of data from IT aspects (Schneier, 2008), the human factor is still a critical area in information security.

FIRST PART – SOCIAL ENGINEER TECHNIQUES

If we want to define first the concept of information, the the security within the concept of information security, we can state that the information is data with meaning/interpretation, while security is a human need (Maslow, 1954), an (undisturbed) status free of any dangers or harms. The need for security has been significantly revalued recently and appeared in all the spheres of life (Kollár, 2015), including information technology, corporate/organizational informatics, too. The company must protect those data, information, applications, IT technology as well as the human resources directly or indirectly related to these. The protection in its narrow sense is a technical-IT task (information security IT security, data security, etc.) while the wider explanation includes the human aspects, too (information security). The human information security is regarded as a critical, and thus more vulnerable, area compared to other areas, because it is a very difficult HR task (conditioning, socialization) to prepare employees to be information-conscious, to recognize and fend off the soft attacks and manipulation (see detailed later) during interpersonal communication (e.g. dialogues, talks, lunches together), as well as to the importance and necessity of setting up a direct and safe even in IT sense working environment (desk, computer, monitor).

Social engineers although they use some IT solutions are rather special because they possess some practical psychological and communication knowledge, and - adapted to the given situation apply it efficiently. The social-engineer-type attackers can be the staff, leaders, interns of the company, professionals dealing with the activities of the company, employees and leaders of suppliers, customers, as well as staff and leaders of corporate customers, clients, partners, visitors, staff of sub-contractors, practically anybody. According to a former survey done by Deloitte Touche Tohmatsu (Oroszi, 2008), 91% of company representatives think that their employees directly or indirectly can pose a threat in IT sense. More than three-fourth of them, however, do not enable their staff to collect knowledge or to update their current knowledge concerning information security. Although in the last eight years, information security awareness has moved in the right direction in Hungary (too) and part of the managers (especially the members of Y and Z generations) are committed (or said to be committeed) to information security, the daily practice entails (as it is described in the third part of the present study) that even a not-too-creatively elaborated social-engineering-type attack can succeed.

A conference was held recently, on March 1-2, 2016, in Budapest, with the participation of more than 100 experts dealing with data protection and information security in Hungary. Out of the most frequently used social engineering technics, the participants highlighted phishing, Trojan softwares, fake websites, unsolicited emails and suspicious attachment. These belong to the computer-based social engineering techniques, and the well-trained IT professionals can destroy the success of such attacks. Most of the experts, however, have only legal and IT engineering qualifications, therefore the aspects related to social sciences (psychology, social-psychology, communication theory) in their attitude is rather shallow, superficial, although they regard the protection against psychological attacks important.

The companies are much more vulnerable to human-based social engineering attacks. These attacks can be as follows:

The attacker either asks some help or information (e.g. a courier, who wants to go to the bathroom and the receptionist allows him/her without checking), or gives false information (e.g. a fake QR-code business card to a company employee).

The aim of phishing is to acquire data from the unsuspicious people, either in person, through email, mobile phone, through fake websites (pharming) which are very similar to the original ones, or through phone (vishing). When phishing can focus on target groups we speak about spear phishing or whaling:
- spear phishing: a specific target group (e.g. the main partners of the company) is chosen and, on behalf of the company, information is requested from them in mail;
- whaling: it is similar to spear phishing, but the target group is the top management of the company. E.g. intelligent prostitutes meet the senior executive and easily obtain confidential information in

intimate situations. Or the children of top managers can also be targets, through them there can be a quick access to the mobile phone, laptop or table of their executive mum/dad.
– Unauthorised use of privileges (piggybacking). It can take different forms, e.g. stealing the login username and password of the staff member, entering by using the ID card of staff (or stealing the card).
– Identity theft is similar to the above.
– The point in closely following somebody is that the attacker e.g. begins to talk to a person having an access control card and, then leads the person, during the chat, to get into the protected area together.
– Shoulder surfing is when the attacker spies on the password by standing behind/next to the person typing in the password.
– Human-based social engineering techniques include dumpster diving, when the attacker analyses the content of wastebins, browses the desk or drawers in order to acquire important information, data and passwords. Most of the people like to keep their username and passwords required for logging into the company systems in arm's length distance, on their desk, computer, display or in their drawer.

SECOND PART – RESEARCH

The opinion of Hungarian executives regarding digital age was surveyed with the help of an online questionnaire of multiple questions between December 2015 and January 2016. The title of the survey was: Organisations in the digital age (Lead researchers: József Poór and Csaba Kollár). All those staff members were regarded as leaders who line managed at least one employee and had decision-making competency in certain questions.

Altogether 406 people gave assessable responses to the questionnaire. The average age of respondents was 36, the youngest respondent was 22, while the oldest one was 75 years old. More than 85% of them had higher education qualifications, and about one-tenth of them worked in the field of information and communication. Leading a company meant, first of all, independence for them and that others can be involved in decision-making (52%) while the second most frequent company management vision (18%) was the clear, authoritarian leadership. As regards allowances, the long-term planning, predictability and performance-based evaluation were mentioned in almost the same proportion, one-third each. The younger ones (lower quarter of age of respondents) mentioned the immediate reward for the work the most frequently. Although more than 60% of respondents considered themselves loyal, but open to changes, especially if they receive a competitive offer (41%), or, if their chances do not decrease (27%). More than one-third of people completing the questionnaire appreciate teamwork and output value of the work the most. The teamwork although its efficiency is undisputable raises the question of information security because the staff and the other members of the project (external staff, sub-contractors) get closer together during the work in joint projects, thus confidential data or information can be more easily distributed to non-competent persons. In this question, one-fourth of respondents stressed the work done and the project-oriented approach. The other parts of the questionnaire raised more targeted questions, focusing on information technology.

More than half of respondents (55%) regard internet and interactive solutions as technology, while 17% put technology in the focus. The stage of IT development among the staff of a company can be indicated by the relation of leaders to digital age and its platforms. Multiple replies were accepted in this question. The most frequent statement was the sharing of (internal) news through intranet or email, the next was the permanent reshaping of the company according to the needs of the digital age, and the third most frequent statement was the corporate-level introduction of social media use. The Hungarian conditions are well reflected in the fact that only an insignificant percentage of the interviewed executives declared that there was a holistic support of processes (the most modern approach) within the whole company as well as out of the company, and the IT integration was flawless in all the areas. As regards the acronyms describing digital age, we surveyed the concepts belonging to acronym CAMSSA (cloud, analytics, mobile, social media, security and augmented reality) with questions starting with "Please, explain in a few sentences what you think about the

following concept…" It turned out from the analysis of the more frequent and more interesting responses that some of the interviewed executives did not even know what cloud computing meant. Many of them, correctly, mentioned the easy accessability from anywhere, platform independency, issues of access rights. Alas, less than 1% of them wrote about the dangers of clouds or the relation between clouds and information security. As regards big data analytics, it was unknown for the fourth-fifth of respondents, but, fortunately, a few others could mention the inherent potential (e.g. sophisticated data mining, use of algorithms, supported decision-making). As regards mobile devices and applications, the leaders were more informed than in case of the other areas. Referring to the social media, the younger ones could reply with actual applications and possibilities of applications. When analyzing the responses from older leaders, there were some "I wish I knew it better" or "I am too old for this" replies. Quite a few respondents mentioned the corporate use of social media, first of all as a marketing or PR tool. Augmented reality was practically unknown for the majority of respondents, or they just wrote something like: "tool of the future", or "a possibility of the future". Regarding the security notion of digital age, we did not want to narrow down the response opportunities by asking the leaders to focus only on data, IT and information security. In spite of this, their replies concerned, almost without exception, the data security, network security, IT system, access codes and antivirus protection. They did not mention the human aspects of information security or social engineering at all.

THIRD PART CASE STUDY

On the basis of our research results and a video case study made on relevant films on Youtube, we called on a leader from the participants of the above mentioned conference who was responsible for corporate data protection and data security, and who undertook to test besides the annually due supervision of IT and data processing regulations - the human information security of staff. The test was supposed to be made strictly with the help of social engineering techniques (not presuming programming knowledge), with the involvement of a company specialized in information security.

The case study below summarises the main events and conclusions of examination made between May 10-20, 2016. The executive requested not to name the company for security reasons. The only thing we can write that it is one of the companies pursuing banking activities in Hungary.

The main actors of social engineering attack against the staff of the company (cast): (1) a pretty woman who asks help from the security guard, (2) a fellow in suit from the banking authority who brought a very important letter to the director, (3) a bike courier who soaked in the rain, (4) the responsible leader himself, as observer (he is not supposed to give any help to the security company hired for the task).

The main target groups of the attack: (1) security guards (subcontractors) at concierge desks working in shifts; (2) receptionists working in shifts; (3) one of the executives, and (4) his secretary; (5) unsuspicious staff, especially (6) a fellow, adhered to whom the colleague of the banking authority can get into the building without being checked.

The main methods used during the attack: (1) entering the office block of the company without identity check, (2) entering the room of the chosen executive without permission, (3) collecting information in the office of the executive, (4) logging in the corporate IT system and databases with the passwords of staff, retrieving information and sending messages.

Main tools and accessories used in the attack: (1) provocative clothes, high heels and make-up, (2) tailored suit, leather shoes and leather bag, (3) large envelope in the leather bag for the targeted executive, (4) fake banking authority access card, (5) biking clothes with big backpack, (6) device suitable for image recording (smart phone).

The aims of the attack: (1) to explore the contacts and habits of the targeted executive, (2) to get into the office block of the company, (3) to access the IT system of the company and to retrieve data from it (specifically the confidential annual plan of a company division), (4) to send fake information on behalf of colleagues to other colleagues.

The main actions of the attack: (1) the pretty woman approaches the security guard (asks his help to find the nearest ATM) and collects information from him about the habits of the targeted executive. The woman learns that the executive is out of his office on a certain day of the week in lunchtime usually between 11:00 and 13:00. He eats out with a redhead woman. The woman also learns that during this time the secretary of the executive usually has a phone chat with her new boyfriend. (2) On the given day, the young colleague from the banking authority waits until the executive leaves for lunch, then, not far from the entrance of the office building, he starts talking to the smokers. He talks about the changes that can be expected in the future and how these would affect the given financial institution. During the conversation, he joins the group walking back to the office building and thus enters the protected part of the office building without any identity check. He asks help in the lift to find the office of the targeted executive. The others help with pleasure. The premise of the executive opens from the room of the secretary, thus he says to the secretary that he is from the banking authority and he has an envelope for the executive. The secretary, while on the phone with her friend, lets him into the room, thus the attacker can record what he sees inside with his phone and makes a video of the business cards he finds in the business card holder on the desk.

(3) The 40 som year old receptionist lets in the bike courier who says he has to use the bathroom urgently after recording his data. The toilet is at the end of the corridor. The attacker enters some rooms at random. He finds nobody in two rooms, he finds the passwords next to the computers, thus he can save all the email contacts of the given colleague.

The attack can be considered a success. On the basis of the images recorded in the room of the targeted executive, his business contact network could have been analysed, his hobby was obvious and it could be concluded that he cheats on his wife at least once a week. By knowing his contacts, his partners could have been called on his behalf, or on behalf of his secretary, he could have been followed in his free time (where and when he goes to do sports), moreover, he could have been blackmailed by using his secret relationship. His personality also could have been stolen/cloned. The attacker playing the role of the bike courier could obtain the relationship network of a colleague, thus he could have sent messages or called his partners on behalf of him or in his place (e.g. he is on sick leave but we need some data). Although the confidential annual plan could not be acquired, but the annual leave plan of another division was collected.

FOURTH PART PREVENTION AND CONCLUSION

There are multiple ways to recognize and to defend at least part of the human-based attack techniques used in social engineering.

The first and perhaps most important thing is that the leaders of the company at all levels should be committed to information security, not just in words, but also from inner motivation. The security standards should not only be imposed, but also observed by the leaders themselves. Even the less trained IT leaders can help to develop security awareness. Everybody can keep their desk tidy or, if not, it should be made clear for them that the office doors must be locked when they step out. Furthermore, it does not require any special investment to use passwords which cannot be easily found out, and to set password protection on the portable devices (tablet, laptop, mobile phone), especially if these are used for business, too. There are several tracking applications for free, which can be uploaded to these devices, thus, when stolen or lost, it is easier to find them. These trackers can determine the position of the device on the basis of GPS or IP address, or the data of the mobile network. The applications, which can run on devices with camera and upload selfies to the cloud, are heavily criticized, but when the selfie made with a stolen device is uploaded to the owner's storage

place in the cloud, it can also help tracking down the device. The white-collar, administrative employees, often by negligence, do not destroy the unnecessary copies of printed documents, maximum tear them in two and throw to the litter bin. The content of the litter bins can be seen not only by the cleaning staff but also those who analyse the content of the large garbage containers standing usually on the back of the office block yard, unattended. Purchasing a paper shredder should not be a problem for any company. Special attention should be given to raising the awareness of staff regarding the emails or attachments which must not be opened (e.g. an email with strange grammar, from a stranger, from a free mail service provider, attachment to run), or when they are found suspicious by the preloaded antivirus software and these warnings should be taken seriously. It is again "only" raising the awareness, that the phone number and email address should be asked from strangers who inquire about confidential data for whatever reason. And the employee of the company should rather call them back following a consultation about the inquiry with the responsible senior information security officer. It is also important, what memories and feelings have those who leave the company. It is the essential interest of the company to separate from the employees in peace (and the line manager has a key role in it), in order to prevent the former employee to take revenge, through maybe the information system. It is also justified to deny access for the redundant employee to all the IT resources and systems of the company (e.g. email, database, intranet).

Oroszi (2008) suggest a three-level training for the users:
−   Training of security awareness with the aim to raise attention and teach basic knowledge. It should have the same content for everybody.
−   During this training, the knowledge can be transferred and expanded in a more specialized way, the skills can be developed and the needs of well-defined user groups can be met.
−   Those who are already professionals can enter further training. It is their responsibility in their day-to-day work to successfully implement the above two levels, to develop and introduce the defense strategy of the company (mapping the vulnerable and weak points, audit, supervision, security standards, principles and regulations) and to carry out information security checks (ethical hacking).

Finally, it should be noted that – besides the above detailed methods – there are some other, not fully accepted methods and processes which can be part of raising human information security awareness and strengthening protection. These are the directed, specific, individual and group hypnosis, role plays, neuro-linguistic programming (NLP), or the deliberate observation of narrative fragments known from narrative psychology, especially in those cases when the employee or the line manager is exposed to higher-than-average information security risk.

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PRACTICE OF SOCIAL PROJECT MANAGEMENT IN RUSSIAN REGIONS

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ABSTRACT

One of the modern features of the development of the social sphere processes is expanding of the variety of spheres of community development - from helping the poor to the research activities of non-profit organizations and informal associations. Every year the number of social projects is rising, along with the increase in the number of commercial and non-profit organizations, ready to assist the social project implementation. We examined a number of aspects of social project management, primarily its initiation motives, formulation of goals and results, coordination of actions. The empirical basis of the study is made in-depth interviews conducted with representatives of business organizations, public authorities and civil society institutions - active participants in the social planning process in the Voronezh region. The divergence of positions of different institutional groups in matters of social project management is represented. As a result, the authors identified the methods enhancing the participation and coordination of actions of public authorities, civil society institutions and business structures in the solution of social problems on the country and region level.

Key words: social project, project management, community development

THE SIGNS OF SOCIAL PROJECTS

In contrast to the concept of "project", developed both in the engineering and in the economic and management disciplines, the concept of "social project" is largely studied by the sociological schools in the context of community development. Modern management concepts, which continues the sociological trend, consider the project from the positivist position. According to the extended version of the Eurasian project management standard (2008), the project is implemented in different spheres of public and society life. The result of the project is a change in the social subject, object, process or phenomenon in the more positive direction (for example, the result of the project can be the creation of the models of social phenomena, social institutions, forms of social organization and social life, the development of management systems, regulations, leading to positive social changes). Social project is characterized by a deep study of social problems, and includes measures not only diagnostic, but also management provision.

Complexity, multi-dimensionality and verstility of social projects, its coverage of the significant number of social and cultural aspects, leads researchers away from trying to give the term a universal definition. The approach to understanding of the concept essence through the description of its characteristics has been widely accepted. Agranovich and A. Moiseeva (2008) distinguish the next target signs of social projects:
– social development of human resources. It includes health, education, science, arts, sport, media programs and projects;
– social services to the population. It concentrates attention on a system of consumer services, housing and communal services, consumer products and food trade;

- social protection of the population. It covers the work of social assistance, insurance, pensions, working conditions and its safety, protection of public order security.

This combination of features is quite complete and, in our opinion, can make the basis for the classification of social projects.

E.Palinka and M. Stsabo (2012) offer the signs that allow dividing the commercial and social projects. Unlike commercial projects, social projects are characterized by the following features:
1. The need in comprehensive approach to assessing the results of the project from the position of value creation for social groups (communities), their close surroundings and the environment (indirect effects of the project must always be evaluated too).
2. The time-delayed effects, which make difficult to forecast and evaluate it.
3. The presence of a positive effect for the targeted social groups, and zero or negative effects for other social groups (for example, projects related to tax incentives and increased tariff).

This system of features is relevant for initiating social projects, in terms of assessing their viability, efficiency and effectiveness.

In the "Comparative analysis of the funds in Europe," (2014) analysts identify three functions of charities, which, in our view, can be logically transposed to social projects:
1. Reallocation. Social projects direct funds of the more affluent to poor, thus it contributes directly or indirectly to the existing distribution system of taxation.
2. Implementation of social changes. Social projects that are not related or indirectly related to market regulators and political constraints, can initiate and maintain positive social change processes.
3. Pluralism. Social projects promote diversity and differentiation in thinking, cultural and educational areas, approaches and practices in the public interest protection. The key factor is the overall effect, created by social projects in the movement towards greater diversity and tolerance.

Thus, it is the social projects which initiate the "searching procedure" to solve political, economic and cultural problems of our time.

THE EXPERIENCE OF COMMUNITY DEVELOPMENT IN VORONEZH REGION

Community development in Russia, including the Voronezh region, is becoming more and more popular over time, increasing its value in the setting and the development of modern society. According to experts, the Voronezh region is related to the regions, leading in the implementation of social initiatives and projects. The spectrum of tasks is rather wide: the assistance in the social protection of the disabled, war veterans, children, development of culture, art, education, science and sports, and much more. Recently several large social projects were implemented in Voronezh, such as: The International Platonov festival, School of effective communication "Repnoe", Book Club "Petrovsky", the project "Open Space", the action "White Flower" and the Governor's Christmas charity ball. The initiators of all projects were representatives of various institutional groups in the region: business structures, government, church, non-profit organizations, individuals and others.

International Platonov Arts Festival, named after the greatest Russian writer of the twentieth century Andrey Platonov, has been held in Voronezh since June 2011. Created under the direct patronage of the Governor of Voronezh Region Alexey Gordeev, the festival has become the major cultural project in the region and one of the dynamically developing multidiscipline festivals in Russia. Platonov annual festival supports work in 4 fields: «Music», «Theatre», «Visual art» and «Literature». All festival events are divided into three programs. «Main program» includes masterpieces, which high artistic values were recognized on the prestigious festivals and widely appreciated by professional critics. «Platonov program» consists of works based on Platonov's literary heritage, or devoted to the

Platonov's work. «Actual art program» is a platform to showcase the creative experiments, the search for new artistic means. The festival costs from 35 to 50 mln. rubles per year, and only 30% is subsidized by the budget funds, 10% is covered by ticket sales, and the remaining cash flows are carried out by private investors and business structures. Non-profit organization "Center of effective communication Repnoe" (School "Repnoe") was established by the famous Voronezh businessman G. Chernushkin in order to provide services of science, culture and art. The school is funded entirely by the private investor. The aim of the project was to gather a group of successful young people, interested in not only the problems of their professions, and to offer them a course of not a study but education. The most renowned experts in their respective fields are invited to be educators here. It is worth noting that the School is free, and any person at the age 18-35 can become a learner, just applying and writing an essay on a given topic. School program is designed for one academic year and it includes seminars, lectures and master classes. After completion of learning the students of the School get certificates confirming their graduation. Best students may also be enrolled in graduate school. The task of graduate students - to come up with relevant to the region social projects and implement them.

Book Club "Petrovsky" had appeared in Voronezh just two years ago, but has become a significant project in such a short time. Book Club is funded by café and a bookshop on 30%, the rest of the project is funded by a private investor. The initiators of the project are G. Chernushkin and graduates of the school "Repnoe". Book Club "Petrovsky" an unusual space, which combines the intellectual bookshop, platform for cultural events and children's creativity activities, and sophisticated European cuisine café. The Club gives the opportunity to develop young talent, giving them space to implement their creative potential. Generally the activities carried out in Book Club, are charitable, designed to engage the residents of the city and the region in solving important social problems of the region.

The next significant social project is the "Open Space" project. It was organized by the company "Instep" and "Investment House". The initiator of the project was businessman A. Shmygalev. The project is fully funded by the business structures. According to the plan of the project, "Open Space" - is an opportunity to meet unique people; a special atmosphere for creative interaction between lecturers and students; new knowledge at first-hand; interesting opinions. The essence of the concept of "Open Space" is the selection of the latest science information on a wide range of issues in the next areas: economics, politics, culture, arts, the humanities and the natural sciences, psychology of interpersonal relations. Everyone over 16 can become a listener. There are no restrictions on education and world view, the main thing is the desire for self-development and for satisfying the interest in topical problems.

Another socially orientated project - a Week of kindness and mercy "White Flower", organized by the Russian Charity League "White Flower". This organization supports the revival of tradition of national holiday of charity and mercy "White Flower" in Russia. The holiday was founded a hundred years ago at the behest of Nicholas II and it united people in helping those who are in need throughout the Russian Empire. In Voronezh, the action "White Flower" is held since 2012. The action is organized by the diocesan department for Church Charity, with the participation of the youth department of the diocese. During the week, volunteers collect donations around the city, and enterprises of the region carry out fund-raising among its employees. The funds collected during the campaign, are directed to the treatment of seriously ill children.

Governor's Christmas Ball has been holding in the Voronezh region for over ten years. Traditionally, during the event the charity auction is held, as well as the concert of young talents, also donations to charity are collected. Since 2010, the project aims to attract additional funding and provide targeted support to talented children in the field of culture, sport and science in the Voronezh region. By tradition, the event is attended by representatives of the political and business elite, cultural and public figures of the region. Over the past four years, there is a positive trend in funds raised through the auctions and private donations. In 2014, the maximum amount has been collected - 77 million rubles. In comparison, 8 million rubles was collected in 2010, 12.1 million rubles in 2011, 37.275 million rubles in 2012, 75,365,000 rubles in 2013. Thus, the review of the largest social projects of the

Voronezh region allows to make a conclusion about a positive trend in enhancing social protection and participation of institutional representatives of all the subsystems of the region in the community development. In our view, the implementation of social activities has a positive effect on the image and prestige of the area, it can increase the level of its social development.

THE RESULTS OF EMPIRICAL STUDY OF THE SOCIAL PROJECT MANAGEMENT FEATURES FROM THE POSITIONS OF VARIOUS INSTITUTIONAL GROUPS OF VORONEZH REGION

Wide spread of social projects in the Russian regions requires comprehension of social project management features and motives of the representatives of different institutional groups. For this purpose, we conducted 25 in-depth interviews with representatives of business, government, civil society institutions, who are active in the development and implementation of social projects in the Voronezh region.

The majority of the businesses (75%) attributed the processes of initiation of social projects with a personal activity and initiative of the specific people and their internal needs. Most of the representatives of civil society institution (65%) associated initiation process with the resolution of personal problems, with a response to the public challenge, with the comprehension of a reality of life, shock, equalization of access to social opportunities. According to one expert: "It is often, when the initiative comes from insiders of the specific problem and aims to align the access to the opportunities that exist in the world, and there is much of healthy pragmatism and very little of romance." 20% of the experts emphasized that the initiative often comes from NGOs.

Almost all public representatives pointed out the important role of public structures and deputies in the process of social projects initiating and a major analytical component of the problem. One expert said: "The initiation of social projects - a dual reciprocal process. On the one hand, there are the situation analysis, the demand of the problem analysis, the analysis of the implementation mechanisms; on the other hand, there are a choice of the customer (often a public entity) of the direction." As believe the majority of business representatives, it is the customer initiator, the project leader, who should assess the viability of the project, its feasibility and the social need for the project; moreover, 40% noted the need for the participation of experts, opinion polls, social support services.

The vast majority of civil society (80%) noted the need for participation of experts, professionals and analysts, sociological research in the assessment.The majority (60%) of public and administration representatives associated evaluation of social projects with expert commissions, professional analysts, 45% emphasized the importance of feedback, participation in consumer evaluation procedure. Almost all business representatives responded that it is the leader, the customer of the project at the start of it, who formulate goals and objectives of the project, selects the methods of achieving the goals, mobilize resources. More than 60% of the civil society representatives said that these functions are performed by the project initiator. Other representatives' opinions are differentiated and based on the concrete experience of implementation of projects. More than 70% of the public authorities representatives believe that the above-mentioned functions are the prerogative of the executors of the project. As emphasized by some of the experts, "direct executor is responsible for everything, the customer only formulates direction."

On the question of the coordination of participants of the project interests' mechanism, almost all the experts of the business community said they did not see the difficulties in the coordination of interests. Only one expert emphasized that the coordination of interests is very difficult and long, when one of the parties the state, and is easy when there are one customer and one executor. Most of the civil society representatives (75%) noted the presence of a specific instrument for effective coordination of participants of social projects interests: meetings, round tables, the formation of initiative groups, opinion polls, etc. Among the key problems of coordination of interests, experts pointed out: conflicts

of interest, related to the distribution of the budget, allocation of responsibilities of participants, authoritarianism of the customers, focusing on key areas.

Views of the public authorities representatives divided on this point. Most of the experts (63%) described the tools of coordination of interests of participants: a written confirmation of local communities (target groups), treatment defining the goals and objectives of social events, laws, regulations, constant monitoring. The rest pointed the difficulties of coordination: the lack of effective managers, the inability to harmonize the interests of participants in the process. 71% of business representatives responded positively on the question of the compatibility of intensive ongoing activities of the organization and implementation of social projects, the rest (29% of the experts) denied the efficiency of such a combination, seeing it difficult; they believe that it is better when social engineering experts are engaged.

Almost all representatives of civil society organizations believe that the current activities of the organization and implementation of social projects is quite compatible things, but one-third of the experts pointed out that the current activities may be perished. Most of the representatives of the public authorities believe that the implementation of social projects is compatible with the current activity only under certain conditions: a serious interest of the participants, the intensive activity in the current goals, the presence of dedicated structures with separate funding and personnel.

On the question: "At which point of the social life of the project there are the greatest difficulties?" A third of the representatives of the business community have pointed out the initiation, because it is difficult to overcome the inertia. The same number of experts noted that difficulties might arise at any stage.

Almost half of the representatives of civil society organizations believe that the most difficult time - the implementation phase, when there is a simultaneous combination of several positions. Most of the public authorities representatives consider as the most problematic stage of initiation and fixing the project goals, and a third of the experts see problems in completing the project, linking problems with the transfer of results into operation, delays, etc.

On the question: "How to evaluate and measure the impact of the social project" almost all respondents suggested different ways of evaluation: comparison of objectives and results of the quantitative indicators, a survey of consumers, the number of participants and beneficiaries, involvement, the degree of satisfaction of the initiator, etc.

On the question "Who should evaluate the results of the social project?" the majority of business representatives said it should be the leader, initiator of the project. The views of representatives of civil society institution has divided on this issue. Almost half of the experts pointed out that consumers – beneficiaries should assess the outcome of the project. A third of the representatives of civil society consider that the evaluation results should be provided by the experts. Most of the public authorities representatives believe that the evaluation of the result of the social project should be provided by all project participants, including the bodies of municipalities. Table 1 summarizes the results, which shows the divergence of positions of representatives of different institutional groups in matters of social project management.

Generally, social projects play a consolidating role in the relations between the state, business and civil society institution, as they give the possibility of uniting this structures for the realization of joint goals and work on joint tasks. Also the stabilizing role of social projects should be noted, since they have a beneficial effect on the climate in society and social development of future generations. It can be concluded that social projects have a tremendous impact on a quality of life and play an important role in the development of modern society and the development of the region as a whole.

Table 1: The discrepancy between the positions of the participants of community development in the region

Comparative characteristics	Representatives of the business community	Representatives of civil society institutions	Representatives of public authorities
Source initiation of social projects	Personal activity, self-realization	The resolution of personal problems, insight, alignment, access to social opportunities	Analytical work of public authorities
The subject of assessing the adequacy of the social project	Leader, Customer	Expert community, Specialists	Expert community
Problems of coordination of interests of participants of the project and their decision	No problem	The distribution areas of responsibility and budget, Customers authoritarianism To solve the problem must be the creation of expert groups	The lack of effective managers. To solve problems requires constant monitoring
The most difficult stage of the project life cycle	Initiation, overcoming inertia	Implementation of the project, the project mid	Completion, transfer results
The subject of the evaluation result of the social project	Leader, Initiator	Consumers, Experts	All participants of the project

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COMPETITIVENESS ANALYZED FORM THE PERSPECTIVE OF CULTURAL DIMENSIONS

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ABSTRACT

Competitiveness and cultural dimensions are both widely researched areas. While competitiveness captures the business environment and productivity of the economies, mainly measured by "hard data". The cultural dimensions represent underlying values behind dominant behaviors which differentiates certain groups of people from others. In this analysis the author was interested in finding a connection between these two factors and experimented with predicting the country's GCI score from the cultural dimensions alone, using data on Hofstede's cultural dimensions and competitiveness scores from the Global Competitiveness Reports. Two models were applied to study the data: SVM classification and multivariate linear regression. The result showed that the cultural dimensions have a significant connection to the cultural dimensions. The classification model showed high accuracy to predict if GCI is high or low, however, the accuracy of the linear regression model, despite its significance, due to the high variance is not accurate enough to predict the absolute value of the Global Competitiveness Index based on the cultural dimensions alone.

Key words: competitiveness, cultural dimensions.

INTRODUCTION

The concept of competitiveness originally were developed to measure the performance potential of companies. The models which describe the competitiveness of nations stem from these (Csath, 2010). There are several definitions and approaches, one of the most quoted one is the so called "diamond model" created (and later developed further) by Porter (1990), where the conditions of the competitiveness is beyond the firm strategy and structure, but also certain conditions need to be there in the operating environment, such as appropriate demand, basic infrastructure and related supporting industries. Government policies should facilitate the effective operation of these conditions. This model could be interpreted both at micro and macro level. In this analysis I build on the data of the World Competitiveness Report, which defines competitiveness as "the set of institutions, policies, and factors that determine the level of productivity of a country" (Schwab, 2015).

Culture is a long researched area of social sciences and there are several approaches. Poór (2006) highlights three approaches. The culture independent view claims that the development of technology will diminish cultural differences and cultures are converging. Others see both convergence and divergence of various aspects of culture. The followers of the culture dependent view considers culture as a strong influencing factor on collective behavior and outcomes, and therefore they argue that management and business practices should be adapted to the particular culture to improve effectiveness. Hofstede is a representative of the latter view and he established the theory and performed extensive research on measures and comparison of cultures.

One way Hofstede defined culture is "the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede, Hofstede and Minkov 2010). Their underlying assumption is that cultures can be compared based on certain dimensions, from

which the dominant values and beliefs of a particular group may be described. In the literature there are many models for constructing the dimensions, which are typically defined as a scale between two conflicting values, such as short term or long term orientation. Neither end of the scale is better or worse, moving towards both sides could create value, and exaggeration of any of them could be harmful (Hampden-Turner-Trompenaars, 2000).

One of the most known is Hofstede's cultural dimensions model, which originally included 4 dimensions: power distance (high vs low distance), uncertainty avoidance (vs. uncertainty tolerance), individualism (vs. collectivism), masculinity (vs femininity). The model was later extended by two another dimensions: long term orientation (vs. short term) and indulgence (vs restraint). Hofstede also established a methodology to measure these cultural dimensions. His original work included over 100 thousands of questionnaires in 50 countries within the IBM organization (Hofstede, 2001). Since then the research is extended beyond companies and the cultural database is maintained regularly.

PURPOSE OF THE ANALYSIS

Competitiveness measures mainly focus on the "hard data", such as macroeconomic indicators, although there are also indicators which reflect the perception of the efficiency of certain mechanisms, e.g. the protection of intellectual property. However, cultural aspects are not explicitly considered in the data. Do cultural traits imply certain outcomes on competitiveness? If yes, then do the cultural dimensions have some predictive values over competitiveness? These questions inspired my analysis, which aims to find connections between the cultural dimensions score and competitiveness score of countries.

The purpose of this study is to analyze to what extend the competitiveness of the countries is predictable from cultural dimension scores.

DATA

The competitiveness measure was taken from the Global Competitiveness Report database. It includes 10 years of data between 2006 and 2015 for 151 countries. For the purpose of this analysis, I only took the aggregated GCI score, based on which countries are ranked. The GCI score is expressed on a continuous scale between 1 and 7, 1 being the worst and 7 being the best score. Data for the cultural dimensions was taken from the Geert Hofstede & Gert Jan Hofstede website. The database includes 65 observations, 4 of these are aggregated data across certain regions, 61 relates to individual countries. The cultural dimension scores are measured on the discrete scale of 0 to 100, all scores are integers.

All the 59 countries in the cultural dataset also have 10 years of GCI score. In the analysis table merged the two databases, which resulted 590 observations of GCI over 10 years, which was the dependent variable, the 6 cultural dimension scores were the independent variables. I divided the dataset into "High GCI" and "Low GCI" groups. A "High" and "Low" category was defined by hierarchical clustering, separating the data at GCI value of 4.8. This was my starting point for the analysis (Figure 1).

ANALYSIS PROCESS

The data was analyzed by two approaches: 1. a classification model to classify "High" and "Low" GCI categories, and 2. a multivariate linear regression model was applied to predict the actual GCI values.

The data was separated into a training set and test set. I wanted to make sure that all observations from the same country falls into the same set, so that the model is tested on countries which are not included in the training set. Therefore the countries were randomly assigned to training and test sets. This

resulted 39 countries and 390 observations (~66%) in the training set and 20 countries and 200 observations (~34%) in the test set. Both models were built based on the same training set and tested on the same test set.
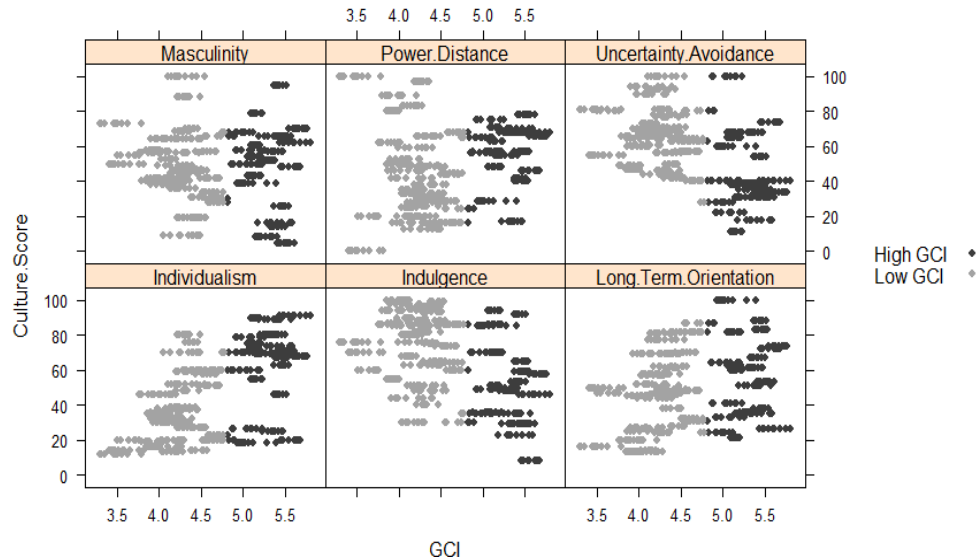
Figure 1: Cultural dimension scores in function of GCI by cultural dimensions (Author's own edition based on the referenced data sources)

I used a support vector machine (SVM) algorithm to build the classification model. Originally SVM was developed for classifying linearly separable data while maximizing the distance (margin) between the two data groups. This was then extended to multidimensional data where the separation is made by a hyperplane in the "feature space". Soft margin solutions were implemented for linearly non-separable data, "where penalties" are introduced for margin violations. The concept was also extended to non-linear models (Chang, C.-C., Lin, C.-J. 2001). For the regression analysis I used a linear multivariate model with the cultural scores as the independent variables and the GCI score was the dependent variable.

RESULTS

The classification model showed 24 cases out of 390 data points (1.8%) misclassified on the training set and 12 out of 200 cases (5.5%) on the test set. This is in line with the expectations that the test set shows somewhat more inaccurate results. The most misclassification occurred around the 4.8 value separating "High" and "Low" GCI categories (the median GCI of the misclassified cases is 4.89, and the GCI range of the misclassified cases is between 4.55 and 5.23). Also, there is some bias in the predictions: the mean GCI for the training set is 4.7 and 5.03 on the test set versus the 4.63 of the actual GCI. Figure 2 shows the correctly and incorrectly classified countries by each of the cultural dimensions.

The regression model predicted the GCI values. The correlation between the training data and the actual GCI is 0.78, and 0.75 on the test set. This prediction is not accurate enough to rely on the value of the predictions, however, it shows a strong enough relationship to assume that the cultural dimensions are somehow connected to the GCI.

Each of the countries had 10 years of GCI data and also 10 predictions. Because the model uses the same inputs for each country, for the visualization of the results I showed the mean prediction values over the mean GCI values, the training and the test set shown in different colors. The line on the chart shows the actual mean GCI value (Figure 3).
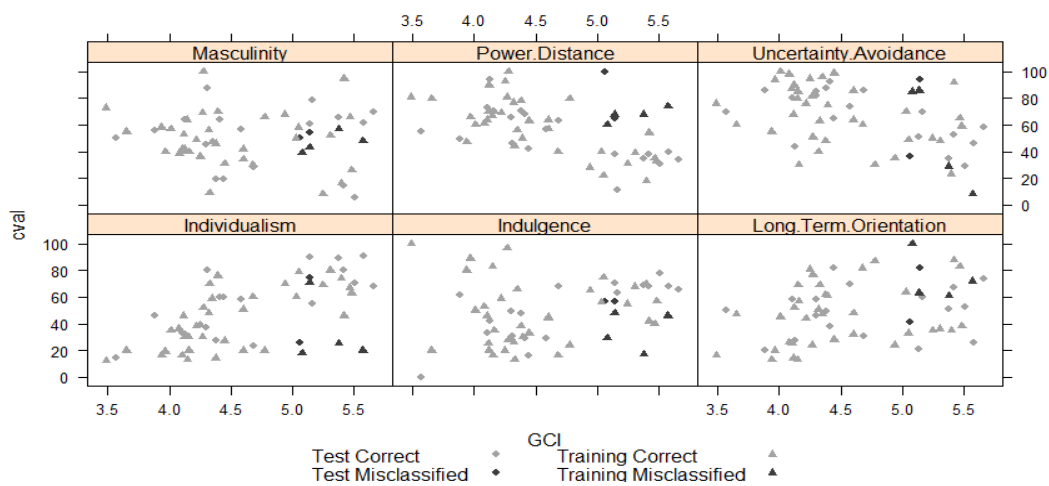
Figure 2: Classification results of the training set and test set shown in relation to each of the cultural dimensions
(Author's own edition based on the referenced data sources)
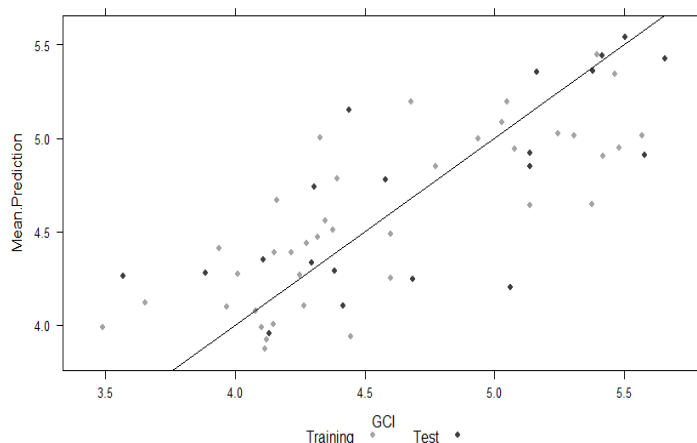
Figure 3: Mean prediction values of the countries over the mean GCI data by training and test set
(Author's own edition based on the referenced data sources)

Figure 3 suggests that the variance of the predictions is large, but the bias is reasonably low. The mean GCI for the training set is 4.57, the test set is 4.72, while the actual GCI mean is 4.63. The summary of the model is on Figure 4.

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	4.7306499	0.1574552	30.044	< 2e-16	***
ind	0.0055064	0.0011646	4.728	3.19e-06	***
indiv	0.0034908	0.0011693	2.985	0.00302	**
masc	-0.0012731	0.0011087	-1.148	0.25158	
power	-0.0116555	0.0015005	-7.768	7.41e-14	***
time	0.0130460	0.0010723	12.166	< 2e-16	***
uncert	-0.0066711	0.0007897	-8.448	6.23e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residuals summary:

Min	1Q	Median	3Q	Max	Sum Sq	Mean Sq
-0.94468	-0.25712	0.00671	0.23422	0.81792	48.676	0.1271

Residual standard error: 0.3565 on 383 degrees of freedom
Multiple R-squared: 0.6071, Adjusted R-squared: 0.6009
F-statistic: 98.63 on 6 and 383 DF, p-value: < 2.2e-16

Figure 4: Linear regression model summary
(Author's own edition based on the referenced data sources)

The histogram of the residuals shows that their distribution is close to the normal distribution (Figure 5). This suggests that the model captured most of the non-random patterns in the data, and the remaining information is mainly random "noise".
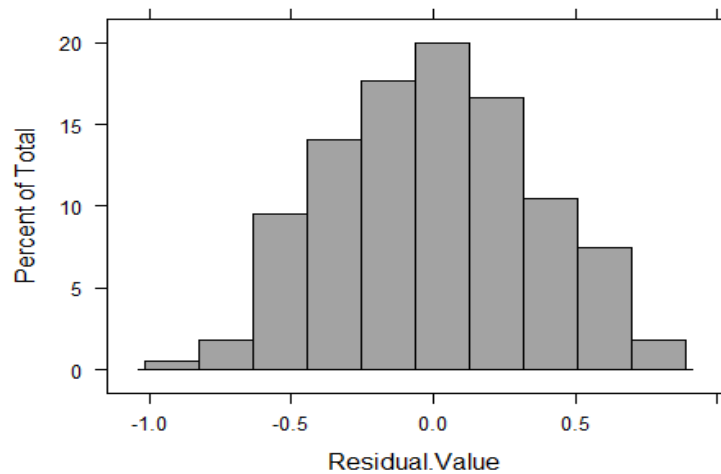
Figure 5: Distribution of the residuals
(Author's own edition based on the referenced data sources)

LIMITATIONS OF THE ANALYSIS

The sample size of 590 is not too large. Therefore only test set and data set was used, cross validation set was not applied to avoid fragmenting the data too much. Both models were ran with one set of parameters only instead of searching for the optimum set of parameters. The cultural dimension scores were assumed constant during the 10 year period, this meant using the same scores 10 times in the prediction. Although this compromise may be accepted on the ground that cultural scores less likely to change significantly over time than the competitiveness, this causes some repetitive occurrence of the predictor variables. The model is prone to the outliers, therefore in this form is not robust enough to make general claim based on it only.

CONCLUSIONS

The cultural dimensions show significant connection with the Global Competitiveness Index, but it is not strong enough to make accurate prediction solely based on the cultural dimensions due to the large variance. However, the results suggest that the connection between competitiveness and the cultural dimensions exists. It obviously not direct cause and effect relationship, but it is a good starting point to design further research to capture details on the possible explanations.

Some of the dimensions don't appear to be as impactful on competitiveness as others. Power distance, uncertainty avoidance and masculinity have a negative coefficient (i.e. the lower they are the higher competitiveness is predicted), while individualism, indulgence and long term orientation has a positive relationship. As competitiveness is related to the business environment and economic productivity of the country, this should be interpreted only in this context based on this analysis, i.e. some cultural dimensions may be more favorable for doing business than others. In fact, the definition of the competitiveness and its indicators themselves may reflect the traits of the culture in which it was created, so it could also influence the outcome of the predictions.

The results only provide information on the set of the 6 dimensions together, the individual effect of each of the cultural dimensions on the GCI needs further research. This may include different methodologies to understand better the sensitivity of the GCI score to the individual cultural

dimensions. Despite the limitations of the analysis, the predictions show that there is connection between culture and competitiveness, and this may set a starting point for further, more detailed research.

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Source of data:

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Download link: http://www3.weforum.org/docs/gcr/2015-2016/GCI_Dataset_2006-2015.xlsx

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Data on cultural dimensions: File: "Six dimensions in 0-100 range.csv". Download link: http://www.geerthofstede.com/media/2788/6%20dimensions%20for%20website%202015%2012%2008%200-100.csv

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TOP MANAGEMENT ROLE IN IMPROVING THE STATE OF QMS THROUGH MANAGING OF EMPLOYEE MOTIVATION

UDC: 005.6:331.101.3

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ABSTRACT

The role of top management in quality management system (QMS) is undeniable and emphasized by many researchers. On the other hand, the employee motivation and involvement are recognized as one of the main prerequisites for successful TQM implementation. Although investigated to certain extent, the connection of the top management and the employee motivation and involvement on the successful transition from ISO 9001 QMS to TQM is still a vague area. The main objective of the presented research is to design a conceptual model that will simulate the influence of top management on the state of QMS, through optimal management of employee motivation. For that sake, the selected influential factors of ISO 9001, TQM and employee motivation are used as initial set of variables for creation of generalized conceptual model. The preliminary conceptual model is extended through comprehensive research of variables correlations in order to achieve balance of the state in upgraded model. The advanced model introduces the correlation dependencies between the variables of treated areas. This conceptual model will serve as a basis for design of a dynamic SD model which will enable experimentation in direction of fostering the transition of ISO 9001 towards TQM practices through management of employee motivation.

Key words: top management, employee motivation, QMS, ISO 9001, TQM.

INTRODUCTION

In the contemporary dynamic environment, the traditional business organizations have substantial problems when coping with the challenges of the modern corporate operations. Advanced managerial concepts emerged in many world-class companies as mechanisms for reaching the objectives. One of them is the Total Quality Management - TQM, (Oakland (1995). The TQM implementation enables the organizations ability for rapid adaptation to the changes in the environment, which enables TQM organizations to become competitive on the global market. Quality management systems like those in accordance with the ISO 9001 standard in many organizations represent initial stimulation for further TQM development. The ISO 9001 standard became commonly accepted in the management of the organizations. Indeed, with the ISO 9001 standard, organizations demonstrate quality and confidence while meeting the expected requirements of the clients. Adequate preconditions are needed for introduction of advanced managerial concepts. Employee motivation is one of them. If the employees are not motivated enough, their participation in the improvement of ISO 9001 will be only formal and will not lead to further development of the QMS and integration of the TQM practices in the process. Poor motivation of the employees may cause inertia and resistance to change, leading to poor introduction of new methodologies such as the TQM. Inclusion of employees gives them an opportunity to improve their personal abilities, to gain appropriate knowledge, to increase their confidence, to express the individual creativity and to participate in solving specific problems (Rice,

1993). The opportunity to participate represents an inspiration for active engagement of the employees, thus generating drastic change of quality approach in their performance. TQM philosophy represents an integral part of the creation of a climate in which employees are encouraged to locate the quality problems and find a solution for them. Top management has a crucial role in establish quality policies, providing resources, stimulating involvement of the employee. The role of top management is to be a guide to pursuit of continuous performance improvement (Singh, Dubey et al., 2011). In that direction the main research challenge presented in this paper is to design a conceptual model that will simulate the influence of top management on the state of QMS, through optimal management of employee motivation.

CONNECTION BETWEEN TQM, ISO 9001 AND EMPLOYEE MOTIVATION

Numerous studies in the last period are oriented towards determination of the connection between the ISO 9000 series and the human resources management in the context of quality management (Spasojević-Brkić, 2009). The paper of Sila and Ebrahimpour (2003) explains that the top management plays a crucial role in the successful implementation of the TQM within the organizations. A similar view is confirmed in the paper of Fotopoulos et al. (2010), which noted that the role of the top management in the application of the TQM practices in the performance of the organization is significant. The objective of study of Ugboro and Obeng (2000) is to provide empirical assessment of the assumed relationship between top management commitment, employee empowerment, job satisfaction and customer satisfaction. According to Respati and Ami (2014), employee behavior, such a quality awareness, employee competence and motivation to create quality products becomes a strategy to improve organizational performance. In the paper of Brown and Wiele (1996) it was concluded that the role of the top management whose responsibility is to provide adequate training for the employees for transition from the ISO 9000 series towards the TQM is emphasized. According to Pool (2000), the implementation of the TQM principles in organizations with developed organizational culture is proportionally dependent on the organizational learning, which enables successful start in introducing advanced methodologies. The view of Rice (1993) is that "only the employees can improve the process, and just only if they are motivated". Tang and Wu (2010) highlight that top management commitment increase loyalty of the employees, which leads towards increasing of their level of satisfaction. Chen (2009), represents similar views in his study. The continuous improvement within the organizations is enabled through introduction of mechanisms for motivation of the employees, according to Swartling and Poksinska (2013). According to Das, Paul et.al. (2008), top management should develop philosophy to involve the employees in the TQM effort and improvement activities. This brief literature overview brings several conclusions. The successful operation of ISO 9001 is a precondition for integration of TQM practices in the organization. The role of the employees can be of significant importance in the process of transition from ISO 9001 to TQM within the organizations. Therefore, inclusion of employees should be continuously encouraged and strengthened, through managing strategy of top management. Motivation is the mechanism that can increase the involvement and dedication of the employees in the process of transition from ISO 9001 to TQM. Still, no papers with structuralized generalized conceptual model of the transition from ISO 9001 towards TQM through management of employee motivation have been found.

RESEARCH METODOLOGY

The research methodology to design such conceptual model was presented in (Stanojeska, Minovski et al., 2015), which explains all methodological steps in order to identify influential factors. First of all, analysis of the literature in the pinpointed areas was conducted. The comprehensive literature research encompassed Emerald, Scopus and Ebsco, in the period from August 2012 to February, 2015. Using by following key words: TQM, elements, influential factors and critical factors, total of 25 papers was filtered. Research of the literature that encompassed Ebsco and Scopus, in the period from July, 2014 to February, 2015, has been conducted in order to identify the influential factors in the area of motivation of employees. A total of 29 papers published in English have been found, according to

these key words: motivation, involvement, satisfaction and employees. The influential factors in ISO 9001 are listed in the requirements of the quality system i.e. they are included in the items of the standard.

After the identification of numerous key factors, a selection of the most influential factors has been carried out and the connection between them has been studied. The simplification enables a kind of filtration of the essential factors that have strongest influence on the treated problem out of all identified influential factors. In the following step, the conceptual model for the improvement of the state of QMS which means a transition from ISO 9001 towards the TQM depending on the motivation of the employees, has been designed.

STRUCTURAL DETAILS OF CONCEPTUAL MODELS

The basic conceptual model is designed on identified critical factors in the QMS areas: strong commitment of top management, employee involvement, customer focus, organizational learning, continuous improvement and reward and job satisfaction as critical factors in the area of employee motivation (Figure 1). It is obvious that the inclusion of the employees shall increase if their motivation is on a higher level. On the other hand, the motivation of the employees will increase through rewards and work satisfaction. The rewarding depends on available budget for the system of quality management, which positively affects the state of the ISO 9001 and TQM. Based on the positive correlation it is very clear that the increase of the motivation will lead towards higher level of inclusion of employees, higher dedication of the top management, strengthening the focus on the clients, intensifying the organizational learning that leads towards continuous improvement of the quality management system, and generally improvement of the organizational performance. The states of TQM and ISO 9001 are negatively correlated with the budget for QMS, because the higher investment in QMS, cause budget cuts.
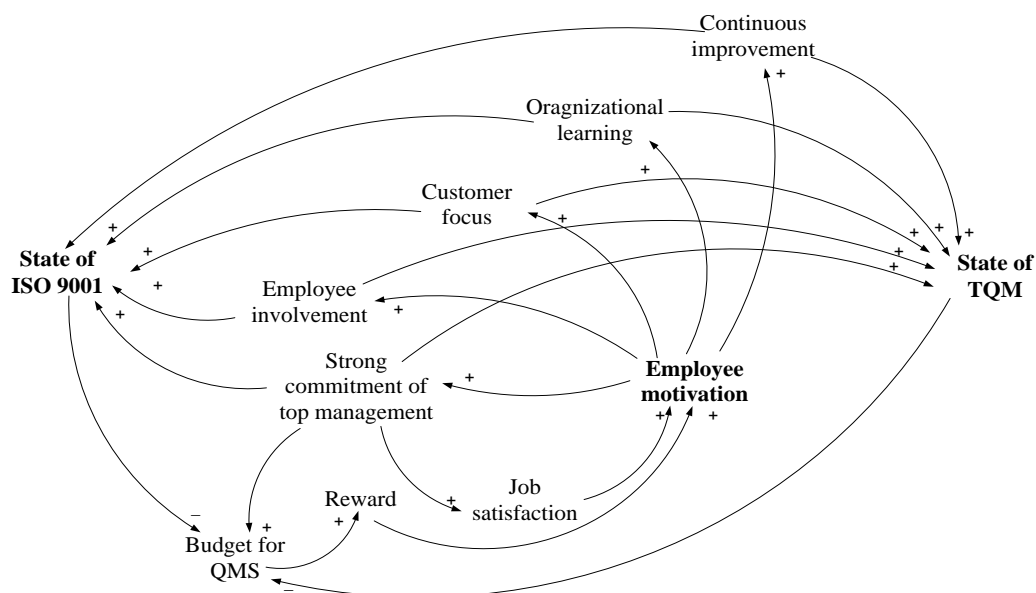
Figure 1: Initial conceptual model of transition from ISO 9001 towards TQM depending on the motivation of employee

Advanced research of interactions between variables in the conceptual model requires the need for additional involvement of some variables to achieve balanced state in the upgraded model, presented in Figure 2.

DISCUSSION

The model is an extension of previous model used to capture the managerial implications and optimize the process of motivation management in direction to enable quality management system development. The validation of the model is based on literary sources. The interactions among the correlation dependencies of variables presented by numerous authors have been found (Table 1).
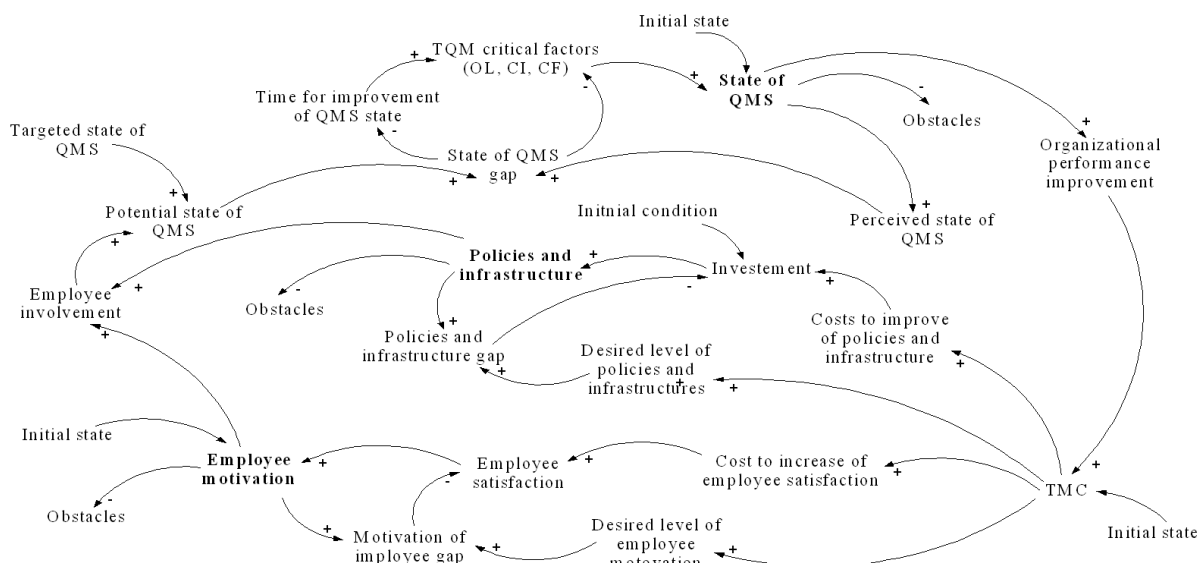
Figure2: Extended conceptual model of improvement of QMS state depending on the motivation of employee

Table 1: Validation of correlations between variables in the model

Correlation among variables		Literary source
Top management commitment	Policies and infrastructure	Kimutal et al. (2013).
	Employee motivation	Ugboro et al. (2000), Malik et al. (2010), Kappelman et al. (1995) Das et al. (2008), Kanji (1998), Sultan (2012).
	Organizational performance	Khan (2011).
	Obstacles in TMC	Sebastianelli et al. (2003), Soltani et al. (2005), Dubey et al. (2012).
Employee involvement	State of QMS	Malik et al. (2010), Das et al. (2008), Respati et al. (2014), Cotton (1993), Tang et al. (2010), Dubey et al. (2012).
	Policies and infrastructure	Jayaweera (2015).
	Employee motivation	Ugboro et al. (2000), Govender et al. (2010), Daily (2003), Das et al. (2008).
	Obstacles in EI	Sebastianelli et al. (2003), Dubey et al. (2012).
State of QMS	Organizational performance	Khan (2011), Lin et al. (2006), Talib et al. (2010), Mardani et al. (2012), Malik et al. (2010), Respati et al. (2014).
	Organizational learning	Sisnuhadi (2014), Tamayo-Torres et al. (2014), Das et al. (2008), Hafeez (2010), Pool (2000), Koh (2010), Ugboro (2000), Sisnuhadi (2014).
	Continuous improvement	Sisnuhadi (2014), Mardani et al. (2012), Koh et al. (2010), Das et al. (2008).
	Customer focus	Sisnuhadi (2014), Piskar (2007), Das et al. (2008), Zhang (2000), Hackman et al. (1995), Mardani et al. (2012), Koh et al. (2010), Dubey et al. (2012).
	Obstacles in QMS	Sebastianelli et al. (2003), Soltani et al. (2005), Dubey et al. (2012).

A comparison of basic and expanded model suggests several findings. First, the results of conducted research showed that the impact of top management commitment to employee involve, can be seen

generally in two directions. One direction is through development of appropriate policies and infrastructure and the other one through increasing the employee satisfaction. Second, according to eight quality management principles of ISO 9000 series, which are stimulation for further successful implementation of TQM, it can be concluded that the both variables, state of ISO 9001 and state of TQM, can be integrated in the variable named state of QMS. The states of QMS, policies and infrastructures and employee motivation, are negatively associated with obstacles connected to each of them. The increase of gap between desired and actual level of motivation, causes the decrease of level of employee satisfaction. The same effect pursuit variable policy and infrastructure gap on variable investment in politics and infrastructures. The increase of state of QMS gap will not lead to growth of level of implementation of TQM critical factors. Based on the positive correlation in the upgraded conceptual model, it is obviously that if the top management enables higher level of employee satisfaction, improvement of policies and infrastructures can increase the involvement of employees, which means higher level of potential state of QMS. Third, the potential state of QMS is related with variable named "TQM critical factors", consisted of three critical factors: organizational learning (OL), continuous improvement (CI) and customer focus (CF). Based on literature, the significance of each of the factors in the input stream on QMS state, has been studied. The paper of the author Sisnuhadi (2014) presents the correlations among the TQM soft factors. The results are as follows: continuous improvement $R^2 = 0.54$; organizational learning $R^2 = 0.36$; customer focus $R^2 = 0.28$. Using normalization the weigh factors were calculated, because these factors are integral part of the group of soft TQM factors. The determined participations of each of three factors in the main variable TQM critical factors are: CI (%) : OL (%) : CF (%) = 46 : 30 : 24. The improvement of the state of QMS generates positive impact on organizational performance that leads to higher level of the top management commitment.

CONCLUSION

Further extended analysis of the relations between variables in the previous conceptual model was the base for design of new, upgraded conceptual model that will simulate the influence of top management on the state of QMS, through optimal management of employee motivation. The top management is responsible for identification and provision of the necessary resources for successful operation of ISO 9001 and transition towards TQM. Creation of appropriate policies and allocation of the needed funds to provide adequate infrastructure in the organizations, are essential steps for appropriate QMS development. Employee motivation enables improvement in the effectiveness of the implementation process of TQM. From the designed conceptual model one can conclude that the inclusion of the employees is one of the critical factors for successful implementation of the TQM, and the motivation of the employees represents a sort of "initiator" that encourages their involvement and dedication to the work. In the following research, the designed conceptual model will serve as a basis to design a dynamic model for transition of the organizations from ISO 9001 towards TQM, under the influence of the motivation of employees.

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THE IMPORTANCE OF NEW PRODUCT DEVELOPEMENT IN SERBIAN SMALL-SCALE MANUFACTURING ENTERPRISES

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ABSTRACT

"Market pull" strategy is dominating in small scale manufacturing enterprises in the Republic of Serbia. The research whose results are presented in this work has determined the significance of this strategy from the aspect of developing new products. The strategy is reflected in close collaboration of enterprises and their customers, from the idea to the final product, including R & D activities. Beside customers, the main sources of ideas are: competitors and fairs. It has been also determined that marketing activities related to introduction of new products are limited and in comparison to the results from surrounding countries Serbia doesn't lag behind. However, in order to improve the activities related to the development of new products in Serbian small-scale manufacturing enterprises we have suggested two strategies in this work: "open innovation" in making closer collaboration with external knowledge sources and the creation of "innovative networks" with partners in this concept usage. Limitations of this research are: weak feedback from respondents (the questionnaire was sent by e-mail), geographical limitations of the sample and the lack of homogenious sample group in the analysis of certain parameters.

Key words: SMEs, new product development, market pull, open innovation

INTRODUCTION

Small manufacturing enterprises are seen as great driving forces of transitional economies growth. Although high-tech enterprises are dominating on the market, many manufacturing enterprises worldwide fall into low-tech (LT) and low-medium-tech (LMT) manufacturing enterprises. LMT enterprises are important from the aspect of employment, economic growth and knowledge creation (Hirsch-Kreinsen, 2008). LT and LMT enterprises make 53% and 35% out of the total number of all enterprises in EU countries (REPORT ON EUROPEAN SMEs 2012/2013). According to this fact taken from (Petrović, 2014), the enterprises in Serbia are presented, according to technological structure, in the following relation: 65% LT and 25% LMT enterprises. According to EU classification, the enterprises with less than 50 employees are small enterprises (SE), while micro enterprises (ME) have 10 employees (Lindner and Bagherzadeh, 2005). Urošević and Stamatović (2011) say that small and micro enterprises (SME) in Serbia represent 99,8% out of the total numberof enterprises, 65,5% of unemployment, 67,6% of the turnover and about 36% of GNP. Generally speaking, SMEs are carrying out closed strategies for developing new products. However, there is a risk for enterprises business because the enterprises are not able to identify themselves and fulfill all business opportunities for product development (Tapio Lindman, 2002).

Market pull strategy is of high significance for successful new product development in small-scale manufacturing enterprises. This strategy requires a strong interaction with customers via sale, marketing and design of a product (Handfield et al., 1999). In the world developed economies SMEs often integrate suppliers for the development of new products through the common education and training, feasibility studies, adjusting common objective performances and estimation of product design (Petersen et al., 2003). SMEs have a weak negotiation power on the market. Therefore, a collaboration with big companies enables SMEs to develop and commercialize new technologies but it also increases the relation of dependence of SMEs to generate and value technologies to the detriment of their contribution to intellectual property (Katila et al., 2008). This work deals with a description of new product development and the application of strategies for improving manufacturing process and launching new products in Serbian SMEs. In the same time, we want to present our research related to new product development from the standpoint of the applied strategies in developed countries in the surroundings. We will also discuss the main disadvantages for new product development in Serbian SMEs and give some suggestions for improving the process.

BARRIERS IN THE DEVELOPMENT OF SERBIAN SMEs

Economy of the Republic of Serbia lags behind EU for 29.5years. The worst are enterprises in the field of textiles (35 years), then the enterprises from mechanical engineering field (34.5 years) (Djordjević et al., 2011). Pharmaceutical enterprises lag behind for 21 years and they have the best result of all. From regional aspect, facilities, tools and other manufacturing means are worst in the south of Serbia (41years), and the best situation is in Backa (about 18.5 years).

According to Aidis (2005), the biggest barriers for the development of SMEs are: lack of financial funds, lack of knowledge, lack of markets and resources. Domestic enterprises are not ready to enter international market, in other words, they are not strong enough to compete with foreign enterprises. In most enterprises with dominating domestic capital there is a problem related to late introduction of the world achievements in the field of management and modern management techniques are slowly applied. Moreover, Serbian enterprises are faced with other serious problems such as insolvency, business disability, indebtedness, technological underdevelopment and insufficient competitiveness so they have to accept foreign business experiences, especially those from global leaders (Djordjević et al., 2011). Table 1 gives a review of barriers for the growth of manufacturing SMEs in Serbia compared to Slovenia and Romania.

Table 1: Barriers for Serbian SMEs in comparison with Slovenia and Romania

Country	EU member		In transition
Barriers	Slovenia[1]	Romania[2]	Serbia[3]
Company registration	●	●	●
Corruption	●	●	●
Credit conditions	●	●	●
Taxes			●
Qualified labor	●	●	●
Training		●	●
Imports and exports		●	●
Attracting investments		●	●
Cooperation with universities		●	●
Resources			●

1) Bartlett and Bukvič (2001); 2) Constantin (2002); 3) Ćoćkalo et al. (2011); Kontic et al. (2012)

METHODOLOGY

In this paper we have examined the role and significance of new product development from the view of requirements satisfaction of final customers. A special attention was paid to the following elements: R&D, strategy for new product development. A sample of 300 manufacturing enterprises was planned but the answers were

received from 76 small manufacturing enterprises, including 48 middle and 28 small enterprises. Executives and their substitutes as well as other representatives from the enterprises participated in the poll.

Table 2 presents a sample structure which included manufacturing enterprises. The main problem in this research is related to the data of small- scale manufacturing enterprises presence in Serbia. Since the research was terminated at the end of 2011, (http://webrzs.stat.gov.rs/WebSite/repository) formal statistics was taken as reference data according to which the planned sample was less than 8% out of the total number of small manufacturing enterprises in Serbia and the result was a little over 3% of that number. There is a presumption that all SEs were not of small-scale manufacturing type, several manufacturing fields were examined simultaneously, in other words, we did not examine a certain homogenious group.

The questions were focused on the analysis of the existing strategies and new product development. The main objective was to determine the differences between the current practice in Serbian SMEs in relation to new product development and the introduction of new strategies in order to achieve market oriented way of business performance. The results were first analyzed by means of descriptive statistics. Chi-square test was used for examining new product development and the analysis of strategies aimed at final customers. The value $p<0,05$ points at statistical significance for the rejection of general hypothesis in relation to researching customer requirements (market pull strategy), quality requirements related to managing development processes, launching and manufacturing of new product, requirements related to reducing costs of new product manufacturing as well as the needs of business enterprises in Serbia for better sale of products on the market.

Table 2: Manufacturing enterprises in Serbia

Business area	Number of respondents
The production of machines and devices, The production of electric and fiber devices	16
The production of chemicals, chemical products and artificial and synthetic fibers	16
The production of rubber products and product made from plastic mass	14
The production of basic metals and standard metal products	12
Wood processing and products made from wood	8
The production of food products	2
The production of textiles and textile products	2
The production of leather and objects made from leather	2
Publishing and printing	2
The production of products made from other non-metal minerals	2

FINDINGS AND DISCUSSION

SMEs in Serbia are working closely with their customers on new product development. About 69% of SMEs use a kind of "market pull" strategy while only 18% examinees said that they used a "technology push" strategy. Market pull strategy relies on respecting the needs of customers and the market. The essence of this strategy is, first, to "identify the customers needs", and then to start projects for the development of new technology (Brem and Voigt, 20009). About 83% SMEs directly combine their research activities with customers.

External sources of ideas for new product development are: buyers (29%), competitors (27%) and fairs and exhibitions (20%). In comparison to Serbia the results in Austria (buyers-21,4%/competitors-33,6%) (Kontic et al., 2012) and Slovenia (buyers-41%/competitors-22%/fairs or exhibitions-25%) (Constantin, 2002) are similar in the fact that collaboration with suppliers is better than in Serbia.

Unfortunately, the ideas practically never come from universities or research institutes which indicates a small influence of scientific and technical institutions on industrial development of Serbia. Unlike Serbia, in Austria 20% ideas for new product development come from universities and research institutes (Kaufmann and Tödtling, 2002). In Slovenia, SMEs collaborate in a certain extent with state, public research institutes and universities in new product development (Hojnik, 2013).

Internal sources of knowledge are also significant for SMEs. In developed economies such as Great Britain, internal sources of ideas are present with only 28%, while the external factors are more extinguished (Laursen and Salter,

2004). The ideas from universities and research institutes are present in only 5%. In Serbia, internal R&D (84%) plays a significant role in new product development. This percentage is significantly higher in SEs (93%) than in MEs (78%). In this sense, R&D activities are reduced only to testing products or realization of technical services. About 92% examinees were directly involved in new product development in their SMEs. The main barriers for new product development were lack of financial means (58%) and institutional barriers (42%).

It is important to say that SMEs in Serbia fall into the group of modest innovators: 3.5% SMEs do innovative research activities while 19% of them were involved in innovative collaboration networks with other enterprises (Hadzic and Pavlovic, 2012). In comparison to the neighbouring countries about 17% of all Slovenian enterprises with domestic capital can be considered innovative (Damijan et al., 2005). When speaking about Romania, only 19% SMEs were involved in innovative activities directed towards new products (37%), new technologies (29%), menagerial and marketing activities (24%), training of HR (13%) (Mioara et al., 2010).

Marketing activities are rather limited in SMEs. Only 33% examinees said that they carried out marketing activities when they advertised new products. Most enterprises represented new products at some exhibitions or fairs (67%). A small number of SMEs (22%) used professional journals or other technical publications for R&D activities related to new product development. Slovenian SMEs represented their products most frequently at fairs and exhibitions (83%) and in journals (75%) (Koschatzky et al., 2001). In Romania, 70% enterprises took part at fairs and exhibitions mainly at the national level while the rest of 30% enterprises presented their manufacturing program at international fairs which speaks about relatively low, efficient marketing activities (Dindire and Gănescu, 2010).

In Table 3 an intersection between Slovenian and Serbian SMEs is given, on the grounds of idea sources for new product development and marketing activities in advertising new products.

Table 3: Comparison of Slovenian and Serbian SMEs on the grounds of idea sources and marketing activities

SMEs		Slovenia	Serbia
External idea sources for new product development	Buyers	41%	29%
	Competitors	22%	27%
	Fairs and exhibitions	25%	20%
Marketing activities in advertising new products	Fairs and exhibitions	83%	67%
	Publishing ideas in professional/technical publications	75%	22%

FURTHER IMPROVEMENT FOR NPD

Low-tech concept is characteristic for relatively mature enterprises with a high percentage of low-qualified workers in which standard products are manufactured, where business risks are low, the enterprises do business at relatively wide market and in which the costs for R&D are low and internal scientific knowledge small. Lack of scientific and technical knowledge within low-tech enterprise can be compensated by high quality skills developed through practice and permanent learning at work (Hirsch-Kreinsen et al., 2003). In the same time, low-tech concept gives flexibility in enterprises re-organization with an accent on specific forms of knowledge.

On the other hand, SMEs cannot rely on internal forces and knowledge so they have to seek for the solutions from their surroundings. An efficient innovation process which is applied on new product development assumes the use of external knowledge sources and better usability of internal knowledge and intellectual property (Chesbrough and Crowther, 2006). In this sense, a collaboration with universities and research institutes would be useful for SMEs. According to Schartinger et al. (2002), universities have a key role in knowledge transfer. Their influence is reflected in common collaboration in research projects which are financially supported by enterprises through funding researches, defining contracts on permanent education of employees and involvement of academic researchers as consultants in private enterprises. For all these reasons the activities of Serbian SMEs should be definitely improved through technology, resources, and

knowledge from external sources. Serbia should make a strategic collaboration with the countries in the region in order to increase innovative activities.

SMEs in developed countries in the field of low-tech industry are able to use and integrate knowledge from external sources for new product development. When considering SMEs in developing countries, it has been said that they do not have contacts with research centres and multinational corporations, the generators of open innovations (Vrgovic et al., 2012).According to the same source, efficiently open innovation strategy requires a significant participation of the Government in building infrastructure and communication network among SMEs with a stress on market needs.

SMEs in developed countries have proved their ability to use and integrate knowledge from external sources for new product development. Open innovations are not necessarily connected to technology. The concept of open innovation has been known for a rather long time not only as a valid strategy for increasing competitiveness of SEs (Forsman, 2011) but for increasing their innovative capacities as well (Lee et al., 2010).

CONCLUSION AND IMPLICATIONS

Small manufacturing enterprises in Serbia mainly use "market pull" strategy as a dominating strategy for new product development. This approach enables a close collaboration with customers in all development process steps including common R&D activities. The research has showh that the most frequent idea sources for new product development in Serbia are: buyers, competitors and fairs and exhibitions. The ideas almost never come from universities or research institutes which shows a low influence of scientific – technical community on industrial development in Serbia. The results are similar in neighbouring countries, in Slovenia and Romania, for instance, which have a slightly better inclusion of external knowledge cetres in generating ideas.

Marketing activities related to introduction of new product are reduced to low level of advertising. The main channels of advertising new products are fairs and exhibitions but even in this case a small part of SMEs use professional journals and other publications to report R&D activities related to new product development. The results are similar to the analized countries as well.

To conclude, two strategies are recommended for new product development in small-scale manufacturing enterprises on the territory of the Republic of Serbia: 1) Open innovation which points at the significance of external knowledge sources (universities, research institutes and innovation centres), through collaboration at national, regional and international level; and 2) creation of "innovative networks" through establishing a network with collaborators who would use a certain form of open innovations. Our research has shown that SMEs in Serbia are not concentrated enough on providing satisfaction of final customers, therefore we recommend the introduction of monitoring and control system in order to provide timely product delivery and satisfaction of customers in relation to product quality.

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Session A: MANAGEMENT AND OPERATION MANAGEMENT

DELPHI METHOD FOR CONSENSUS ON NURSE MANAGER SELECTION

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ABSTRACT

The first purpose of this study was to describe and illustrate a modification of the Delphi technique that was designed to identify future personal attributes needed to help update requirements for nurse manager selection. The subject matter experts consisted of a group of nurses holding expert positions in the Mashhad University of Medical Sciences (MUMS). The second purpose was to determine a consensus from the responses of the MUMS experts. The approach consisted of a 15-member expert panel of 10 nurse managers and 5 chief nurse executives. The panel completed three rounds of the Delphi process, identifying 24 criteria for nurse manager selection.

Key words: decision making, Delphi method, nursing, criteria selection.

INTRODUCTION

It appeared from the research that effectively managing human capital could help lead to successful job performance and accomplishment of organizational goals. The literature suggested a key ingredient to organizational success was the middle manager. Blumentritt and Hardie (2000), referring to the work of Marshall, Prusak, and Shpilberg, suggested that the middle manager was a significant player in the modern-day world of reduced management power, greater task intricacy, and intense competition.

The Delphi technique is an approach used to gain consensus among a panel of experts (Brekelmans, Poell, & van Wijk, 2013). This is normally achieved through a series of rounds where information is fed back to panel members using questionnaires. It has been used extensively within social science research and is being increasingly employed by nurse researchers. This popularity has meant that the technique has been adapted in various ways and there is the possibility that the rigour associated with the original format has been threatened. This signals the need for a critical review of the Delphi as a robust and systematic approach to data collection. While there is a great volume of literature surrounding the 'Delphi', there is a dearth of papers critically analysing the technique (Keeney, Hasson, & McKenna, 2001).

The research suggested the registered nurse manager needs a broad breadth of knowledge combined with a strong ethos of multi-disciplinary skills. Domrose (2004) suggested the nursing shortage, past layoffs of middle managers, slashes in education programs, and lack of support in some places for nurse leaders have created a situation what several feared could be a mounting leadership insufficiency unless hospitals and nursing groups took action. The Delphi technique could achieve consensus of subject matter experts without bringing them together face-to-face to establish future personal attributes for the MUMS registered nurse mangers (Keeney et al., 2001). The specific objectives of this study were as follows:
1. Identifying future personal attributes required by the MUMS nursing manager as perceived by the MUMS experts, a group of nurses holding expert positions in the MUMS, Ghaem Hospital Section.
2. Determining a consensus of future personal attributes derived from the responses of the MUMS experts.

This study attempted to add significance to the literature concerning the use of the Delphi technique as a group decision-making tool. The Delphi survey was a group facilitation approach, which was an interactive multi-stage process, intended to modify opinion into group consensus (Hasson et al., 2000). The results of the study could enhance effective decision-making in the MUMS and assist in the development of possible solutions for the establishment of recruiting, selection, and training criteria for the current and future nurse managers.

METHODOLOGY

This section discussed the methodology and the manner in which this research was conducted. It provided the basis for which the identification of personal attributes were collected and analyzed.

A total of 15 professionals served as the panel of experts for this study. The researcher contacted the potential panel members with a description of the study process with a panel member contact letter and an information sheet that stated that given the conditions provided, the completion and returning of the form to the researcher indicated consent to participate in the study. Potential panel members were provided with researcher contact information to answer any questions and asked to return the consent to participate form. A descriptive design using a three-round modified Delphi survey was used to meet the study objectives.

The first survey questionnaire explained the issue in general terms with examples and asked the panel members to provide input about the initial set of personal attributes. Responses from the first survey questionnaire were grouped together through a factor analysis and returned to the panel members in the second round.

Using the information gathered in Round One, the panel members value rated the input provided in importance, using a numerical scale. The researcher summarized the numerical data input provided for the second survey questionnaire using the mean or average rating as a measure of central tendency.

Second round responses were analyzed, tabulated, and returned to the panel members for the third and final round to be rated based on the feedback of the other panel members. In addition, panel members were also asked to rate each personal attribute with a *Yes* or *No* response to question if the personal attribute should be required for entry-level hiring.

Panel members used a five-point Likert-type scale to indicate their value ratings for importance (Table 1). In each subsequent round, respondents were asked review their original responses and either retain them or change them based on the rationale and mean scores of all the participants from the previous rounds.

Table 1: Five-Point Likert-Type Scale Rating Importance

Rating	Definition (Linguistic Variable)
1	Very Important
2	Important
3	Neither Important Nor Unimportant
4	Unimportant
5	Very Unimportant

RESULTS

The purpose of this Delphi study was to identify future personal attributes required by the MUMS nursing manager. Once identified, the study would use the results in an attempt to determine a consensus of future personal attributes utilizing the responses of the MUMS experts. Using the derivative of this study, the personal attributes identified, the MUMS could use the results to develop a model to guide critical hiring decisions and initial training of the future nurse managers.

The MUMS Delphi panel consisted of 15 members who were classified as: Nurse Executive (N=5: 1-Male; 4-Female), Nurse Manager (N=10: 3-Male; 7-Female). The nurse executives comprised 33.3% of the panel total, while the nurse managers represented 66.7% panel.

Round One

For the first round survey, the panel members asked to complete an open-ended survey questionnaire by listing personal attributes they believed were required for a successful nurse manager in the future. They were also provided with the operational definitions for the study and asked to review the example of personal attributes. The panel members were also instructed to feel free to use the examples provided and anything else they thought appropriate. Although the panel members were provided with the above instructions, two of the panel members were still a small bit confused and needed a little more clarification about what was being asked. Even though, there were only two panel members with questions, the researcher believed that all of the questions received should be shared with all panel members along with the answers. The sharing of panel member questions and the responses was thought to only enhance the general understanding of the study for all involved.

In the first round survey questionnaire, the number of personal attributes provided by the panel members varied per panel member. The responses included a large number of duplications, but oftentimes had a slightly different rationale for inclusion on the listing. All panel member surveys were accepted as submitted. The panel of experts provided a total of 67 separate response items. Using a factor analysis, the responses were eventually combined resulting in 24 individual personal attributes for the remaining two rounds.The personal attributes were reduced to 24 in order to eliminate duplication and to provide for efficiencies in evaluating, analyzing, and reporting the data identified for each survey round. Round One personal attributes and their associated rationales were displayed in Table 2.

Round Two

In Round Two, the responses received from the panel members in Round One and after a factor analysis were aggregated and returned to each panel member with the listing of personal attributes and a summary rationale statement generated from the survey results. The panel members were provided with Importance and were asked to please complete each spreadsheet by independently value rating each response using the five-point Likert-type scale. The MUMS Competency Cluster Importance returned 22 out of the 24 or 91.7% of personal attributes that would be considered consensus. Out of the 22 personal attributes considered consensus, 17 or 77.3%, conflict resolution, decision-making, delegation, perspective, effective communication, effective discipline, effective staffing strategies, equanimity, ethical principles, financial resource procurement, humor, involvement, optimism, practice standards, prioritization, problem solving, and productivity measures received the highest rating of 100.0% with a 1 = Critical or 2 = Very Important value rating. The 22 personal attributes considered consensus along with the percentage ratings for each one were displayed in Table 3.

Table 3, also detailed the value ratings provided by the panel members' responses. The largest range of value ratings was budget forecasting with a mean value rating of 2.7. Budget forecasting had a range value rating of 2 = Important to 5 = Very Unimportant. The highest mean value rating in this category was as also budget forecasting. The lowest mean value rating was 1.0. That distinction was held by decision-making.

Round Three

Round Three represented the last round for surveying the panel members. The statistics and any consensus generated in this round would be considered final input. In Round Three, all responses received from the panel members in Round Two were aggregated and were returned to each panel member, with the listing of personal attributes and a summary rationale statement generated from the latest survey results. The panel members asked to please complete each spreadsheet by independently value rating each response using the five-point Likert-type scale. Additionally, in the final round, each panel member was provided with one added list, the MUMS Required for Hire. Using the MUMS Required for Hire, each panel member was asked to

independently evaluate each response by answering either *Yes* or *No* as to if the personal attribute was required before hiring. Again, using a decision rule, each personal attribute or competency cluster with 10 or more panel members, 66.7%, responding with a yes, would be considered consensus for this study.

Table 2: Round One Survey Responses

Criteria for selection	Reason for Selection
Administrative Theories	The transition into amid or upper management position would be easier if there was more information provided on Administrative Theories.
Budget Forecasting	Most have had little budget experience until the NM level. Money is always a factor.
Conflict Resolution	Must deal with this weekly: The workplace stress creates conflict, Nurse/doctor; nurse/nurse; nurse/subordinate staff; nurse/other department, etc. There is an almost constant need for this at the NM level. A large part of the day is utilizing this skill.
Decision-Making	The nursing staff depend on the manager to make decisions. Need for decisions regarding staff problems with flexibility yet decisiveness and sound judgement. Many decisions are made at this level with a huge amount of autonomy.
Delegation	The job is too big for one person to do all that is demanded. Must be able to delegate in order to do the job. Effective delegation is critical to being an effective NM.
Effective Communication	NM's must communicate effectively with superiors and subordinates in order to do their job.Verbal communication is frequently garbled as it cascades down to lower level staff. Written communication must be written so it is clear to the lowest level of staff that it effects. Needs to be diplomatic.
Effective discipline	Know how to use discipline to improve a person's work behavior and encourage team building. All significant disciplinary issues are taken care of at the NM level.
Effective Staffing Strategies	Flexible & effective staffing strategies; MUMS will continue to work with less staff.
Equanimity	The ability to remain calm in tough circumstances gives staff confidence in themselves and you.
Ethical principals	You must have a high standard for yourself and expect no less from your coworkers and expect the best and do not settle for less. This should already be evident before someone is given a supervisory position.
Financial Resource Procurement	There is competition for all resources. Because nursing services is the largest department it is frequently seen as the place to balance the budget. Must be able to give convincing rationale for preserving or increasing financial resources for nursing in order to recruit and retain quality nurses.
Humor	Very important to your mental and physical well being and ability to lead and take orders. You must be able to unwind, relax, and laugh. If you do not have a positive attitude you will soon burn out with all the daily problems you encounter.
Information systems	Pulling and analyzing data; with so much on the computer now, NM must be computer literate. Can increase productivity.
Involvement	Visiting with the staff in their work environment pays dividends.
Optimism	Have to be able to inspire others to share the programs vision. That is very difficult even with an optimistic approach. Nursing is continuously changing.
Organization of unit work	This is important, but each unit runs so differently, even within the guidelines of the same policies and procedures.
Perspective	The ability to recognize the relative significance of challenges keeps molehills from becoming mountains.
Practice Standards	Fundamental knowledge of standards is essential.
Prioritization	Must be able to determine where to put your greatest energy. Related to delegation in that lesser tasks can be delegated.
Problem solving	A cousin to Conflict Resolution. Must be able to problem solve, manage stress and utilize conflict resolution skills. Critical for leading, assessing, and care of your unit/department. When done effectively it can built a cohesive team.
Productivity measures	This is critical to being able to measure goals and objectives and performance indicators. Awareness of how to make the best use out of limited resources including limited staff.
Research-based care practices	Need ability to learn and apply latest research in MH care i.e. reducing incidents of restraints.
Stress management	Stress management is extremely important and every manager has to have an effective means for reducing and managing stress. If one cannot manage their own stress then it would be difficult to help others manage theirs.
Teaching-learning theories	Necessary to share information with all levels of staff to improve patient care.

Table 3: Personal Attributes Meeting/Not Meeting Criteria
Considered Consensus –Importance Round Two (N=15)

Criteria	Responses	Percent	Mean	SD
Meeting Criteria				
Conflict Resolution	15	100.0	1.1	0.35
Decision-Making	15	100.0	1.0	0.00
Delegation	15	100.0	1.7	0.49
Effective Communication	15	100.0	1.1	0.35
Effective Discipline	15	100.0	1.7	0.49
Effective Staffing Strategies	15	100.0	1.7	0.49
Equanimity	15	100.0	1.7	0.49
Ethical Principals	15	100.0	1.3	0.46
Humor	15	100.0	1.6	0.51
Involvement	15	100.0	1.8	0.41
Optimism	15	100.0	1.6	0.51
Perspective	15	100.0	2.0	0.53
Practice Standards	15	100.0	1.6	0.51
Prioritization	15	100.0	1.3	0.49
Problem Solving	15	100.0	1.1	0.35
Productivity Measures	15	100.0	1.9	0.26
Humor	15	100.0	1.6	0.51
Information Systems	13	86.7	2.0	0.53
Research-Based Care Practices	13	86.7	2.0	0.53
Stress Management	13	86.7	1.9	0.64
Teaching-Learning Theories	11	73.3	2.1	0.64
Organization of Unit Work	10	66.7	2.1	0.74
Not Meeting Criteria				
Budget Forecasting	7	46.7	2.7	0.82
Administrative Theories	6	40.0	2.6	0.51

The MUMS Competency Cluster Importance returned 23 out of the 24 or 95.8% of personal attributes that would be considered consensus. Out of the 23 personal attributes considered consensus, 15 or 65.2%, conflict resolution, decision-making, delegation, effective communication, effective discipline, effective staffing strategies, equanimity, ethical principles, humor, involvement, optimism, practice standards, prioritization, problem solving, and productivity measures received the highest rating of 100.0% with a 1 = Critical or 2 = Very Important value rating. The 23 personal attributes considered consensus along with the percentage ratings for each one were displayed in Table 4. Table also detailed the value ratings as provided by the panel members. The largest range of value ratings was budget forecasting with a mean of 2.2. Budget forecasting had range value rating of 1 = Very Important to 5 = Very Unimportant. The highest mean value rating was administrative theories with 2.47. The lowest mean value rating of 1.1 was bestowed upon decision-making.

The MUMS required for hire competency attempted to develop a consensus of the entry-level personal attributes required of the nurse manager prior to hire. In other words, the nurse manager would have already developed the required set of generic capabilities to a reasonable degree to be hired for the position. Some authors suggested that generally, job seekers should not expect the employers to treat entry-level job candidates the way the employers of yesteryear did. Before employers would hire someone and expect to lose money on them for 18 months or more while they trained them. The idea was that the employer would get another 20 years out of them as an employee. More recently, as suggested by the literature, employers were leaning toward the idea that a person who stays five years was a long-term employee.

The MUMS Required for Hire Competency returned 14 out of the 24 or 58.3% of personal attributes that would be considered consensus. Out of the 14 personal attributes considered consensus, 7 or 50.0%, administrative theories, conflict resolution, decision-making, effective communication, effective discipline, ethical principles, and problem solving received the highest rating of 100.0% with a yes value rating. The 14 personal attributes and competency clusters considered consensus along with the percentage ratings for each one were displayed in Table 4.

Table 4: Personal Attributes Meeting/Not Meeting Criteria
Considered Consensus –Importance Round Three (N=15)

Criteria	Responses	Percent	Mean	SD	Required for Hire		
Meeting Criteria					n	Percent	
Conflict Resolution	15	100.0	1.2	0.41	15	100.0	Yes
Decision-Making	15	100.0	1.1	0.26	15	100.0	Yes
Delegation	15	100.0	1.7	0.49			
Effective Communication	15	100.0	1.3	0.46	15	100.0	Yes
Effective Discipline	15	100.0	1.6	0.63	15	100.0	Yes
Effective Staffing Strategies	15	100.0	1.5	0.52	14	93.3	Yes
Equanimity	15	100.0	1.7	0.72	14	93.3	Yes
Ethical Principals	15	100.0	1.1	0.35	15	100.0	Yes
Humor	15	100.0	1.9	0.64			
Involvement	15	100.0	1.7	0.49	12	80.0	Yes
Optimism	15	100.0	1.7	0.62	14	93.3	Yes
Perspective	13	86.7	1.7	0.46	14	93.3	Yes
Practice Standards	15	100.0	1.3	0.49	14	93.3	Yes
Prioritization	15	100.0	1.7	0.46			
Problem Solving	15	100.0	1.2	0.41	15	100.0	Yes
Productivity Measures	15	100.0	2.2	0.41	13	100.0	Yes
Financial Resource Procurement	14	93.3	2.3	0.46			
Humor	15	100.0	1.9	0.64			
Information Systems	13	86.7	1.8	0.68	14	93.3	Yes
Research-Based Care Practices	13	86.7	2.2	0.56			
Stress Management	13	86.7	1.9	0.59			
Budget Forecasting	12	80.0	2.2	0.94			
Teaching-Learning Theories	11	73.3	2.3	0.70			
Organization of Unit Work	10	66.7	1.9	0.35			
Not Meeting Criteria							
Administrative Theories	8	53.3	2.5	0.74			

The 14 personal attributes identified and considered consensus in the category of MUMS Required for Hire Competency would be considered the minimum entry-level requirements for the position of the future nurse manger. This would suggest the remaining personal attributes could be acquired after hire. Moreover, if the nurse manger candidate possessed more than the 14 minimum entry-level requirements for the position, this would suggest an even better candidate for hire.

CONCLUSION

This study and its results suggested that the modified Delphi Technique could achieve consensus of subject matter experts without bringing them together face-toface to establish future personal attributes for the MUMS nurse managers. This researcher suggested that the Delphi technique might be used more widely within MUMS to assist them in their quest to maximize their resources and improve the service delivery system.

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A FUZZY EXTENSION OF ORDINAL APPROACH FOR GROUP DECISION MAKING UNDER MULTIPLE CRITERIA

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ABSTRACT

Decision making and processes involved in many organizations are not limited to an individual level. Decision-making process is usually performed at the group level, and linguistic variables are very useful in dealing with uncertain and inaccurate factors involved in complex group decision situations. This paper implements classical Ordinal Approach under a linguistic framework. To accomplish this, an integrated fuzzy group decision making method based on classical ordinal approach proposed, which allocates different weights for decision maker group members to use linguistic terms in order to express their fuzzy preferences for alternative solutions and for individual judgments. The outcomes of a numerical example of proposed method have been highly consistent based on the Spearman's rank correlation coefficient and presented good agreement with other methods.

Key words: Ordinal Approach, Fuzzy numbers, Group decision making, Multi criteria group decision making

INTRODUCTION

Decision making is a usual human activity. It basically involves selecting the most preferred alternative(s) from a finite set of alternatives in order to achieve certain predefined objectives (Chuu, 2009a). Group decision making process can be defined as a decision situation where (1) there are two or more individuals different preferences but the same access to information, each characterized by his/her own perceptions, attitudes, motivations, and personalities; (2) all recognize the existence of a common problem; and (3) all attempt to reach a collective decision (Bui, 1987). There are two types of group decision making: (1) heterogeneous and (2) homogeneous. The heterogeneous group decision making environment allows the opinions of individuals to have different weights, which is contrary to the homogeneous group decision making environment (S. J. Chen et al., 2005). It is useful to compose a heterogeneous group with dissimilar individuals. When a group is diverse in terms of personalities, gender, age, education, functional specialization and expertise there is an increased possibility that the group will perform its task more effectively (Chakraborty et al., 2007). Multi criteria decision making (MCDM) methods have been developed to solve conflicting preferences among criteria for single decision makers (Corner et al., 1991; Keeney et al., 1976; Korhonen et al., 1984; Saaty, 1980).

In many situations decision makers may provide imprecise information which comes from a variety of sources such as unquantifiable information about alternatives with respect to attributes (D. F. Li et al., 2009). Decision makers (DMs) judgments are uncertain and cannot be estimated by exact numerical values (Zhang et al., 2008). In order to deal with vagueness of human thought, Zadeh (1965) first introduced the fuzzy set theory. A fuzzy set is an extension of a crisp set. Crisp sets only allow full membership or no membership at all, whereas fuzzy sets allow partial membership. The concept of fuzzy sets is one of the most fundamental and influential tools in the development of the

computational intelligence (Herrera et al., 2006). Some researches (Ashtiani et al., 2009; Chang et al., 2000; S. J. Chen et al., 2005; Cheng et al., 2002; Chuu, 2009b; Fan et al., 2010; Kahraman et al., 2003; Lu et al., 2008; Mahdavi et al., 2008; Shih et al., 2007; Wu et al., 2007; Yang et al., 2008) have been carried out in describing the uncertainty of individual preferences for alternatives and aggregating these fuzzy individual preferences into a group decision making. This paper proposes a fuzzy group decision-making method based on ordinal approach. Section 2 of the paper gives all preliminaries used, and section 3 demonstrates a framework of fuzzy group decision making method. An example for using the method is shown in section 4 and finally conclusions are discussed in section 5.

Preliminaries

In this section, some basic definition of fuzzy sets, trapezoidal fuzzy number and linguistic variables are reviewed.

Definition 1

A fuzzy set presents a boundary with a gradual contour, by contrast with classical sets, which present a discrete border. Let U be the universe of discourse and u a generic element of U, then U $=\{s$. A fuzzy subset Ã, defined in U, is:

$$\widetilde{A} = \{(u, \mu_{\widetilde{A}}(u)) \mid u \in \bigcup\}$$

(1)

Where $\mu_{\widetilde{A}}(u)$ is designated as membership function or membership grade (also designated as degree of compatibility or degree of truth) of u in Ã. The membership function associates with each element u, of U, a real number, in the interval [0, 1] (Mario, 2000).

Definition 2

A trapezoidal fuzzy number $M = (l, m_l, m_u, u)$, $l \leq m_l \leq m_u \leq u$, and its membership function is shown as Eq. 2 and Fig. 1 (Yang et al., 2008).
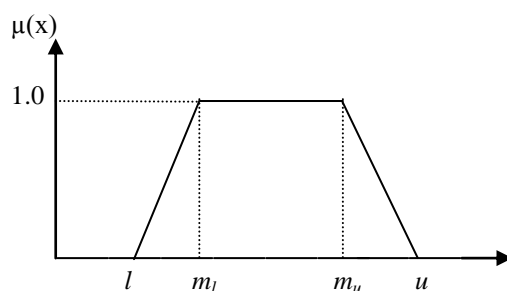
Figure 1. The trapezoidal fuzzy membership function

$$\mu_a(\chi) = \begin{cases} 0, & x \leq l \\ \dfrac{x-l}{m_l - l} & l \leq x \leq m_l \\ 1, & m_l \leq x \leq m_u \\ \dfrac{x-u}{m_u - u} & m_u \leq x \leq u \\ 0, & x \geq u \end{cases}$$

(2)

Definition 3

A linguistic variable is " a variable whose values are words or sentences in a natural or artificial language" (Wang et al., 2009). These linguistic variables can be expressed in positive trapezoidal fuzzy numbers as Table 1 and 2.

THE FUZZY EXTENSION OF ORDINAL APPROACH

Fuzzy extension of ordinal approach group decision making problems considered in this paper is represented as follows:

Let $O=\{O_1,O_2,...,O_m\}$ be a separate set of options, $D=\{D_1,D_2,...,D_t\}$ be the set of decision makers, and $\lambda=\{\lambda_1,\lambda_2,...,\lambda_t\}$ be the weight vector of decision makers. Let $C=\{C_1,C_2,...,C_n\}$ be the set of criteria, and $w=\{w_1,w_2,...,w_n\}$ be the weight vector of criteria. The fuzzy group decision problem can be concisely expressed as matrix format:

Table 1: Linguistic variables for the ratings

Extremely Poor	EP	(0, 0, 1, 2)
Very Poor	VP	(1, 2, 3, 4)
Poor	P	(2, 3, 4, 5)
Medium Poor	MP	(3, 4, 5, 6)
Fair	F	(4, 5, 6, 7)
Medium Good	MG	(5, 6, 7, 8)
Good	G	(6, 7, 8, 9)
Very Good	VG	(7, 8, 9, 10)
Extremely Good	EG	(8, 9, 10, 10)

Table 2: Linguistic variables for the importance weight of each criterion

Extremely Low	EL	(0, 0, 0.1, 0.2)
Very Low	VL	(0.1, 0.2, 0.3, 0.4)
Low	L	(0.2, 0.3, 0.4, 0.5)
Medium Low	ML	(0.3, 0.4, 0.5, 0.6)
Medium	M	(0.4, 0.5, 0.6, 0.7)
Medium High	MH	(0.5, 0.6, 0.7, 0.8)
High	H	(0.6, 0.7, 0.8, 0.9)
Very High	VH	(0.7, 0.8, 0.9, 0.1)
Extremely High	EH	(0.8, 0.9, 0.1, 0.1)

$$\tilde{D}_t = \begin{array}{c} \\ O_1 \\ O_2 \\ \vdots \\ O_m \end{array} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \\ \begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \cdots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \cdots & \tilde{x}_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ \tilde{x}_{m1} & \tilde{x}_{m2} & \cdots & \tilde{x}_{mn} \end{bmatrix} \end{array}$$

(3)

$\tilde{W} = [\tilde{w}_1, \tilde{w}_2, \cdots, \tilde{w}_n]$ where $\tilde{x}_{ij}^k$ and $\tilde{w}_j^k$ are linguistic variables that can be presented by fuzzy numbers. The proposed model is linearly defined in the following steps:
1. Identifying evaluation criteria.
2. Producing options.
3. Identifying weights of criteria and weights of decision makers based on linguistic variables as shown in Table 2.
4. Presenting preferences on the part of each decision maker (every decision maker gives preferences to per alternative based on every attribute according to linguistic terms such as Table 1).
5. Construction of fuzzy decision matrix. In fuzzy decision matrix, we suppose that, each $\tilde{x}_{ij}^k$ is fuzzy number.
6. The normalized fuzzy decision matrix is constructed as follows for trapezoidal fuzzy numbers for the benefit and the cost attributes:

$$\tilde{y}_{ij}^{(k)} = (a1_{ij}^{(k)}, a2_{ij}^{(k)}, a3_{ij}^{(k)}, a4_{ij}^{(k)}) = \left(\frac{a1_{ij}}{\max_i(a4_{ij})}, \frac{a2_{ij}}{\max_i(a3_{ij})}, \frac{a3_{ij}}{\max_i(a2_{ij})} \wedge 1, \frac{a4_{ij}}{\max_i(a1_{ij})} \wedge 1 \right)$$

$$\tilde{y}_{ij}^{(k)} = (a1_{ij}^{(k)}, a2_{ij}^{(k)}, a3_{ij}^{(k)}, a4_{ij}^{(k)}) = \left(\frac{\min_i(a1_{ij})}{a4_{ij}}, \frac{\min_i(a2_{ij})}{a3_{ij}}, \frac{\min_i(a3_{ij})}{a2_{ij}} \wedge 1, \frac{\min_i(a4_{ij})}{a1_{ij}} \wedge 1 \right)$$

(4)

where operator "$\wedge$" is the floor operator (R. Li, 2002).

7. Construction of defuzzification decision matrix:

$$BNP_{ij} = [(UE_{ij} - LE_{ij}) + (M_u E_{ij} - LE_{ij}) + (M_l E_{ij} - LE_{ij})] / 4 + LE_{ij} \quad \forall i, j$$

(5)

8. Considering proper value (DM weights) of every decision making group member idea:

$$N_{ijw} = N_{ij} \times \lambda_k$$

(6)

N_{ij} is an element of defuzzification decision matrix for every DM, and λ_k is the weight of per DM idea.

$$R_j = \begin{matrix} O_1 \\ \vdots \\ O_i \\ \vdots \\ O_m \end{matrix} \begin{bmatrix} r_{1,j}^1 & \cdots & r_{1,j}^D & \cdots & r_{1,j}^k \\ \vdots & & \vdots & & \vdots \\ r_{i,j}^1 & \cdots & r_{i,j}^D & \cdots & r_{i,j}^k \\ \vdots & & \vdots & & \vdots \\ r_{m,j}^1 & \cdots & r_{m,j}^D & \cdots & r_{m,j}^k \end{bmatrix} \begin{matrix} , i = 1,2,...,m \\ , j = 1,2,...,n \\ , D = 1,2,...,k \end{matrix}$$

(7)

9. Formation of R_j matrixes; while the rows of the matrix are options and its columns are DMs opinions based on j criterion. So n matrixes lieu of j criteria were established, (R_j).

$$R_G = \begin{matrix} O_1 \\ \vdots \\ O_i \\ \vdots \\ O_m \end{matrix} \begin{bmatrix} r_{1,1}' & \cdots & r_{1,j}' & \cdots & r_{1,n}' \\ \vdots & & \vdots & & \vdots \\ r_{i,1}' & \cdots & r_{i,j}' & \cdots & r_{i,n}' \\ \vdots & & \vdots & & \vdots \\ r_{m,1}' & \cdots & r_{m,j}' & \cdots & r_{m,n}' \end{bmatrix}$$

(8)

10. Computing linear sum in lieu of D decision makers $\left(\sum_{D=1}^{k} r_{i,j}^D \right)$ and final grade of every option in lieu of j criteria would be calculated. In this matrix the line with the highest mark is the first rank and the line with the lowest mark is m rank.

11. Changing R_G matrix into Borda count, i.e. criterion with first rank based on per option would have *m-1* relative value on the basis of m options. The same goes for, option with second rank (*m-1* relative value). Options with m rank would receive zero relative values. Then the Borda count matrix will be multiplied with the corresponding weight vector of criteria.

$$\begin{matrix} O_1 \\ O_2 \\ \vdots \\ O_m \end{matrix} \begin{bmatrix} b_{1,1} & b_{1,2} & \cdots & b_{1,n} \\ b_{2,1} & b_{2,2} & \cdots & b_{2,n} \\ \vdots & \vdots & \ddots & \vdots \\ b_{m,1} & b_{m,2} & \cdots & b_{m,n} \end{bmatrix} \times \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix} = \begin{bmatrix} b_{1,1}.w_1 + & b_{1,2}.w_2 + & \cdots & b_{1,n}.w_n \\ b_{2,1}.w_1 + & b_{2,2}.w_2 + & \cdots & b_{2,n}.w_n \\ \vdots & \vdots & \ddots & \vdots \\ b_{m,1}.w_1 + & b_{m,2}.w_2 & \cdots & b_{m,n}.w_n \end{bmatrix} = \begin{bmatrix} r_1 \\ r_2 \\ \vdots \\ r_m \end{bmatrix}$$

(9)

The alternative sum with the highest value would be considered as the first rank and the lowest represents the last rank.

NUMERICAL EXAMPLE

In this section, first we work out a numerical example, taken from (Zeshui Xu, 2007), to illustrate the ordinal approach for decision making problems with fuzzy data. So a group decision making problem

of evaluating university faculty for tenure and promotion is used. A practical use of the proposed approach involves the evaluation of university faculty for tenure and promotion. The criteria used at some universities are C_1: Teaching, C_2: Research, and C_3: Service (whose weight vector $w = (0.36, 0.31, 0.33)$). Five faculty candidates (alternatives) $O=\{O_1,O_2,...,O_5\}$ are evaluated using the linguistic variables by three DMs $D=\{D_1,D_2,D_3\}$ whose weight vector $\lambda = (0.4, 0.5, 0.1)$ under these three criteria, as listed in Table 3.

Table 3: The ratings of the five candidates by decision makers under all criteria

	C_1: Teaching						C_2: Research						C_3: Service				
	O_1	O_2	O_3	O_4	O_5		O_1	O_2	O_3	O_4	O_5		O_1	O_2	O_3	O_4	O_5
D_1	MP	F	MP	VG	MG		G	VG	MP	MG	G		G	VG	VG	MP	MG
D_2	F	G	G	G	MG		MP	F	G	MG	VG		G	VG	MG	MG	F
D_3	F	F	MG	VG	MG		VG	MP	G	MG	G		VG	G	F	VG	F

Linguistic evaluations (shown in Table 3) are converted into trapezoidal fuzzy numbers to construct a fuzzy decision matrix. Constructed normalized fuzzy decision matrix by Eq. 4 is shown in Table 4.

Conversion of normalized fuzzy decision matrix to the defuzzification decision matrix by Eq. 5 as Table 5.

Table 4: Normalized fuzzy performance matrix

		O_1	O_2	O_3	O_4	O_5
D_1	C_1	(0.3, 0.44, 0.62, 0.86)	(0.4, 0.55, 0.75, 1)	(0.3, 0.44, 0.62, 0.86)	(0.7, 0.88, 1, 1)	(0.5, 0.66, 0.87, 1)
	C_2	(0.6, 0.77, 1, 1)	(0.7, 0.88, 1, 1)	(0.3, 0.44, 0.62, 0.86)	(0.5, 0.66, 0.87, 1)	(0.6, 0.77, 1, 1)
	C_3	(0.6, 0.77, 1, 1)	(0.7, 0.88, 1, 1)	(0.7, 0.88, 1, 1)	(0.3, 0.44, 0.62, 0.86)	(0.5, 0.66, 0.87, 1)
D_2	C_1	(0.44, 0.62, 0.86, 1)	(0.66, 0.87, 1, 1)	(0.66, 0.87, 1, 1)	(0.66, 0.87, 1, 1)	(0.55, 0.75, 1, 1)
	C_2	(0.3, 0.44, 0.62, 0.86)	(0.4, 0.55, 0.75, 1)	(0.6, 0.77, 1, 1)	(0.5, 0.66, 0.87, 1)	(0.7, 0.88, 1, 1)
	C_3	(0.6, 0.77, 1, 1)	(0.7, 0.88, 1, 1)	(0.5, 0.66, 0.87, 1)	(0.5, 0.66, 0.87, 1)	(0.4, 0.55, 0.75, 1)
D_3	C_1	(0.4, 0.55, 0.75, 1)	(0.4, 0.55, 0.75, 1)	(0.5, 0.66, 0.87, 1)	(0.7, 0.88, 1, 1)	(0.5, 0.66, 0.87, 1)
	C_2	(0.7, 0.88, 1, 1)	(0.3, 0.44, 0.62, 0.86)	(0.6, 0.77, 1, 1)	(0.5, 0.66, 0.87, 1)	(0.6, 0.77, 1, 1)
	C_3	(0.7, 0.88, 1, 1)	(0.6, 0.77, 1, 1)	(0.4, 0.55, 0.75, 1)	(0.7, 0.88, 1, 1)	(0.4, 0.55, 0.75, 1)

Table 4: The defuzzification decision matrix

		O_1	O_2	O_3	O_4	O_5
D_1	C_1	0.55	0.67	0.55	0.89	0.76
	C_2	0.84	0.89	0.55	0.76	0.84
	C_3	0.84	0.89	0.89	0.55	0.76
D_2	C_1	0.73	0.88	0.88	0.88	0.82
	C_2	0.55	0.67	0.84	0.76	0.89
	C_3	0.84	0.89	0.76	0.76	0.67
D_3	C_1	0.67	0.67	0.76	0.89	0.76
	C_2	0.89	0.55	0.84	0.76	0.84
	C_3	0.89	0.84	0.67	0.89	0.67

Considering proper value (DM weights) of every decision making group member idea by Eq. 6 and establishing *n* matrixes lieu of *j* criterion as Table 5. Linear sum would be reached in lieu of *D* decision makers and final grade of every option in lieu of *j* criterion would be calculated. In these matrixes the line with the highest mark is the first rank and the line with the lowest mark is *m* rank.

Change the R_G matrix into Borda count; multiply the Borda count matrix with the corresponding weight vector of criteria by Eq. 9. The alternative sum with the highest value would be considered as the first rank and the lowest represents the last rank.

Therefore, the ranking order of five university faculty will be as follows: $O_2>O_5>O_4>O_3>O_1$ So, university faculty O_2 is the best faculty among the five faculties, and O_1 is the worst faculty.

Spearman's rank correlation can be considered for agreement of multi criteria group decision making methods, which compute the sums of the squares of the deviations between the different rankings. The consistency of the two methodologies is tested with the Spearman's rank correlation test. The results are given on the Table 6.

Table 5: R_j matrix

C_1	D_1	D_2	D_3	$\sum$	Rank		C_2	D_1	D_2	D_3	$\sum$	Rank
O_1	0.22	0.365	0.067	0.652	5		O_1	0.336	0.275	0.089	0.7	5
O_2	0.268	0.44	0.067	0.775	3		O_2	0.356	0.335	0.055	0.746	3
O_3	0.22	0.44	0.076	0.736	4		O_3	0.22	0.42	0.084	0.724	4
O_4	0.356	0.44	0.089	0.885	1		O_4	0.304	0.38	0.076	0.76	2
O_5	0.304	0.41	0.076	0.79	2		O_5	0.336	0.445	0.084	0.865	1

C_3	D_1	D_2	D_3	$\sum$	Rank
O_1	0.336	0.42	0.089	0.845	2
O_2	0.356	0.445	0.084	0.885	1
O_3	0.356	0.38	0.067	0.803	3
O_4	0.22	0.38	0.089	0.689	5
O_5	0.304	0.335	0.067	0.706	4

$$
\begin{matrix} O_1 \\ O_2 \\ O_3 \\ O_4 \\ O_5 \end{matrix}
\begin{bmatrix} 5 & 5 & 2 \\ 3 & 3 & 1 \\ 4 & 4 & 3 \\ 1 & 2 & 5 \\ 2 & 1 & 4 \end{bmatrix} \Rightarrow
\begin{bmatrix} 0 & 0 & 3 \\ 2 & 2 & 4 \\ 1 & 1 & 2 \\ 4 & 3 & 0 \\ 3 & 4 & 1 \end{bmatrix} \times
\begin{bmatrix} 0.36 \\ 0.31 \\ 0.33 \end{bmatrix} =
$$

$$
= \begin{bmatrix} 0 & + & 0 & + & 3 \times 0.33 \\ 2 \times 0.36 & + & 2 \times 0.31 & + & 4 \times 0.33 \\ 1 \times 0.36 & + & 1 \times 0.31 & + & 2 \times 0.33 \\ 4 \times 0.36 & + & 3 \times 0.31 & + & 0 \\ 3 \times 0.36 & + & 4 \times 0.31 & + & 1 \times 0.33 \end{bmatrix} =
\begin{bmatrix} 0.99 \\ 2.66 \\ 1.33 \\ 2.37 \\ 2.65 \end{bmatrix} =
\begin{bmatrix} 5 \\ 1 \\ 4 \\ 3 \\ 2 \end{bmatrix}
$$

The first row of the Table 6 shows that, the rank correlation coefficient is statistically significant at %80 levels and implies a rank correlation of about 80 percent. This level of consistency states that, the results obtained by Xu and proposed method are highly consistent, but there is no %100 consistency between the results of the two methodologies, but the other rows show the rank correlation coefficient is statistically significant at %100 levels and implies a rank correlation of about 100 percent. This level of consistency states that, the results obtained by other methods and proposed method are highly consistent, and %100 consistencies between the results of the methodologies.

Table 6: Spearman's rank correlation coefficient between methods

Row	Other Methods	Proposed Method
1	Xu (2007)	* 0.80
2	Chen (2000)	** 1.0
3	Z Xu (2004)	** 1.0
4	Wu (2007)	** 1.0
5	Mahdavi (2008)	** 1.0

CONCLUSION

This paper proposes fuzzy group decision making method which allow group members to express their fuzzy preferences in linguistic terms for alternative selection and for individual judgments. This paper

has investigated linguistic variables to handle uncertainties in group decision making under heterogeneous information fusion. It developed a new fuzzy extension of ordinal approach based on decision makers' viewpoint weights. The classical ordinal approach covers only homogeneous group decision making but proposed method cover both homogeneous and heterogeneous group decision making based on linguistic information. The proposed method results are very closed to other methods also this method is comfortably determined and fulfill. Furthermore, in the table 7, the selections made by the proposed methods approximately are identical with the five already established methods, which is expressive in itself and possibly approves of the reliability and validity of the proposed methods. Finally, the rankings obtained by the methodology are highly consistent based on the Spearman's rank correlation coefficient, which seems the presented method is more reasonable than other methods and can be easily solved effectively and efficiently.

Table 7: Comparison with other methods

Options	O_1	O_2	O_3	O_4	O_5	O_6
Xu (2007) Ordering	4	1	5	2	3	
Proposed Method Ordering	3	1	4	3	2	
(C.-T. Chen, 2000) Ordering	3	1	2			
Proposed Method Ordering	3	1	2			
(Z Xu, 2004) Ordering	3	1	2			
Proposed Method Ordering	3	1	2			
(Wu et al., 2007) Ordering	2	3	1	4		
Proposed Method Ordering	2	3	1	4		
(Mahdavi et al., 2008) Ordering	3	1	2			
Proposed Method Ordering	3	1	2			

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CHOOSING THE ADEQUATE INTELLIGENT DECISION MAKING TECHNIQUE IN QUALITY MANAGEMENT

UDC: 005.6:005.311.6

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ABSTRACT

There are complex problems present in companies, which cannot be solved by classical mathematical programming. Instead, the use of intelligent techniques is widely supported as optimum solution. The problem of Intelligent Decision Making Techniques is in the variety of management sectors when it comes to Quality Management. It is crucial to choose the best technique for solving complex problems and making the right decisions in tricky situations. There are a few widely used intelligent techniques. In this paper they are going to be presented and defined in a simple manner so there can be an objective view when choosing which of techniques should be used in solving problems in an organization.

Key words: Intelligent, Quality Management, Optimization, Algorithms, Fuzzy, Neural Networks.

INTRODUCTION

Modern view of quality states that it is inversely proportional to variability. Quality management and improvement thrives to control the variability to ensure a continuous specific quality level. In complex production lines there is a catch. It is very ungrateful to control the quality of mass produced goods. One of the most effective tools is statistical process control (SPC) (Grouchy, 2012). This tool uses a probability and statistics based approach. Also, SPC relies on control charts and diagrams. Through SPC, the quality of the products is analyzed in strict time periods or production cycles. Quality is the most powerful arsenal a company could have. At the end of the day, quality wins over cheap price tags. Consumers often choose the more reliable product, and reliability is an element of quality. However, complex problems may occur in production or other segments of the company. Managers must make hard decisions on which the future of the company depends on. SPC and other quality control tools could not maintain high quality standards. The evolution of the computers made it possible for new methods to arise. Computer integrated manufacturing allowed automatic implementation of quality control tasks (Shimp, 2013). Data centers were implemented in the core of management. Data-collection systems increased the number of data input and decreased the data collection costs. Knowledge discovery is at the hands of the managers. However, the decisions were made by intelligent methods. Decision-making tasks like data collection and analysis is important for overall quality improvement. Good quality products can conquer new market segments (Đorđević, Ćoćkalo, 2010). The better the quality the less is the cost of production therefore a lower price tag can be asked from the potential consumer. The result is a better quality product, a lower price, satisfied

customer, therefore sales will go up, the market will expand, and the company will ensure survival in the harsh, modern and dynamic market conditions (Nikolić, 2007). For a clear decision, a manager often needs support from expert systems, database centers and other intelligent methods.

INTELLIGENT TECHNIQUES

Particle Swarm Optimization

Particle swarm optimization method is inspired from the social behavior of biological swarm systems. These biological swarm systems can be viewed in a bird flock or colony of ants. It was developed by Kennedy and Eberhart in 1995 (Hawkins, 2011). This technique is a computational method where the result is optimized solution. A population is viewed and every candidate from the population represents a particle. These particles communicate either directly or indirectly. Through communication the particle's position, velocity and the current optimum particles are used to determine directions. Particle Swarm Optimization is used for real-time self-tuning of the power control parameters. These parameters are voltage and frequency regulation, and power sharing. This kind of controller is very effective and useful in the improvement of quality of power supply of the micro grid. Beside particle swarm optimization (PSO), there is a method which includes fuzzy logic with PSO. It is also used to improve power quality. PSO can also be used in construction applications. Here, quality is closely interrelated with time and cost. The objective is to minimize the cost and time, and maximize the quality. The algorithm of PSO is quite simple, and it can be used in various systems, as long as there is clear definition of the particles, values and velocity (see also Figure 1.)
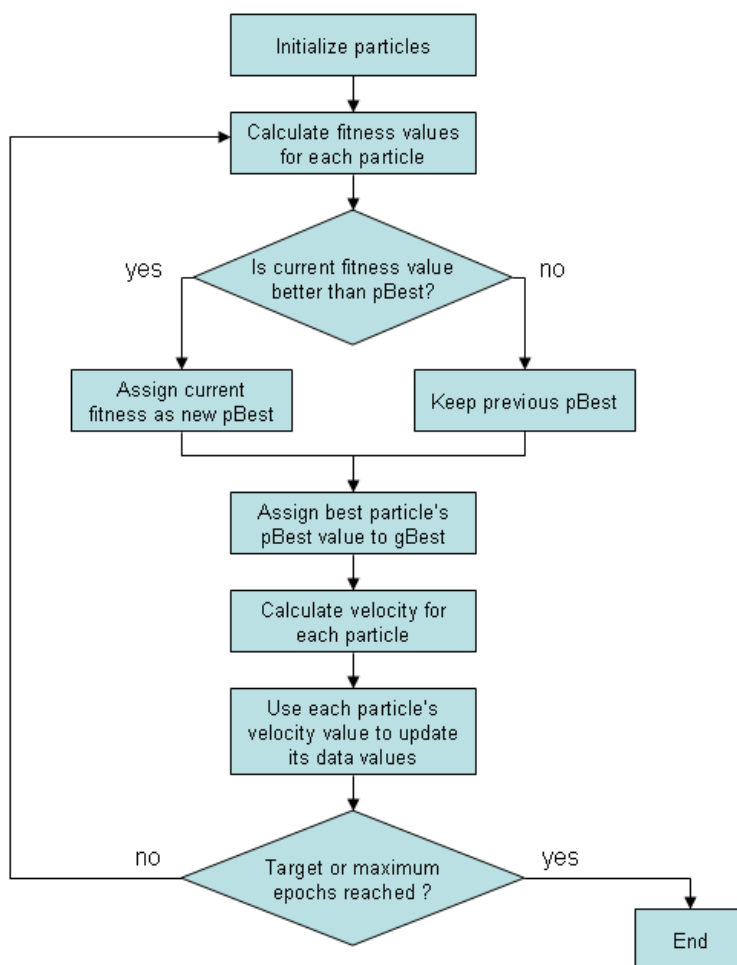

Figure 1: Flow diagram illustrating the particle swarm optimization algorithm (Xiangyang, 2010)

Genetic Algorithms

Genetic Algorithms (GA) represent heuristic procedures that use the principle of evolutionary algorithms. This algorithm is inspired from the biological process of natural selection and the survival of the fittest. The GA principle evolve around the pool of solutions defined as population of chromosomes and a search process is achieved by generations of crossovers. The competitive chromosomes exclude the weak solutions and carry their genetic material to the offspring. Through this process the better solutions are used to replace inferior solutions in the population. Genetic algorithms can be used in the optimization of quality detection and monitoring systems. Also, GAs are implemented in voltage and frequency power grids. Artificial intelligence methods are used to detect quality. A hybrid technique involving Artificial Neural Network (ANN) and genetic algorithm (GA) is developed. GA is used to find the optimal values of the input chromosomes which maximize the nonlinear exponential function of the output node of Artificial Neural Network.

Fuzzy sets

Fuzzy sets are based on the research theory of fuzzy logic, and fuzzy measure. Fuzzy reasoning is an application of fuzzy logic to knowledge processing. Control can be established through fuzzy reasoning. Fuzzy reasoning has the ability to realize a multi-elemental nonlinear input-output as a synthesis of multiple simple input-output relations. Fuzzy sets have been used in several intelligent technologies. The application of this method is present in control, automation technology, image processing, robotics, medical diagnosis and pattern recognition. Major applications of fuzzy sets are in the:
− automotive industry (automatic transmission system, suspension, engine system etc.)
− washing machine strategy sensor (dirt level, fabric type, load size etc.)
− digital image and signal processing (auto-focus, auto-zoom)
− electro-photography (photocopying machines)

Fuzzy logic has been extensively used in quality measurement and control. It can be used through like VIKOR, TOPSIS and AHP, where they are utilized to arrange distributors in their relative category.

Neural Networks

Neural networks are computational models. These networks mimic the connections of the neurons in the nervous system. The structure of the main network takes inputs, then weighs and transforms them by predetermined functions. As a result it determines the output through the neuron connections. Neural networks have three main layers: Input layer, hidden layer, and output layer (see also Figure 2).
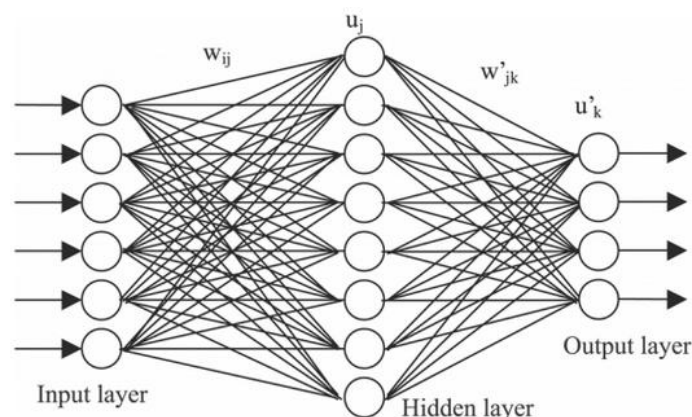
Figure 2: Neural Network Layers (Hewitt, 2015)

Neural networks are commonly used for machine learning, data classification, generalization, feature extraction, optimization and data completion.

Swarm Intelligence

Insects socialize and work without any supervision. The team-work which is present among insects is mainly self-organized. Coordination and control is a result of communication between individuals in the colony. This kind of collective behavior in a group of social insects is called swarm intelligence. Swarm intelligence provides solutions for difficult problems (from insects perspective such as finding the shortest route to a food source among possible paths). Swarms have a particular pattern and can be used for finding the best solution for a problem (see also Figure 3).
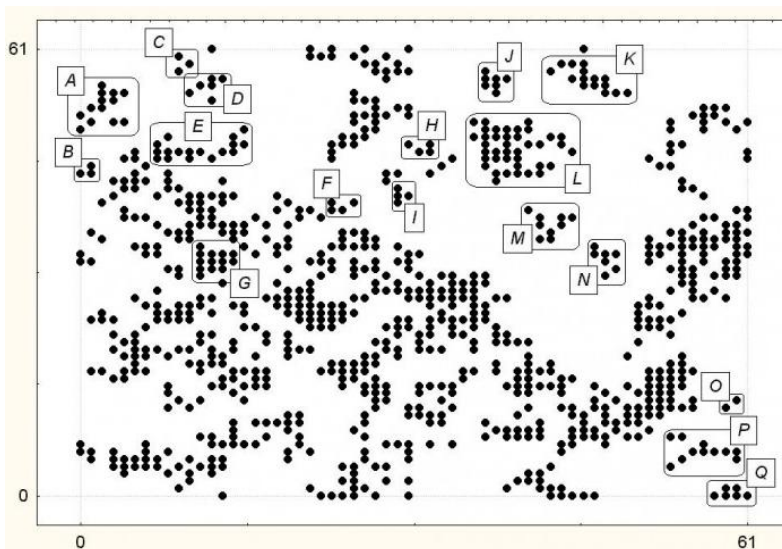
Figure 3. Swarm Intelligence (SI) pattern (Leach, 2010)

Swarm Intelligence has application in telecommunications, airlines and wireless communication networks. It can improve quality of control, coordination and multiple line production.

INTELLIGENT TECHNIQUES AND DECISION MAKING

The frequent situations in companies are that the managers don't choose the best intelligent technique for decision making. Every intelligent method has strengths and weaknesses. Decisions are very important for a manager. The future of the company depends on them. Strategic management is simply a congregation of good and timely decisions. Quality is a primary goal for every organization which produces and sells products (Kotler, 2003). Intelligent techniques can improve quality through optimized decisions.

The process would go like this:
– Analyzing the organization and it's segments,
– Defining every job and task which takes place,
– Defining the quality of the company's products,
– Analyzing the satisfaction of the costumers with the purchased product,
– Defining and projecting future tasks and plans,
– Analyzing the internal and external environment of the organization,
– Defining new goals from the aspect of product quality,
– Laying out the decisions that must be made for achieving the goals,
– Defining and projecting the parameters which have an impact on the decisions,
– Analyzing and implementing the right intelligent technique,
– Inserting the inputs, analyzing the outputs,
– Making a decision.

CONLUSION

Quality management is crucial for a company's survival on the market. High quality products lure new consumers, keep them, and assure they will come back. The better the quality, the lower the production cost, therefore a lower price tag can be put on the products. Lower prices and good quality ensures the organization's leadership position on the market. Managers have to face a series of decisions when it comes to quality management. Almost every aspect of the organization is factor which affects the quality of the final product. It is very difficult to always make the right decision. Intelligent techniques can improve decision making and as a result better quality products can be made. Neural Networks, Swarm Intelligence, Genetic Algorithms and other intelligent methods drastically improve the precision of decisions. Intelligent Systems (IS) truly support the decisions making process in quality management. Choosing the right intelligent system is sometimes a challenge. Because of that, the first step in choosing the adequate intelligent system is to analyze and define the parameters which are going to affect the whole organization.

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THE ROLE OF REENGINEERING IN THE PROCESS OF BUSINESS IMPROVEMENT

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ABSTRACT

Competitive conditions on global market caused the companies on the continuous and rapid change of organizational structure, with aim of actualizing internal and external factors of business success. Business performance depends on internal factors. Internal factors are making profit, and simultaneously reducing the costs of production, marketing and distribution. In external factors of performance are included: orientation of companies to the customers and their needs, increase product quality and service, decreasing prices and shorten the delivery time. Success by reengineering is achieved with strong will of entire team, and applying known methods. Customers are at the first place because the purpose of reengineering by itself is to fulfill needs of users. Reengineering also considers fast work- but not vigilant, tolerate the risk- because who doesn't take the plunge, that doesn't profit, to accept imperfection.

Key words: reengineering, fundamental, drastic, radical, process

INTRODUCTION

The most important business goals in today's global economy are speed, quality, flexibility and low price. However, traditional business systems are incapable for achieving these goals because they are made in consent with two basic principles: specialization of the work process, division of labor into small parts and a hierarchical management- setting supervisor who monitors the people who work. These principles were adequate at the time of the industrial revolution, but today they are utterly unsuitable, because unavoidably lead to the delays, errors and high costs. These problems can not be overcome by specific actions and repairs. Reengineering is the only way to the improvement. Reengineering can be characterized by words as fundamental, radical, drastic and process. When it is said fundamental, it considers the depth and comprehensive change, radical means speed of change and inability of many to adapt to it. Term drastic includes replacement of existing way by new, and not the advancement. The word process refers to the processes in the company.

REENGINEERING

Definition, types, stages and goals of reengineering

Reengineering is new approach which makes changes organizational structure and creates new processes, new culutres, new systems, new ways for impelementation changes due to success of company (Sajfert, Vukonjanski 2008). It consists of the next phases, ant that are: creating and setting vision, comparison with the best (benchmarking), process innovation, transformation of enterprise, impelemtation of reengineering, monitoring and control of process reengineering. Every activity must have its agents who will be accomplishing and realizing the results of reengineering. Each agent of

process has precisely defined role which can not carry out any other agent of that process. Fundamental groups of agent process of reengineering are: business board or council of executive directors, team for reengineering, leader od process.

BPR (business process reengineering) is a process and customer-oriented, that means it is focused to the improvement business and fulfilling the customers' needs. It is directed on drastic changes and usully tends to new beginning. It considers from the viewpoint of customers and act toward the changes of existing system. There are three types of BPR, which company can implement (Pavlović, 2006): reduction of costs, achieving the competitiveness, to be the best in the speciality, defining and achieving breakpoint.

In order to successfully complete the reengineering process, it is necessary first of all to go through ceratin stages, which are very significant because reengineering is by itself very complex and not a simple process that does not change just a part of something, but introduces radical changes. Reengineering process consists of the next stages (Đorđević and Ćoćkalo, 2007): Prediction change process, presentation project of reengineering, diagnosis, redesign, reconstruction, evaluation process. Prediction change process must provide support of management, identification necessary information, discovering possibilities of reengineering, choice of reengineering project. The phase of project presentation of reengineering sholud inform shareholders and organized teams for implementation of reengineering. Diagnosis means decomposing existing processes into parts and detection of so-called "bottlenecks" business. Reprojection includes next processes: using existing alternatives, design new processes, new architectures of human resources, new hardware and software platforms and simulations of whole process. Reconstruction is the stage where is specifically implemented new organization or reorganization . Evaluation is the last phase that involves assessment of performance of the process and using techniques with the aim of continuous process improvement.

The goal of reengineering is to optimize the efficiency and effectiveness of business process. The activities that are started, always have as a purpose to accomplish the best results. Reengineering provides opportunity for all employees to participate in process creating positive result, to develop sense of ownership and help to enterprise to reach the long-term growth and advantage over its competitors. Four stages in which we can percieve aims of reengineering: reducing the costs, improving the quality, increase volume of production, increase speed of work

REENGINEERING AND QUALITY IMPROVEMENT

Total quality management (TQ) is a management system focused on man, aimed to the steady growth of customers' satistfaction, with continuous decrease real costs. TQ is simultaneously an approach which encompasses the entire enterprise and integral part of strategy on the highest level: it horizontally functions in all organizational parts, includes all employees, suppliers and users. TQ emphasizes learning and adapting to constant changes, as the key factors of company's success. Term "Total Quality Management"- TQM is most commonly used to mark the management system by total quality. When it is generally spoken, for TQM it can be said that it is comprehensive effort which covers entire company, and it is concentarted on achieving customers' satisfaction.

Concept of reengineering and TQM concept are the concepts which present basis for advancement business quality in modern conditions earning (Table 1). It is believed that those concepts are good for functional and operational performance, faster and drastic changes, introducing new processes, and not improving the existing characterize reengineering, while TQM implies solution focused on quality, not enough wide, and it doesn't take into account the speed and product innovation.

Table 1: Comparative depiction of characteristics TQM and Reengineering

	TQM	**REENGINEERING**
Features	Improvement	Innovation
Level of changes	Gradual	Radical
Starting point	Existing process	Does not exist
Frequency of changes	Continuously	Periodically
Needed time	Long	Short
Participation	Bottom to up	Top to bottom
Field of action	Narrowly, within the existing functions	Widely, through all functions
Risk	moderate	high
Tool	Static control	Information Technology

REENGINEERING AND INFORMATION TECHNOLOGIES

Role and significance of IT in reengineering process

Information technologies, along with human resources and organizational changes, are one of the key elements in the process of reengineering. Information technologies have the main role in business process reengineering, but there is also opposite influence, so conducting the reengineering project has impact on increase of company's information system quality. For definition business strategy and future company development it is necessary to know current situation in enterprise and on market, as well as marketing trends. If there is information system in company with higher level than transactional, then it can provide needed information about the situation in company and about actual demand for products or services by company at the market.

Modern information system can be used for creative exchange views and information by users within the company and outside it, via the intranet and internet, in order to bring conclusions about future market criteria and company's business strategy directions. At the stage of implementation, it is used tools for application development in order to adapt company's information system to the organizational changes and new requirements for information that are result of changes. Prolonged application of information technologies in the decision-making process is to support the computers in design and use of models decision. The role of computers on that level is reflected in realization of the interactive dialogue between the user and system.

That contributes to the success of problem resolving and more efficient decision-making process. The most significant advantage of computer's support is at resolving semi-structured problems. At this level, computer system should enable simple approach to the relevant data and information, as interactive testing versions, but computer does not replace man in decision-making, but improves the decision-making process. In that way computer supports phase connceting aims, limiting and generating variants. Installation od decision-making model is possible at stage of identification of situation, and at the stage of control of implementation the decision. In this way, most of activities of process business decision-making is supported by the computer.

REENGINEERING APPLICATION IN SERBIA AND IN WORLD

Due to its radical principles and fast breakthrough in processes that we will mention, and esspecially in sense of increase quality in all its dimensions and aspects, there are opinions that reengineering in our country can be very acceptable. Another more item for which it can be acceptable is that our economy is in recession because for a long time decreases the acitivity of the manufacturing sector.

This attitude has as result significant delay in impelementation some major systematic reforms, but also in alarming standstill in economy development which occured due to simultaneous actions larger number own and international factors. Because of specific mentality of our man, which is reflected among delays, inertia, lack of clear and feasible startegic vision and demotivation, it seems that it would be in our economy system welcame certain enhanced version of reengineering.

According to research study "The Impact of Reengineering Business Processes to Small and Medim-Sized Enetrprises in Serbia" by Goran Jovanović, by the analysis of results it led to the conclusion that top managers didin't introduce ISO standards in their business. The fact is that only 24% of examinees, mostly in medium-sized enterprises, and only with part in small enterprises which count till 50 workers, introduced quality system from some of ISO series of standards. These results are worrying, because it is not just limiting factor on foreign market, but more and more on domestic market, and also it is obstacle to the successful development of the company. According to analysis of results and confirmation of the same, it can be concluded that small enterprises generally don't accept major changes as solution for the future. These results are worrisome, esspecially if we take into account that only 40% small and medium-sized enterprises in large changes see salvation or solutions for more successful future.

In Serbian state-owned enterprises for more than two decades have been ruling by political passions and manipulations because of that it is led to the frequent change of leading figures in these companies. That creates chaos, which completely devalues such enterprises. As for private companies, from the already mentioned conclusions of research, it could be seen that reengineering isn't factor of success, that the huge changes are avoided and the awareness of the need for reengineering among managers of such companies is on very low level.

In the world it is different, for instance company "Duke Power" which is engaged in production of electricity, didin't have much reasons for implementation reengineering, however, with development of technology, it has been led to the conclusion about necessity of change. The company "Duke Power" opted for the implementation of reengineering business with the clients. Its experinece shows that it is important to firstly recognise, outline the process, and then use advantage of information techonolgies. The basis is providing information in the hands of wokers who are in direct contact with buyers. Employees at the site respond on the requirements of customers, and company saves money due to fewer people are involved in the process.

Company "IBM" which is leader on PC market, considers that for applying reengineering is very important the leader who conducts the process. In the same way, in order to reengineering being successful, it must be conducted in a disciplined way and introducing the radical changes must be applied to the whole company. Reengineering is the responsibility of the administration, so that the management of company is responsible for improved results.

"Deer & Company", it is a company of agricultural industry, known for gradually introducing the reengineering, because of negation larger part of organization. Reengineering firtsly was implemented in parts of organization where the changes were easier accepted, that are drive factory and Department of Insurance. Successes of reengineering in these parts, later were used as support to the whole organization, esspecially top management. Unfortunately, there are a lot of companies in the world which start with reengineering, but they don't persevere to the end. Their attempts finish there where they started. There are no significant changes nor great improvements. It is considered that 50-70% of organization who start reengineering do not achieve dramatic results that were planned.

CONCLUSION

It is very important to have resources and capabilities, clear vision and big desire in order to reenigneering of business process could become successful. Beside all mentioned, it is needed to possess courage to start with changes which will change business processes from the root. The success

of reengineering is linked to ability. If people manage with reengineering who don't have enough knowledge, and do not know the conditions, failure is guaranted. On the other side, if people manage with reengineering who have enough knowlegde, will and in front of all objectivity, and if organization understands concept of reengineering and implementation follows the instructions, in that case the reengineering will be very successful.

Very important factor in process of reengineering which must be emphasized is the influence of IT. Information technologies are integral part of each enterprise and they present main support during the transformation business processes. In the implementation phase, tools are used for development of application in oreder to adapt company's information system to organizational changes and new requirements for information that are consequence of changes.

Due to its radical principles and rapid breakthrough into processes what we have intention to change, and esspecially in terms of increasing the quality in all dimensions and aspects, there are opinions that reengineering in the most companies can be very acceptable. Advantage of reengineering is that it tends to penetrate to the essence of the problem and dramatically attacks them with new solutions which are based on completely new, radical combination of available resources.

Company that wants to respond to new business challenges must constatnly change itself and to adapt to leading trends. Most business, esspecially enterprises in transition countries, sholud apply concept of reengineering, in order to adapt to dynamic changes in the envirnoment. In these countries, reengineering sholud not be radical, but oriented on advancement of existing processes, and with development of information system.

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QUALITY IMPROVEMENT AS AN AGENT OF CHANGES IN AN ORGANIZATION

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ABSTRACT

The world in areas of production, technology, organization and management in recent decades is surviving huge changes. Modern business brings new rules, new methodes, new people, in effect, period of changes appears which is taking place in companies across all over the world. The changes create foundation of new business culture and new criterions of business success. The main goal of changes is improving competitiveness and better market position. The strategy of constant innovations and dynamic changes are responses to the requirements which market struggle sets. It is necessary for modren organization to be open for innovations, to be flexible, creative, with more precise determination of optimal strategy and creation of organizational culture, decision-making and management. That vision of gradual changes can be achieved by establishing a trend of constant innovations in all parts of organization. The basic purpose is to establish an innovative organization in which innovations will not represent rarity or a periodic appeenrence, but the aim for which every employee tends during each working day.

Key words: quality, doing business, innovations, competitiveness.

INTRODUCTION

The issue of quality is very present in the theory and practice of modern management, esspecially the last few decades. The quality of products and services has growvn into the most competitive weapon of numerous organizations around the world. The global market requires more and more products of high quality and it will be insisting on it with the aim of faster accomplishing the overall progress. The competitiveness of organization in the world market is determined by the quality of processes within the organization itself. The product quality is desire and goal for every successful market-oriented business system. The quality signifies an effort to do things well for the first time and each next. Nowadays, requirements for innovation skills, uniqueness, well-designed products, flexibile adaptation to the changeable market conditions and customers' requirements present the biggest requirements for standards of quality for modern organisation. The buyer is the one who defines the quality, and not the manufacturer. It is necessary to know user's needs for evaluation of quality.

MODERN MANAGEMENT AND QUALITY

The quality of products and services has grown into the most competitive weapon of numerous organizations around the world. The most successful organizations will be those which could develop an innovative culture. In the past decade, organizations around the world proved that quality often means lower expenses. Also, better quality means reducing errors, needs for finishing and work that does not contribute to raising the value of the product (Dyson, 2002). The costs of prevention, that are made at the design stage, are far lower than those that originated from account of prevention during

production, while these costs are far lower than costs of identification malfunction and corrections after finished control, which are again far more lower than expanses of corrections after identification of defects by users. High quality usually provides satisfaction of customer, increased market share, higher level of customer retention, increased customer loyality, even accepting the highest price. The users increasingly expect and demand higher quality products and services. Overcoming the level of quality which is offered by competitors in the market, organizations are coming to new buyers, retaining existing and win new markets. Frequently, informed users have will to pay the highest prices for quality of the highest level which considers new, useful features and it affects the reduction of the total expenses of product life cycle. Today, leading organizations consider as one of the most important aims TQM, the high satisfaction of its employees. The concept of the appropriate authorized employees presents a framework for a multitude of new concepts. The appropriate authorized employees are able to establish mechanisms of management their own work. Thus, they can estimate the quality of their own processes, to interpret results of measuring and to compare them with the set objectives, and also to take over appropriate corrective actions if it is necessary. Employees usually have knowledge, skills and experience to perform changes of processes, improving them in the field of effectiveness and also efficiency.

QUALITY AS THE AIM OF THE ORGANIZATION

Quality as the aim of the organization sets in front of employees the maximum demands, thus organizations which want to achieve quality must invest maximum in employees and provide conditions for fulfilling their personal aims and needs. The relation between motivation for work and motivation for quality is such that organization can resolve the issue of motivation for work to some particular level (in terms of quantity), but not to resolve the issue of motivation for quality. However, if motivation for work is not resolved, it can hardly be said about motivation for quality. The management of organization is not able to control all these factors, but it must know and manage factors which are under its integration, such as the individual characteristics of person, characteristics of work and organizational environment (Collins and Porras, 2002). Individual characteristics represent needs, values, interests and attitudes which are possessed by persons. These characteristics are various at different people, an they affect their incentives for performing tasks, so in that way some people are motivated by money, some by job security, some by challenging tasks, etc. Management must take into account individual characteristics of employees in order to encourage those who contribute to the achieving the goals of the organization. Job characteristics present the attributes of the work such as autonomy, complexity, responsibility, etc. During the distribution operations it must be established harmony between individual characteristics and characteristics of work. Characteristics of work refer to the rules and procedures in organization, strategy and policy of human resources, practice management and reward system by which it is contributed to the efficiency of the organization. Motivation for quality is based on internal factors, that are typical for individual, then motive of self-actualization and the achievement motive. Quality demands whole man, full addiction to accomplish the set goals and standards, and their continous reassessing and promotion. The employees, to whom successfully performing the job means the pleasure by itself, tend to the quality.

TOTAL QUALITY MANAGEMENT TQM

TQM- Total Quality Management represents the last applied level in quality management.. TQM approach has been applied both in production and in providing the services. Approach includes improving the functioning of the organization, operation and every individal. Total quality management is a systematic approach to management which has for the aim continued advancement values for buyer, design and continuous improving business processes. Continuous improving and advancement refer to the products, services and organizational systems with which it is being accomplished increased value for buyers. Innovations of technologies, products, processes and organizations present part of this strategic concept and orientation of modern organization toward

improvement and innovations in all aspects of its functioning. Organization as that tends to constant changes in order to realise new requirements and needs of customers.

Organization is completely focused on the demands and needs of customers. The aim od TQM is to engage all employees in the organization and system of quality improvement. It siginifies the way of life organization which installs continuous improvements business' indicators at the all levels and in all activites, it creates adequate environment through teamwork, trust and respect, it systematically accesses, consistent and organized in processes, it applies quantitative methods and analytical techniques, with full applicaion of knowledge and experience in advancement of processes. TQM is a method of defining problem, identifying the cause of the problem, taking appropriate actions, checking the efficiency of actions, standardizing solutions and further development of the process.

That is a method which includes: learning about the needs and expectations of customers, engaging the organization as whole, analysis of all expenses that refer on quality, placing priority on quality compared to the control ("properly do for the first time"), development of approach and procedures that support quality and training. TQM has result: fulfillment of expectations of customers and all stakeholders (owners, suppliers, trade unions, shareholders, banks, business environment), the accomplishment of business excellence and exquisite business performance, product development and world-class service with an attractive quality, responsibility and authority of all employees, development and the involvement all employees to the learning process, orientation on buyers and partnership, particularly with suppliers, resources management, process management, continuous control, analysis, measurement, improvement and innovation.

QUALITY MANAGEMENT ACCORDING STANDARDS TO ISO 9001 IN THE WORLD AND IN SERBIA

ISO 9001 is an international standard containing demands for a quality management system, which an organization has to fulfill in order to coordinate its operations with internationally accepted standards. ISO 9001: 2015, as a part of series of standards ISO 9000, presents an international standard by which are defined criteria that organization needs to fulfill in the context of the organization of quality management system. Although ISO 9001: 2015 prescribes which requirements of system of quality management system have to fulfill, it does not define how they should be conducted in particular organization. In that way, it is achieved huge flexibility in implementation in different branches of industry and in different market environments, respecting organizational structure of companies and resources with what they dispose with.

ISO 9001, as a leading world standard of quality management, it has passed revision process. New, updated version of the standard is published in September 2015. ISO 9001: 2015 has more developed structure in relation to the version of the standard in 2008 in order to allow its easier useness in combination with all other standards from management systems field. Some of the main changes in new version of standard are: equalizing terminology with other standards from system management field, adapting to service organizations- term "product" is replaced by the term "good and services", the introduction of explicit requests for acceptance of the process approach in system quality management, following the trends of development

IT systems ant its application in companies, terms "document and record" substitute with the term "documented information", from understanding of requests and expectations of users moves on understanding of requests and expectations of all stakeholders, the obligation of establishing indicators of performance processes is introduced, their monitoring and measurement, the number of obligated documents is decreased.

From the beginning of the year 2000, ISO organization began with collection and analysis of data about number of issued certificates for standardized management systems (SMS) worldwide. Due to

the volume and characteristics of this process, available data for this analysis are delayed at least one full calendar year, which also is valid for results depicted in this work.

Table 1: Overview of number of certificates for SMS in the world for 2011, 2012 and 2013

Standardized management system (SMS)	Number of certificates	Number of certificates 2011	Increasing	Increasing in %
ISO 9001	$1,101,272^1$ $1,129,446^2$	1,079,647	$21,625^1$ / $32,249^2$	$2\%^1$ / $3\%^2$

Source: The ISO Survey of Management System Standard Certifications - 2012/2013. (www.iso.org).
Note: [1]2012; [2]2013

Certification for ISO 9001 has stable trend of growth worldwide. At the end of 2013 (31.12.2013.) in the world, there were 1,129,466 certificates in 187 countries, and increase compared to 2012 is 3%. The first three countries in the world according to number of certificates are China, Italy and Germany, and in Europe: Italy, Germany and UK. The first three countries in the world with the highest growth of certification in 2013 are Italy, India and the United States. According to the number of certificates for ISO 9001, Serbia is on the 51 place in the world, out of 187 countries that possess this certificate. In table 2, it is shown the summary of the number of certificates with relations: Serbia, the world and Europe, expressed in ‰ for the number of certificates in Serbia, in 2013.

Table 2: Comparative analysis of the number of certificates in Serbia

Standard	Serbia	World	Europe
ISO 9001	$2,366^1$	$1,129,448^1$ $(2.1)^2$	$485,554^1$ $(4.8)^2$

Source: The ISO Survey of Management System Standard Certifications - 2013. (www.iso.org).
Note: [1]Number certifications; [2]in %

AWARDS FOR QUALITY IN THE WORLD

In recent decades, the need for measuring the performance of organization is more expressed. To survive, organizations follow competition and tend to increase competitiveness and to improve total performance. For successful performance management of the organization, it is necessary to measure them according to changes in the business. For that reason, many countries have founded national awards for quality and business excellence.

Organizations accept and adapt particular models for assessment of performance, in order to realize the value which will be evaluated and awarded by prize for quality. Through the awarding excellence in business, values are being promoted: productivity, efficiency, quality products and services, environmental protection. Quality rewards has the purpose to pay tribute to organizations that accopmlished business excellence. Beside paying tribute, awards for quality provide model for organizations that will ideally represent business excellence and the application of TQM in practice.
In the world, there are numerous quality awards, among which the most famouse are the next rewards that mutually differ (Kostić, 2007):
− Deming Prize for quality in Japan
− US National Quality Award (MBNQA- Malcolm Baldridge National Quality Award)
− European Quality Award (EFQM- European Foundation for Quality Management)
− Oscar of Quality- the national quality award in Serbia, which globally does not have a significance, but it is important for development of quality in Serbia.

In the middle of the last century, Japan has lanuched its model of business excellence. The application of this model has resulted in the growth of the Japanese economy. In the seventies of the last century, Japan began to hamper competition. America has created own Quality Award as American model of

excellence, as a measure to the Japanese industrial boom. For the short time, the application of this model has given the results, and American economy has regained its place in the global market. Europe has gained insight, with a certain delay, that it is needed to create its own model of excellence in order to European comapnies could become more competitive. Year 1991, it launched EFQM-Model of the European Quality Award, and the first award of the prize was a year later. As in Japan and America, this model of excellence gave the excellent results.

CONCLUSION

Improving the quality of business becomes imperative of modern market and global flows. Implementation and establishing process of constant quality improvement present the basis for advancement of organizations's business productivity and creating competitive advanatage in the international market. With application of process approach and implementation of the basic principles of quality management, top management of organization and individual processes management, have to create environment, by their leadership and actions, in which the employees will be completely involved and in which system of quality management can function effectively and efficiently.

However, customers have become more selective and also there are more and more competition, so it is necessarily to offer more to the customer than the competition and to totally fulfill its demands and needs. The sole way that organization can attract and retain the customers is the quality product or service. The current time is the time of quality. Process of business system management and defined long-term development plans are necessarily to be focused on the quality, so far as it is desirable to survive in the business world trends.

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SERVICE QUALITY IMPROVEMENT IN THE HOTEL INDUSTRY WITH A VIEW TO INCREASING CUSTOMER SATISFACTION

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ABSTRACT

The hotel industry is growing rapidly, which has enabled the economic development of certain world regions, such as East Asia and the Pacific. The conditions on the global market have influenced the hotel enterprises to opt for constant service quality improvement since it is the only model which meets new challenges. The trends in the hotel industry are changing, both for the customers and for the hotel business. The reason for these changes lies in the fact that hotel enterprises are forced to include management concepts in their business operations, such as benchmarking, quality management system (QMS), integrated management system (IMS) and corporate social responsibility (CSR), with a view to obtaining customers' loyalty. Due to their application in business operations, the hotel enterprises excel in business which also contributes to the hotel service excellence. As a result of these activities, the end user is satisfied with the hotel services which is the foundation of the hotel enterprises' business philosophy.

Key words: the hotel industry, customer satisfaction, service quality.

INTRODUCTION

In contemporary market conditions which are increasingly characterised by the uniformity in the offer of mass-produced products and where the market is being unified by mass products, service quality is considered one of the best sources of differentiation and competitive advantage in gaining prominence. Providing quality service is an imperative in the implementation of the orientation towards the customer. Service quality, as an important source of sustainable competitive advantage, enables the service organisation to increase its market share. Three elements affect service quality and those are **customer satisfaction, customer loyalty** and **business performances**. For this reason, service companies have the obligation to create within their business philosophies the most suitable atmosphere for the development of these three elements which enable further survival of the companies on the market (Ranđić et al, 2009).

Service quality is the model which enables the development of the companies' competitive advantage while having an impact on customer satisfaction and value-based observations and resulting in the improvement of the company's image. Service quality perception occurs as a result of comparing customers' expectations with the achieved service performance. What is specific about services is that the customers usually react quickly to their quality, while this reaction is slightly delayed when it comes to material products. It can be said that service quality has a few advantages, such as:
−   achieving competitive advantage on the market,
−   creating customer satisfaction and consumer loyalty and
−   improving service provider's image.

Service quality is a way of managing business processes in order to insure complete customer satisfaction at all levels (internal and external) (Grižanić, 2007).

In the conditions when the service organisation wants to increase service quality and satisfy its client, it has to bear in mind that its goal is not service maximisation, but obtaining the maximum profit out of it. Namely, it is very hard to obtain the maximum for each client, since that kind of approach does not lead to profit-making, but it is necessary to determine where improving service effectiveness leads to the highest profits. In service organisations, the prerequisite for providing quality services and achieving customer satisfaction is having knowledge. In other words, companies can only successfully cope with the complexity of providing services with additional value and encouraging innovation by possessing knowledge. Certain authors in the management area are of the opinion that knowledge has become a product and that its influence on companies is rapidly increasing, since they apply their intangible knowledge with a view to creating new business opportunities.

Contemporary business operations in the hotel industry are characterised by the care for target groups of hotel service users, since hotel enterprises secure loyal users in such a way. However, owing to the development of the society, technology and life styles, the users themselves change their attitude towards traveling and staying in a hotel. Hotel enterprises are again facing new trends in tourism as a prerequisite for their further survival on the hotel market. Hotel enterprises have to identify their customers and markets which they want to enter, which are the key challenges in developing their financial security. Thanks to the great availability of information, the end users are nowadays perfectly informed owing to the influence of numerous information, which conditionally creates a problem to the hotel enterprises during the adaptation to their demands. In the beginning, travelling was available only to those who had significant financial means and to the nobility, but with the further advancement of tourism and the hospitality industry, it became available to all social strata. With the development of the society, there was also a change among the hotel service users themselves, where there is a significant market segmentation by groups based on their needs, affinities, wishes and propensities, such as for example business, adventurous, sport, luxurious, sexual, rural and similar affinities (Bogetić et al, 2015).

CUSTOMER SATISFACTION AS A HOTEL BUSINESS IMPERATIVE

Customer satisfaction is said to be the parameter of the companies' successfulness on the market and in conquering certain market segments. Furthermore, customer satisfaction is one of the important elements in the evaluation process of service or products' quality. For this reason, it can be stated that it is harder to objectively measure service quality than product quality. Service quality perception occurs as a result of comparing customers' expectations with the achieved service performance. What is specific about services is that the customers usually react quickly to their quality, while this reaction is slightly delayed when it comes to material products. However, customer attitudes about product or service quality can change depending on the change in the attitudes of customers themselves and depending on the change of product or service quality as well. It is thus considered that the company has to work continuously on the improvement of product or service quality, with a view to surviving on the market.

One of the imperatives of a successful manager is the extensive knowledge of the market and the prediction of existing trends in his/hers field of expertise. The same applies to the managers of hotel enterprises who have to be well-acquainted with the new tendencies on the hotel and tourist industry market with all their specificities.

If the hotel enterprises are not flexible and adaptable to the new market trends, their perspective is not promising, i.e. the end users will be less and less satisfied with the offered services and they will soon be using the competitive hotels' services.

One of the most famous consulting companies in the area of hospitality, Horwath HTL, has released their evaluation of new trends in tourism development in the future. The above mentioned trends are the imperative for hotel enterprises if they want to survive on the market. The first five trends will have a major influence on demand in the tourism sector but will also impact the second set of trends, which concerns changing supply.

Together, they represent forces which will shape the future of tourism and the hotel industry. New trends in the area of tourism are (Horwath, 2015):
1. Silver hair tourists
2. Generation Y & Z
3. Growing middle class
4. Emerging destinations
5. Political issues and terrorism
6. Technological (r)evolution
7. Digital channels
8. Loyalty programmes
9. Healthy lifestyle
10. Sustainability

Hotel enterprises have to think about these trends and start with the change of their business philosophy in order to be ready for new end users' demands. However, hotel enterprises already have to be ready for the new focus group, the so-called Millennials, representing young people born between 1980 and 2000. What is specific about this focus group is that they base their stay in a certain hotel and certain destination on exploration and gaining experiences. Moreover, hotels are required to increasingly use information technology in the process of providing hotel services with the aim of meeting new demands of this generation and so as to give the Millennials a unique hotel experience. Certain authors in the marketing area are of the opinion that nowadays in the conditions of global competition and large selection of products and services, customer loyalty is very short-lived. For this reason, it is necessary to work constantly on service improvement and to communicate with the end users. Following the new trends, and in accordance with the business philosophy it follows from its establishment, the Ritz-Carlton Hotel maintains an image of a leader in product and service excellence. These occur as a result of their owner's, Cesar Ritz's, credo which all employees in these hotels must follow to date. However, their CRM system, the Ritz-Carlton Mystique, is a good example of the hotel enterprise's relationship with its users, who in this way gain an unforgettable experience.

The coinage Mystique is a data base which the Ritz-Carlton hotels use to track information such as guests' affinities and habits, the frequency of their visits and the complaints they had during their previous stays. The obtained data is helpful in understanding the relationship between an individual guest and the brand, and the data is considered useful only if there is staff readiness to use these data to create permanent, unforgettable and unique experience for the guest. An example of how the Ritz-Carlton Mystique functions can be seen in the relationship of this hotel with one of its loyal users: "When I entered my room, I found they had stocked everything I would ever need. The hotel had laid out my favourite snacks, magazines, movies and music. Everything was there for me. I had a bowl of fruit (a favourite snack of mine) and a box of chocolates with my name spelled out on the pieces." There were even business cards in the room made up for the guest with his contact information at the Ritz-Carlton (Michelli, 2008). Human resources certainly play an important role in the functioning of the Ritz-Carlton Mystique and in all the other models helping hotel enterprises in their dealing with the customers, i.e. when it comes to the process of selecting quality people, their training and readiness to accept the philosophy in which they have to take care of their customers' habits and meet their demands.Certain authors in the area of hotel business point out the significance of diversity in hotel facilities and characteristics considered necessary for raising customer satisfaction. Characteristics such as cleanliness, price, location, safety, personal service, physical attractiveness, the possibility for relaxation, standardised service, appealing image and reputation are recognised as crucial, deciding factors in a large number of studies and it is considered that besides the material components of the hotel product, such as the vicinity of restaurants or suitable parking space, the aesthetics of the hotel, both inner and outward, is also particularly relevant for the customers. The studies also state that the longer the stay is, the more important the client-staff relationship becomes (Radojević et al, 2015). Nevertheless, the latest research shows that one of the key

factors for service quality evaluation for the hotel users is that free WiFi is included in the offer. This is the crucial factor for some users when choosing the hotel. Today's tourists have to be offered an interesting combination of "things to see and things to do". The attractiveness of a tourist product is measured by the quality of its content. The fact that tourists' needs cannot reach a point of complete saturation is important for the tourism industry. Development is secured when the needs exist and when they are adequately satisfied, and the constant improvement of the quality of the tourist offer enables an active encouragement of tourist service development (Antić, 2016, p.230).

THE APPLICATION OF INTERNATIONAL STANDARDS IN THE HOTEL INDUSTRY AN ANALYSIS

The concept of quality is a widely discussed area in the hospitality management. Quality in the hospitality industry is defined as "the consistent delivery of products and guest services according to expected standards". Nowadays, guests are willing to pay more when they visit hospitality properties offering service that meets or exceeds their service expectations. The level of quality service is an important factor in the experience that guests receive during their visits to lodging operations (Kapiki, 2012). By creating value for the guest and establishing adequate lodging, existing guests can be successfully retained. Moreover, it is extremely important for hotel enterprises that their managers recognise the importance of client retention, since the attraction of a new customer is regarded to be a more expensive and time-consuming process. In the conditions of global competition, the issue of quality is of utmost importance for hotel enterprises, which is a result of the influence of certain factors such as:
−   The expansion of consumer rights,
−   The development of quality conscious tourists,
−   Hotel enterprises becoming increasingly aware of the importance of quality as a source of competitive advantage.

When we talk about quality, self-evaluation also has to be mentioned, which is in the hotel industry usually done through comment cards in the guestrooms or online questionnaires. It is very important for the hoteliers to be able to identify and solve the problems. Hotel enterprises have to approach the issue of customer dissatisfaction seriously for two reasons:
−   Guests who aren't satisfied with the services in the hotel enterprise will direct their trust and loyalty towards another hotel enterprise. Dissatisfied guests will have an influence on the creation of bad publicity for the hotel enterprise. On the hotel market, characterised by the high level of competition, bad publicity is not something that any hotel enterprise needs.
−   The results of guest dissatisfaction with the hotel's services are – the complaints. Guest complaints have an influence on the creation of conflicts between the hotel, hotel employees and the guest. These conflicts can contribute to bad communication between these parties, with the end result being an inadequate working atmosphere in the hotel and the departure of loyal guests to other hotels.

By solving customer dissatisfaction, hotel enterprises affect the increase of service quality levels. These activities can be successfully done if there is good communication between the hotel and its guests. Putting emphasis on good communication between the hotel and the guests is a result of big competition on the hotel market, but also the need to get feedback from a dissatisfied guest. Guests who are not satisfied with the service in the hotel, often show their dissatisfaction with silence, which is a big problem for a hotel enterprise. It is thus necessary that the hotel enterprise is more engaged in the problems of dissatisfied guests and their complaints about the quality of the hotel service, since that is the only way that those guests become loyal and satisfied again and have a nice opinion about the hotel and its service quality. In global hotel enterprises the issue of quality encompasses hotel enterprise's focusing on two important directions:
−   The implementation of international management standards defined by ISO with the function of establishing integrated management systems and
−   The application and development of hotel standards.

The first area of application involves the implementation of ISO management standards, primarily the quality management system, as well as other management standards necessary for the formation of integrated management systems. When we talk about the ISO standards in the hotel industry, we usually mean the most common ones, such as ISO 9000, ISO 14000, ISO 22000, ISO 50001, but ISO standards applied in tourism and the hotel industry are also often implemented, such as for example ISO 18513:2003, ISO 13009:2015, ISO 13687:2014, ISO 18065:2015, ISO 17680:2015, ISO 13810:2015 and the like.

The implementation of standards is of utmost importance for the hotels' business quality improvement which is characterised by the simplification of working processes, lower costs and increasing efficiency in performing business processes. Owing to the standards, hotel enterprises have defined working processes and thus lower the possibility of error occurrence to a minimum. Likewise, standardised working processes enable hotel enterprises a functioning system for incorporating new employees. Countries with highly developed hotel infrastructure and hotel accommodation capacities have accepted this philosophy which has contributed to higher tourist interest and higher consumption in those destinations, resulting in economic development and raising competition levels in the area of tourism and hospitality. This kind of position in hospitality is possible only by implementing quality standards.

Classification of activities and categorisation of facilities are most often mentioned as one of the examples of the second group of standards. However, other forms of regulations also exist whose aim is to improve hotel enterprises service quality. One of the more important regulations is connected with the application of HACCP in hotels and restaurants. The issue of hygiene and health safety, as well as food preservation, is of great significance, and the consequences of non-compliance with the regulations in this area can be fatal for the future of hotel and restaurant enterprises. Other international standards besides HACCP, whose aim is to establish a system, are also included in these standards, as well as the standards dealing with the issues of travellers' safety, employees' safety and business excellency models. The responsibility to deliver safe food has led to the emergence of a trend in the hotel industry relating to the usage of organic food and agricultural products in hotel restaurants. All food products are required to have organic certification. After the implementation of standards, a hotel can and should keep its specificity and recognisability through diversification of the hotel offer and personalised service. The standards enable work simplification and speed increase in the execution of work tasks, leaving the employees more time for hotel guests, with the aim of satisfying their needs and demands. The rule is to fulfil every guest's wish and for special wishes which deviate from the standard hotel service there is also a special price (Radosavljević, 2007).

The standardisation process is complicated, long-lasting and continuous, and it demands teamwork, but primarily good employee education. Namely, a prerequisite for the successful implementation of international standards in a hotel enterprise is that the employees understand the new working system which is being established. Fear of change is a significant aggravating factor which slows down the acceptance of new management concepts. Due to the fact that enterprises in other industries are also faced with this problem, it turned out that management, where employees have the highest responsibilities, has the crucial role in these processes, which is also confirmed by the quality management principles.

For hotel enterprises which place importance on the customer/guest, satisfaction is both a business goal and a marketing tool. As with satisfaction, customer dissatisfaction is also the difference between product/service expectations and customers' perception of what they got in that transaction, whereby the perceived value is less than expected (Živković et al., 2013).

Hotel enterprises especially pay attention to environmental protection and sustainable development, which is best confirmed by large international hotel chains' practices. The most frequent hotel commitment areas are energy, water and waste management. However, (Cherapanukorn et al., 2014) apart from these environmental activities many hotels have programs to protect the biodiversity and in particular the marine (Shangri La, Six Senses, Banyan Tree and DusitThani). Banyan Tree Hotel has even developed two special labs for marine research with basic facilities and equipment for fieldwork conducted by the greatest experts and scientists from around the world. The necessity to care about these issues is obvious, as many of these hotels and hotel chains rely on sea experience for customers, such as the beach, diving or other water sports and all that with a view to satisfying customers. Hotel enterprises have timely understood that only by constant business quality

improvement can they sustain a certain level of service quality and retain their customers. International standards which are being implemented enable hotel enterprises to carry out the processes of raising service quality levels and customer satisfaction in a most efficient way.

CONCLUSION

Strong market competition, characterised by the emergence of new countries on the hotel industry market (Asia and the Pacific), as well as the new trends among the end users, have influenced hotel enterprises to perceive the necessity of improving the former way of business. Today's end users of hotel services are different than those from 10 years ago, since there has been a division of users into more segments according to the new interests and desires, which additionally complicates the hotels' business, whose basic philosophy is customer satisfaction with the hotel services. The service quality issue has also been dealt with by the founders of certain hotel enterprises before the World War II, who have understood that quality is a significant comparative advantage over the competition. Certain famous people in the area of hospitality, such as Cesar Ritz and Conrad Hilton, have set the foundations of today's business operations, especially when it comes to cleanliness, communication with the users, keeping a database of hotel service users, employees' education, satisfying customer demands and the like. Everything mentioned above are the reasons due to which hotel enterprises have in the last 20 years started implementing management concepts, such as QM, QMS, EMS, OHSAS, HACCP, CSR and the like, with a view to raising the level of service quality. Simultaneously with the development of new trends in the society, there has been a development in the standards which define certain processes, thus facilitating business activities to hotel enterprises. With the application of management concepts, a hotel enterprise is working on constant business quality improvement which contributes to service quality improvement and customer satisfaction.

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QUALITY IN FUNCTION OF IMPROVEMENT OF BUSINESS AND COMPETITIVENESS

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ABSTRACT

Quality is a key factor of improving business operations and competitiveness. Conditions of market economy, openness of international market and fierce competitive race, requiring the application of modern quality concept. Quality is the responsibility of all employees. Improving the quality based on the application of ISO 9001 and total quality management are the basis for successful and competitive business. Standardization of operations based on the application of international standards and striving towards achieving business excellence are the key factors of a competitive market positioning in the global market. The paper analyzes the implementation of standards of quality and their effects on the business. Improving quality is a condition for realization of development goals of the company, but also one of the ways to start the process of overall economic growth and development.

Keywords: quality, standards of quality, competitiveness, improving business.

INTRODUCTION

The global market requires economic operators to use its advantages in the best possible way. In the business market changes are more dynamic. Who is in these changes slow, slow to learn and quick to forget, was sentenced to extinction. The market has become the arena in which the providers of products and services relentless struggle for each promil markets. Survival in the market can provide only fastest who are able to outperform competitors. Being a competitive on market is to recognize and appreciate the needs and requirements of market, and that means being able to offer competitive quality, respecting the principle of just-in-time. Quality today is a vital element of change and expansion of the resource base in the global market.

For inclusion in the global market economy primitive organizations as well as organizations with traditional management style must make a radical strategic shift from problem-oriented towards a systematic and innovative management style. It's a style of management that is focused on long-term measures, prevention of problem and change management through continuous improvement and innovation, which companies provide constant improvement and sustainable growth with constant prilbližavanje goals of business excellence (Heleta, 2010).

IMPLEMENTATION OF QUALITY IN BUSINESS

ISO 9001 is an international standard that defines quality management system and is the only standard of quality management, which is a comprehensive applicable to all organizations, products and services. The purpose of this standard is to facilitate business. By applying the principles and requirements of this standard greatly simplifies operations thanks to a clear definition of responsibilities. Established and certified quality management system according to ISO 9001 indicates that the production processes and working methods defined by the enterprise so that it allows the delivery of good quality products, but does not guarantee the quality of product. With a regulated system of business there is a greater possibility that the company will actually produce quality.

Integrated management systems can be of great importance to companies from countries in transition, as they represent an effective means of improving competitive advantage in the global the market. Namely, instead of building a long-term concept of TQM, in a shorter period of time can achieve the goals of business excellence by applying one by one module integrated management system based on respect for the requirements of international standard ISO 9001, ISO 14001 and ISO 18001 (Sajfert et al., 2006).

The concept of TQM is a multidimensional and dynamic model of quality management, which takes into account all parameters of business management, emphasizing the responsibility of each individual business, especially to increase productivity as well as the imperatives of modern business. Special attention is paid to the human factor. One represents knowledge and work, and he as a worker and manager responsible for the implementation and improvement of quality. European Foundation for Quality Management EFQM defines TQM as a method of management of the company for the achievement of business excellence based on customer focus, partnership with suppliers, the development and inclusion of all employees (Đorđević, Ćoćkalo, 2007).

Knowing the current position is the starting point in any improvement. No improvement without setting standards, so it should establish a precise standard for measuring each employee, machine or process. Kaizen - key Japanese business success, a strategy that is a constant review of the prevailing standards, and better replacement of existing standards. Any measure, regulation or standard is aimed at continuous improvement or revision. If the establishment of of that proposed solution brought results, adopt a new standard. After the establishment of the work under the new standard, we can say that there have been improvements.

The results of the study (Molina et al., 2004) also confirm complementarity of ISO 9000 and TQM since they affect different aspects of knowledge transfers. While ISO 9000 aids transfers by influencing the degree of knowledge transferability, TQM does not affect this aspect, concentrating oil the aspects regarding human resource management and organizational culture.

In order to support TQM effect on KM practices (creation, storage, distribution, application), companies should follow nine practical directions (Ju et al, 2006):
−   Top management supports the implementation of the four KM value chain activities in terms of goal setting and resource allocation,
−   All employees should commit to company's policies of KM and value chain activities
−   Quality measurement should be set up to measure the four KM value chain activities;
−   Other companies that are known for their good practices of KM value chain activities should be benchmarked;
−   The concept of process management should be applied and a suitable process for KM value chain activities should be developed;

- TQM's emphasis on quality, customer involvement should be applied, and other departments should participate in KM value chain activities;
- Training for employees should be provided in order to further understand KM value chain activities;
- The employees should be authorized to organize formal and informal KM communi ties;
- Customers' opinion and satisfaction should be valued in the design of ihe four KM value chain activities.

THE INFLUENCE OF QUALITY ON IMPROVING BUSINESS OPERATIONS

The contribution of TQM to innovation is related to continuous improvement. In addition, research indicated a casual relationship between quality performance and innovation that confirms the view that quality and innovation can be improved simultaneously. Based on Perdomo-Ortiz et al. (2009) the positive effects of TQM on innovation can be conceptualized in three aspects. First, market orientation and customer focus related practices which provide organizations with the customer needs information that leads to new ideas to meet these demands (Fuentes et. al., 2006; Hoang, et. al., 2006; Hung, et. al., 2011). The next contribution of TQM to innovation is related to continuous improvement. This practice aids to improve know-how within the organization by recognizing the necessary changes in processes (Perdo-mo-Ortiz, et. al., 2009; Prajogo and Sohal, 2004a; Satish and Srinivasan, 2010). Finally, Teamwork, employee empowerment, and people management which encourage autonomy and sharing ideas among employees that consequently leads to innovation (Fuentes, et. al., 2006; Hoang, et. al., 2006; Per-domo-Ortiz, et. al., 2009; Prajogo and Sohal, 2004a).

Concurrently, a wide range of studies have examined the relationship between TQM and innovation (Abrunhosa and Moura E Sá, 2008; Hoang et. al., 2006; Lopez-Mielgo et. al., 2009; Lorente et. al., 1999; Prajogo and Sohal, 2003). Prajogo and Sohal (2003) stated that TQM and its cultural factors foster innovative activities in the organization. Many firms adopt quality management programs in order to achieve high degree of differentiation and to reduce costs (Tarí 2005). TQM refers to a management approach to planning and implementing continuous improvement throughout the entire firm for performance improvement (Claver-Cortes et al. 2008; Teh et al. 2008).

A study by Talib et al. (2011) reported an intensive review of TQM, finding that top management commitment, customer focus, training and education, continuous improvement and innovation, supplier management, and employee involvement are major practices for TQM. If quality management practices lead to knowledge creation then the link between quality management and firm performance can be explained. That is, quality management becomes a source of knowledge creation that results in a competitive advantage. Note this is a necessary but not sufficient condition for success. For example, lack of senior management support in implementing quality management practices could also lead to poor results.

REVIEW OF RELEVANT RESEARCH

Analysis of factors for improving business, development of competitiveness, implementation of system quality standards and their impact on business have been main point of interest in vast number of research, and only few of them will be presented here. Research dealing with concept of corporative entrepreneurship (Bešić, Đorđević, 2009) had obtaining information about executives' attitudes towards running business. According to this research, some of the main factors extracted are: improving quality of business 22,5%, increasing productivity 20,3%,

enterpreneurial behavior 16,54%, education of employees 15%, upgrading technological basis 8,27%.

Research (Ćoćkalo et al, 2010) conducted on territory of Republic of Serbia had set as its main goal determining facts, attitudes and opinions regarding introduction of new quality management systems into industry as well as stating reasons for and against certification and difficulties and effects of its implementation. As for the problems about certification of ISO 9001 standards and reasons against it, they all stem from procedurally-administrative and spending issues. More specifically, they refer to time needed to do the documentation, performance and implementation, excessive paperwork, difficulties in interpreting standards, high costs of implementation together with high maintenance costs. We may conclude that more attention is paid to benefits of certification and that problems are being devaluated by being treated as natural side-effects. Great emphasis is being put on importance of internal motivation for improving organizational processes since it represents the situation where certification has proved to show the best results for upgrading performances and market position of enterprises. Research conducted amongst certified organizations in Serbia (Majstorović, 2007) which was focused on general model of quality management and its application has extracted, as main effects of QMS the following: improving relationship with the buyer 44,2%, promoting quality 22,4%, improving processes 19,1%, increasing participation of employees 12,5%. As main negative effects it has extracted: increase of bureaucracy 26,7%, extending working processes 19,8% and decreasing attention 4,1%. These factors contribute to the fact that it is necessary to implement system of quality management in order to improve competitiveness of national companies on international market.

Similar research on implementing systems of quality management and its effects on business, as well as upgrading knowledge in the companies have been conducted in countries from this region and wider and only some of them would be mentioned in this paper. Research (Gutošić, 2009) of introduction and implementation of quality management system influence on small and medium enterprises, according to ISO 9001 standards, Answers to the question about changes in quality after implementing management control systems state the following: quality of delivered products/services has improved 10%, total income has increased 10%, ratio of expenses in general income has been reduced 6,5%, image of the company has improved 37%, business organization has become better 47%, doing business has become easier 20%, rentability of business has increased 13%, responsibilities and obligations have been made clearer 70%, number of employees has grown 6,5%, responsibilities of the employees in charge have become greater 77%, staff turnover has increased 27%. There were no cases without any change.

Research (Marijanović et al, 2010) conducted from October 2008 to June 2009 focuses on analysis of conducting business in Croatia and it involved 273 organizations. In 91% of companies employees present the most important element of firm's success. Croatian organizations are mostly concentrated on short-term results and in lesser part on long-term factors od success such as development of partnerships. It is encouraging to know that in those organizations with confirmed ISO 9001 standards 59% of managers have heard of self-evaluation. 96% of organizations in process of certification consider education as personal motivating factor. Research (Prodanovska, Mitreva, 2010) conducted in Macedonia involved 151 companies and deals with analysis of development of employees and managers and their participation in business processes. Perfecting the employees is a task of top management which uses suitable methodologies for projection and implementation of education as main condition of TQM strategy. Companies that strive to establish TQM concept cause generating new ideas taking into consideration ideas of employees. Results show that staff give their suggestions for improving working conditions with high chances of them being accepted in 11 - 37%, in 56 right of voice. That can only mean that these enterprises do not nurture mutual trust and culture of sharing knowledge and expertise.

CONCLUSION

In today's market conditions, the quality is a key factor in improving the business and the primary development goal, expressed in the form through achieving business excellence and achieving world-class products and services. Customer satisfaction and organizational performance needs to be continuously monitored in order to identify opportunities for improvement. Continuous quality improvement by reducing the costs necessary for the successful operation of the company and improving its competitive position. In modern business, the quality of implies a concept that has been implemented in the organizational, structured and allows the achievement of business excellence based on the use of effects improving business productivity. Improving the quality of business is the basis for improving the other factors that influence the competitive ability of the company at an international level. The implementation of quality systems and continuous improvement of the quality of the embedded system creates conditions for increasing labor productivity and overall business, which will lower the cost and price competitiveness in the international market.

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OVERCOMING PROCRASTINATION AND ACHIEVING GOALS THROUGH PROJECT PLANNING

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ABSTRACT

Time management is crucial for optimal results in an organization. Managers often struggle to meet deadlines and execute projects in given time windows. One of the most affective "phenomenons" is procrastination. Managers, students, almost everyone face, in some part of their lives, with procrastination. Procrastination has become one of the biggest challenges for professionals and individuals in managing time. Procrastination comes from the Latin word "Pro" which means " in favor of" and "Cras" meaning "tomorrow". It is a habit or act of delaying or putting things off or on-hold. There are ways procrastination can be beaten, and these activities require clear focus and desire for achieving goals.

Key words: Time management, Procrastination, Project management, Achieving goals.

INTRODUCTION

Procrastination is present among workers, students, managers in all fields of work. The word itself means "to put off until tomorrow" (Knaus, 2010). When a person procrastinates, a course is chosen through which a task, work project is voided from a different vantage point, either from some time in advance or retrospect. From this observational theory, the urge to procrastinate meets the basic definition of an impulse where a temporary smaller and sooner reward is preferred over a larger, later reward. Many researchers tried to define procrastination and it's drug-like effect. The impact of the feeling that is brought by procrastination is as intense as the feeling gamblers and drug addicts. In this paper the common psychological aspect of procrastination won't be deeply analyzed, rather the most useful and helpful means of overcoming procrastination will be discussed. Psychology plays an important role, but "fixing" some parameters of the human "psyche" won't bring change, because over time procrastinators develop a habit the same as drug addicts (Burka, Yuen, 2008). When a chronic procrastinator changes his thinking, it does not necessarily mean he will be able to change his habits right away. The main "enemies" of procrastination are focus, motivation and sense of obligation (Andreou,White, 2010).

OVERCOMING PROCRASTINATION

Defining goals: The first step is to define goals. Writing down the goals and objectives can help to "break the ice" (Scoot, 2013). It is important to describe the goals as in many details as possible. This is strengthening the will power in defeating the urge to procrastinate. The goals should be specific, measurable, attainable, relevant, and time bound.

Planning: When the goals are set, every day should be planned in advance. Every goal, project has to be written down on paper. Planning is crucial because 1 minute of planning can save 5 to 10 minutes

of execution. Plans are important because they give objectivity and they "show the road" to achieving goals. 80/20 rule: Applying the 80/20 rule means that 20% of all activities will account for 80% of results. Focusing on key result areas: Managers must identify and determine the results that are absolutely necessary to get to do the job well. Before starting, everything should be prepared so no interruptions are made. One step at a time: Even the biggest and most complicated job can be done if its "chopped up" into smaller tasks. The other key is to imagine that we have an upcoming deadline. That way a sense of urgency is created. Technology: Technology can be very useful and can improve productivity, but also it can make slaves out of people. Social networks can improve communication but at the same time productivity can "plummet" to the ground (Forsyth, 2010).

The mentioned methods are very effective. Managers, workers should always define goals. Goals will "drive" them to do tasks in a timely manner. Procrastination can sometimes be very annoying in a workplace. If it is present in a team, conflict may arise and big projects can "sunk" even before the "leave the port". It is very difficult to work with procrastinators. Managers must help them overcome their procrastination habits by motivating them. There are many software tools that can be used for "battling" procrastination.

PROJECT PLANNING SOFTWARE

Project planning software is essential in almost every big organization. There are many open source solutions and professional tools which cost money depending on the features the software has. One of the most commonly use, and very reliable project planning software is Microsoft Project Professional 2016. Although the professional version of this software is the most expensive one, there are cheaper options with fewer features. With Microsoft Project Professional 2016 there are a ton of things a manager can do to achieve goals, meet deadlines and overall to beat procrastination, or to detect procrastination among his workers or team members.

With this and similar project planning software managers can:
−   easily plan and mange projects with intuitive controls and flexible team tools
−   prioritize everyday work, project tasks, important details and multiple timelines

Project planning software ensures portability and projects can be managed from anywhere. Project timelines connect team members and share progress of tasks. Collaboration is improved, and real time communication with team members is possible. The software has a user friendly interface which allows easy project managing. Presentation can also be made, and the most important thing of them all is that work platform is secured and safe from malicious attacks and the projects can be stored on external hard drives like "Google Drive" or "Cloud". One of the great things about these kinds of programs is the use of Gant-grams. Gant-grams allow efficient time planning. Tasks are divided into sections and portions of time. Gant-grams take into consideration the priority of tasks (see also Figure1). The figure shows that project tasks are show in a time table where some tasks overlap each other. There are indicators which show the percentage of task completion. Task priority is marked with different colors. This kind of Gant-gram gives an objective view on project development and progression. Beside Gant-grams, other various types of diagrams are available (see also Figure 2). Statistical tools help increase time management precision. Statistical tools show the time and work needed for a task to be completed.

The above figures show the vast possibilities of project planning applications. Clear view of tasks, projects, and selective work elements are in front of the user. The easy-to-use interface offers fast, precise and fluent work. Scheduling projects is very important, and these programs allow managers, workers and student, or any other who uses it, to constructively arrange work tasks in manageable time periods. Gant-grams are crucial for meeting deadlines, and for a steady, controlled workflow (Nikolić, 2007). Project planning programs offer database-like options, where files, documents saved and can be randomly accessed by every user, and team mate who has permission or better say a "key". This

allows an integrated overview of the whole project, and the team leader or manager decides who can view what file.
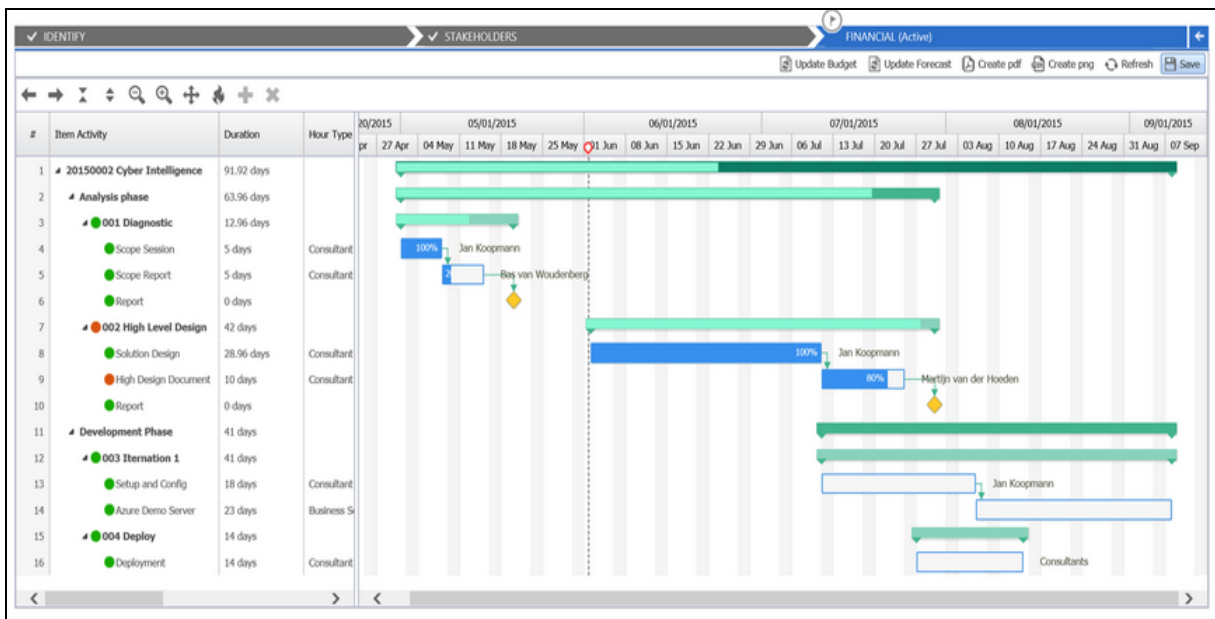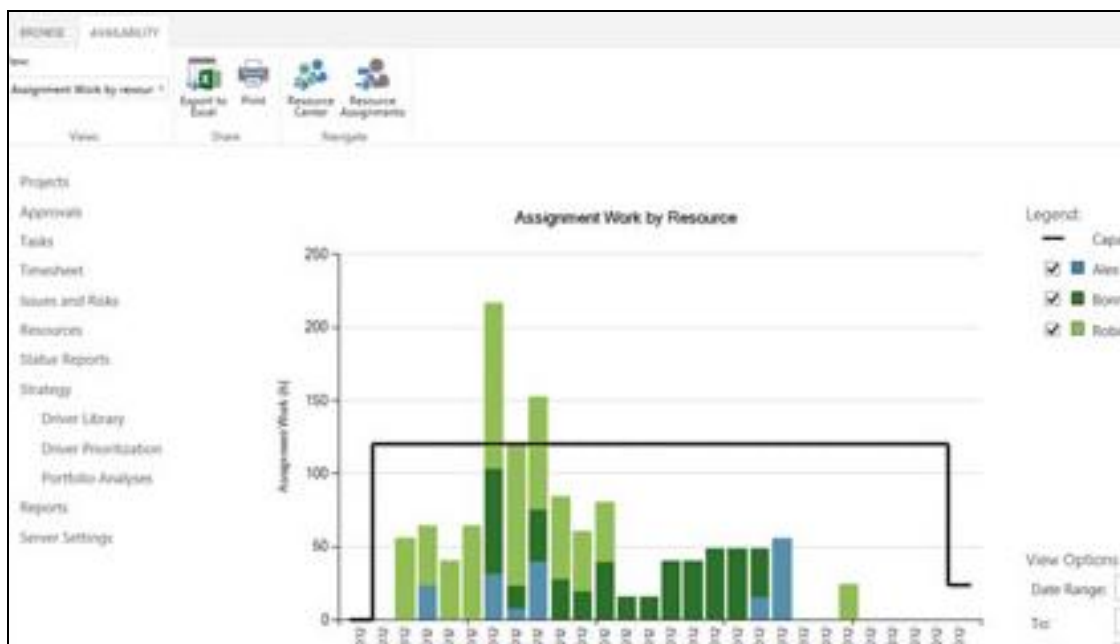

Figure 1: Example of a Gant-gram
(Source: http://www.assistancesoftware.com/psa/ accessed: 17.01.2016.*)*

Figure 2: Example of project managing diagram
(Source: https://products.office.com/en-ie/project/project-online-portfolio-management
accessed: 17.01.2016*)*

THE PSYCHOLOGY BEHIND PROCRASTINATION

There are many impact factors that affect a person's behavioral pattern and work management (Hughes, 2012). Procrastination is formed by habit, but there are other things which strengthen this habit and consume time of the affected person. Some other factors and stimulus which affect a person's ability to work easily or to procrastinate:

1. The brain is always changing. It can generate new, flexible behavior, but also it can strengthen old, rigid behaviors. This phenomenon is called the "plastic paradox".

2. Procrastination can be an attempt not just to avoid particular tasks but to avoid the feelings that are somehow associated with those tasks. Sometimes a person is well aware of what he feels, and sometimes the clue that he has feelings comes from signals in the body, because emotions arise from bodily, sensory experiences.

3. Procrastination can be driven by some of the fears, such as fear of success or fear of feeling controlled. Feelings, especially fear, are fast, powerful, and not easy to change. Fear doesn't make sense to the person who experiences it. However, fears that don't make sense at face value are not necessarily "irrational". If a person procrastinates on a task but can't pinpoint exactly what makes him fearful or uncomfortable, chances are an "implicit" memory has been activated.

4. Low self-esteem contributes to procrastination. Self-image whether the person has confidence in his ability to succeed and can value who he is - is being shaped from the earliest days of life. The brain is wired to be "ultra social" it literally grows and develops in response to the way we are responded to by the people who care for us (Ganta, 2014).

Other factors are:
− Obsessive compulsive disorder (OCD)
− Clutter (a combination of indecisiveness and fear of making a mistake)
− High levels of stress or mediate, continuous levels of stress
− Sleep deprivation and sleep apnea
− Family relationships
− Family influence

As we can see, the above factors are primarily base emotions which are acquired in early childhood. This means that procrastination has deep roots embed in the psychology of a person. Given these facts, overcoming procrastination expects dedication, and motivation for success and thriving to higher and better quality of life and time management.

CONCLUSION

Procrastination is present in modern society. Workers, managers, students and other all influenced by it and therefore productivity plummet in organizations where procrastination is present. Managers can a really bad time when their workers or team mates procrastinate and delay tasks and barely making deadlines. Procrastination brings stress, stress can cause further procrastination. This vicious cycle continues until one or multiple projects fail. Students, scholars and other persons can suffer from this task/work delaying phenomenon. Overcoming procrastination is not easy. It requires constant action, development of character and various methods. Planning in detail, finding motivation is the beginning. Taking small steps is very important. Realizing that one is procrastinating is the main first step, after that gradually developing new work habits is a little harder but necessary. There are project planning programs which can dramatically improve productivity and teamwork reliability. Gant-grams, diagrams and other options drastically changes the way projects are realized. In the fight of procrastination, finding out the main cause, the psyche factor is hard, but after that the process of achieving excellence in time management is much easier. In the modern world, many external stimuli are present, and procrastination is a modern "disease" of the working, studying class. Overcoming procrastination means better time management, lower levels of work induced stress, and high productivity.

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QUESTIONNAIRES APPLIED IN MUSCULOSKELETAL DISORDERS ASSESMENT IN TRANSPORTATION FIELD

UDC: 612.74:656.5

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ABSTRACT

Musculoskeletal disorders are widespread all over the world, making very high costs and impact on influencing the quality of life. The risks of musculoskeletal disorders presence are very high in transportation tasks, so that postural requirements of work should be considered in the design of work procedures and equipment in transportation sector. This paper aims to survey different types of questionnaires used for postural requirements analysis in automotive and transport machines fields. The most frequently used questionnaires in automotive field are DBQ, Nordic Musculoskeletal Questionnaire and ASDQ, while transport machines field usually uses checklists as type of questionnaire. Checklist, proposed by Kittusamy (2003), is implemented on the sample of 17 crane operators that are working on Serbian sites and it can be concluded that armrests, seat height adjustment, lumbar support, and air conditioning are recommended for improvement in domestic crane cabins in aim to reduce musculoskeletal disorders.

Key words: Musculoskeletal disorders, Questionnaire, Transport machine, Vehicle.

INTRODUCTION

Musculoskeletal disorders are widespread all over the world, making very high costs and impact on influencing the quality of life. They are the single largest category of work-related illness, that represents at least the third of all registered occupational diseases in the United States, the Nordic countries, and Japan and they occur in certain industries and occupations with rates up to three or four times higher than the overall frequency (Punnett & Wegman, 2004). The risks of musculoskeletal disorders presence are very high in transportation tasks, both in automotive and transport machines fields and this paper aims to concentrate on these two fields. Since musculoskeletal disorders are important issue to research and evaluate them, a questionnaire capable to gather data and analyze them is very usable tool. Accordingly, this paper aims to survey different types of questionnaires used in vehicle and transport machines fields.

THE QUESTIONNAIRE APPLICATION IN MUSCULOSKELETAL DISORDERS STUDIES IN AUTOMOTIVE FIELD

Driving is a high-risk job with a variety of physical and psychological hazards (Tamrin et al., 2007), while questionnaires are usually used for the assessment of physical workloads and musculoskeletal disorders. The most widely addressed questionnaires for assessing the subjective issues in driving are Driver Behavior Questionnaire (Cordazzo, Scialfa, Bubric, & Ross, 2014), Automotive Seating Comfort Survey (Kolich,2003), Automotive Seating Discomfort Questionnaire (Smith, Andrews&

Wawrow, 2006**)** and Nordic Musculoskeletal Questionnaire (Crawford, 2007)**.** It is obvious to choose a questions from previous studies to make a valid questionnaire, for instance Deros, Daruis, & Basir (2015) made their original questionnaire based on the contents of literature studies, as did Kushwaha& Kane(2016), too. Smith, Andrews& Wawrow (2006**)** have developed well known and frequently used Automotive Seating Discomfort Questionnaire (ASDQ) to quantify subjective occupant discomfort feeling in automotive seating. The ASDQ had primary 30 items (as given in column 1 -Table 1), that later were subjected to correlation and factor analysis - principal component analysis that resulted in 20 items (as given in column 3 table 1).

Table 1: Questionnaire for seating discomfort items (Smith, Andrews& Wawrow, 2006)

Initial	Intermediate	Final
Cushion widt	Cushion width	Cushion width
Cushion length	Cushion length	Cushion length
Cushion firmness	Cushion firmness	Cushion firmness
Side cushion support	Cushion bolsters	Cushion bolsters
Mid cushion support	Cushion Center	Cushion Center
Side cushion comfort	Cushion contour	Cushion contour
Mid cushion comfort	Cushion aesthetics	Trim
Cushion contour	Cushion pressure	Trim friction
Cushion aesthetics	Trim	Trim feel
Cushion pressure	Trim friction	Backrest height
Trim comfort	Trim feel	Backrest width
Trim touch	Trim aesthetics	Backrest firmness
Trim aesthetics	Backrest height	Backrest bolsters
Trim pressure	Backrest width	Backrest contour
Backrest height	Backrest firmness	Lumbar stiffness
Backrest width	Backrest bolsters	Lumbar prominence
Backrest firmness	Backrest middle	Lumbar support
Side backrest support	Backrest contour	Lumbar height
Mid backrest support	Backrest aesthetics	Lumbar pressure
Side backrest comfort	Backrest pressure	Overall, discomfort
Mid backrest comfort	Lumbar stiffness	
Backrest contour	Lumbar prominence	
Backrest aesthetics	Lumbar support	
Backrest pressure	Lumbar height	
Lumbar stiffness	Lumbar pressure	
Lumbar prominence	Overall, discomfort	
Lumbar comfort		
Lumbar location		
Lumbar pressure		
Overall, discomfort		

Table 2: Similarities in variables between ASDQ and ASS (Smith, Andrews& Wawrow, 2006)

ASS Kolich (2000)	ASDQ
A—lumbar support	17—lumbar support
B—lumbar comfort	LMBR—lumbar sub-scale
E—back lateral support	11—backrest width
F—back lateral comfort	13—backrest bolsters
G—seat back feel/firmness	12—backrest firmness
H—ischial/buttock comfort	8—cushion center
J—cushion length	5—cushion length
K—thigh comfort	4—cushion width
L—cushion lateral comfort	7—cushion bolsters
M—cushion feel/firmness	6—cushion firmness

The Automotive Seating Comfort Survey (ASS) with 13 questions is proposed by Kolich (Kolich,2003). Similarities between ASS and ASDQ are shown in Table 2. Driver Behavior

Questionnaire (DBQ), is also very often used questionnaire, and it contains 31 questions. It was developed by Reason et al. (1990) in the UK (Cordazzo et al., 2014). Principle component analysis was again performed and resulted in three factors. Bazilinskyy&de Winter (2015) have applied DBQ to evaluate the attitude on auditory interfaces in contemporary vehicle. Deros et al. (2010) have used a questionnaire based on the content of previous studies, such as Shaliza et al. (2009) and Azhar (2009). This questionnaire consists of three parts: part I) questions about demographic information i.e. age, gender, position, body mass index, part II) questions about understanding of manual material handling, workstation, and work environment evaluation, and part III) queries on the comfort level of body parts. Such questionnaire gave observations on the operation as a whole, enabling the researcher to acquire data by analyzing the questionnaire and to get results that reflect a facts on ergonomic problem. Historical development on DBQ is shown in Table 3.

Table 3: Historical development on DBQ (Cordazzo et al, 2014)

Researcher	Activity
Reason, Manstead, Strading, Baxter&Campel (1990)	Introduced self report DBQ with 50-items in which drivers rated the frequency of risky behavior executed during driving.
Winter&Dudon (2010)	Identified almost 200 studies that have since used the DBQ in part or as a whole.
Wahlberg, Don, & Kline (2011)	Agreed that the DBQ is the main tool which was widely applied to evaluate driving behavior.
Aberg and Rimmo (1998)	Created Swedish version (DBQ-SWI) based on Porker el. at. (1995) and Reason el at. (1990) with additional items to evaluate errors, resulting in 104 items-scale
Rimmo (2002)	Used DBQ-SWI with performing confirmatory factor analysis of four factor model, stud suggested that factor structure is independent of demographic characteristics, while factor scores tend to be related to both age and gender.
Davey, Wishart, freeman, and Waston (2007); Ozkan and Lajunen (2005), Proket et al.(1995)	Used DBQ as a forecaster of individuals' differences in collision concern.

Nieuwenhuijsen (2005) gave recommendations that make the questionnaire more effective and reliable in acquiring data that reveal actual information about the target population, such as to avoid long questionnaires and keep completion time between 30 to 60 minutes or less, questionnaire to be clear, easy to answer, short, and to avoid too much details, and to use questionnaire which was already tested in previous studies or base the questionnaire on studies that have been performed (Gallais, 2008)). A study of low back pain in car drivers by Gallais (2008) contained 70 questions and required about 30 minutes of completion time. Sluiter (2001) used a questionnaire based on European agreed criteria on musculoskeletal disorders risk factors in the upper limbs (Zare, Bodin, Cercier, Brunet & Roquelaure, 2015) and Nordic Musculoskeletal Questionnaire. Similar studies are done by Martin et, al. 2005; Wilder et, al. 1994; McAtamney and Coelett, 1993; Kuorinka et, al. 1987 to evaluate the severity of musculoskeletal symptoms (Kushwaha & Kane, 2016).

THE QUESTIONNAIRES APPLICATION IN MUSCULOSKELETAL DISORDERS STUDIES IN TRANSPORT MACHINES FIELD

Unfavorable operators' postures during transport machines work usually are the result of improper design of the cab and inadequate working procedures. If not managed, incorrect posture of any part of the body, can lead to an increased risk of premature fatigue, pain or injury. Exposure to awkward postures and performing repetitive movements in uncomfortable working position or overtime, are factors that can lead to a variety of musculoskeletal disorders operator in transport machines' cabs. Experimental studies have shown that the positions of the hull that are not neutral (ie. flexion, lateral bending and/or twisting) cause an increase in the level of muscle fatigue and inter vertebral pressure in the lower back (Kittusamy, 2003). Epidemiological studies have shown that flexion, lateral bending and twisting of the trunk are factors that contribute to the development of low back pain (Punnett et al, 1991). Compression of the spinal disc may be significantly injured when the shift troops from the neutral position in the bent position (Chaffin, Andersson& Martin,

2009). In addition, it is known that prolonged sitting can also increase the risk of the development of low back pain. Laboratory studies are usually focused on the study of fatigue in the shoulder, tied for positions that are not neutral, and have shown that long-term lifting arm (abduction and flexion of the shoulder) causes extreme level of muscle fatigue and discomfort (Kittusamy, 2003). Hagberg indicates a positive relationship between the elevation of the shoulders and an increased risk of tendonitis, based on field studies conducted (Kittusamy, 2003). The relationship between keeping the neck in a position that is not neutral and the development of musculoskeletal disorders, is also documented (NIOSH, 1997).

Checklists, as the form of questionnaires, for the assessment of the design of the cab in the literature is difficult to be found (Spasojević Brkić et al., 2015) - one of them for evaluation of cab design of transport machines is proposed by Kittusamy (2003). That checklist is used to measure certain characteristics of design and is constructed as a result of the literature review. Kittusamy interviewed the operators first and then tested it a pilot study that incorporated the personnel, operating engineers and interns. Later study was carried out at several different construction sites in the Greater Boston (Massachusetts oblast). Seven experienced operators (6 males and 1 female) employees at two major contractors, are covered by the survey (videtitabelu1). In the age of the operator have ranged from 33 to 58 years (43.4 ± 10.7). Working experience of the operator was in the range of 11 to 40 years (23 ± 12.1). Standing hight ranged from 165 cm to 183 cm (172.4 ± 7.1) while the weight ranged from 52 kg to 129 kg (84.2 ± 25.4). Each operator was using a different model of construction equipment. The total score for the evaluation of the design of each cabin that has been done by assigning equal weights to each of the responses, as the result was closer to 100 percent, it was considered that a design is better. Although some features of the cabin can be more important than others, easy access assignment of equal weights used herein, similar to that done by Lifshitz and Armstrong (Kittusamy, 2003). All seven models of transport machines are listed in Table 4 together with total scores for each type of cabin. The total score is calculated using 31 questions in the checklist for assessing the cab design

Table 4: The assessment results obtained by cab design checklist

Operator	Producer	Model	Ttype	Total score
1	Caterpillar	CAT 416B	Loader/Backhoe	74
2	Caterpillar	CAT 446B	Loader/Backhoe	74
3	John Deere	JD 710D	Loader/Backhoe	71
4	Caterpillar	CAT M318	Excavator	87
5	Caterpillar	CAT M318	Excavator	81
6	Daewoo	DH 200W	Excavator	81
7	Komatsu	PC 400LC	Excavator	71

By applying the checklists the following problems were discovered:
1. The seats did not have a lumbar support in all cabins (100%).
2. In the majority of cabins (86%), the vibrations were felt through the floor.
3. In the majority of cabins (86%), the temperature could not be controlled in the cabin.
4. In the majority of cabins (71%), the locations of the controls and levers were not adjustable.
5. More than half of the cabin (57%) did not have adjustable armrests.
6. In more than half of the cabins (57%), the vibration could be felt through the seats and controls and levers.
7. In more than half of the cabins (57%), seats did not have the possibility of turning.

Checklist, proposed by Kittusamy (2003), is implemented on the sample of 17 crane operators on Serbian sites and their comfort in the crane cab is assessed. The results show that most of the problems are caused by armrests (only 13.6% of positive responses), starting with whether they exist at all, if they are set to the correct height and whether they can be adjusted. The following problem is seat height adjustment (only 12.8% of positive responses). The positive response was obtained from 10-12% of the respondents in relation to the seat lumbar support, tilt and swivel seats, as well as regarding the control of temperature in the cabin. Only 5.5-10% of positive responses are obtained regarding if the seat is placed at the same height, whether the easy reach, cargo visibility problems and general overview of the work area and reflection of the glass cab exist.

CONCLUSION

Unfavorable operators' postures during transport tasks usually are the result of improper design and/or inadequate working procedures. If not managed, incorrect posture of any part of the body, can lead to an increased risk of premature fatigue, pain or injury. Accordingly, postural requirements of work should be considered in the design of work procedures and equipment in transportation sector, so this paper aimed to survey different types of questionnaires used for postural requirements analysis in automotive and transport machines fields. Although questionnaires have certain subjectivity, it can be mitigated through statistical analysis application on collected data. The most frequently used questionnaires in automotive field are DBQ, Nordic Musculoskeletal Questionnaire and ASDQ, while transport machines field usually uses checklists as type of questionnaire. Checklist, proposed by Kittusamy (2003) is implemented on the sample of 17 crane operators that are working on Serbian sites and it can be concluded that armrests, seat height adjustment, lumbar support, and air conditioning are recommended for improvement in domestic crane cabins in aim to reduce musculoskeletal disorders.

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ANALYSIS OF THE IMPACT OF COMMUNICATION ON THE OPERATIONS OF THE COMPANY

UDC: 005.551

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ABSTRACT

In this paper we define the role of team and teamwork in companies, organizations, businesses, and school educational institutions. We are engaged in communication among team members and their cooperation in the organization. We also want to discover and to define the problems and defects that may occur in poor communication in teamwork. We define possible solutions and strategies that can enhance communication within companies, and therefore that can accelerate an organization's operations. It can indicate the existence of a small number of studies related to the teamwork carried out on the territory of Zrenjanin why we why we study focused and committed on the territory. The research we want to find out whether there is a correlation between the years of service of the respondents and their attitudes about the importance of communication in team work.

Keywords: teamwork, communication, teamwork deficiencies, problems of teamwork, clearly defined goal.

INTRODUCTION

Today, a growing number of organizations introducing team work in order to increase work efficiency. The need for team work occurs in more complex tasks that an individual would not be able to realize alone or with tasks that require different skills and different knowledge. The introduction of teamwork in the organization has a number of advantages. Use the faster flow of information, flexibility is achieved, which leads to be able to quickly and easily adapt to changes occurring in the environment. As the benefits of teamwork we can give a better operating result, the diversity and richness of diversity, improving business skills, higher satisfaction, increased work discipline, more efficient decision-making and improved communication and information. It is known for the famous "Hawthorne experiment" that is derived between 1927 and 1932 in order to detect the effect of micro-climatic factors on productivity. Researchers want this experiment to prove that productivity varies in relation to the working conditions and productivity will grow in a better light in the control group, while in the experimental group, which is reduced to decrease the brightness. However, experimental results were unexpected. Irrespective of lighting, productivity has increased both in experimental and in the control group. This result in both facilities, there is a reason that the members of the group have built a sense of group identity, leading to better performance. The researchers concluded from this that the efficiency of not only affect the working conditions already much greater impact may have social factors (Seiffert, Adzic, Cvijanovic, 2012). A group of people who strive for mutual cooperation towards a common goal, and that connects the joint mission called it. The work of all members within the team contributes to the final performance and the result of their joint work of all the members are responsible in equal measure. However, that would have been provided successful teamwork is one of the first steps is the formation of an appropriate communication process.

Well-organized and implemented communications can contribute to the performance of team work, but on the other hand poor communication can have a negative impact and that hinders teamwork.

PROBLEM RESEARCH

Teamwork is very rare because of the fact that the creation of a strong team of very hard and achieving effective communication with all team members in the organization. Although scientists in some areas of theoretical assertions claim otherwise, teamwork required to provide certain forms of behavior which is very hard every day to enforce (Kolarić, 2012). The teams each have to bear the responsibility, respect deadlines and work together in certain projects. The consequences of the teams that are not centered on the results are many. Organizations where there is bad and ineffective teamwork rarely possess competitive skills, lose employees who are oriented toward common goals, and difficult the process of growth and development. As a problem of our research we can mention the existence of a small number of research related to the teamwork carried out in the city of Zrenjanin and the lack of information about the presence of a lot of teamwork and the situation in the territory.

RESEARCH SUBJECT

Teamwork is currently considered as the best way of organizing work. It also stresses that good communication is the result of successful business organization. Many scientists believe that this kind of work in the future to improve and thrive. The reasons for this finding are numerous (improved communication, improved interpersonal relationships, reduced costs, the rational use of human resources, etc.). Team is actually a group of people with complementary skills and experiences. People who work for a common goal, and that are jointly responsible for all successes and failures that accompany them on the way to the imaginary target. Well designed teamwork improves and business organizations representing primary goal of the business policy of each company. Team is necessary to establish the best way to determine the best strategy to keep. The objectives of the team must be clearly and specifically defined. In the interest of any organization is to achieve better communication in order to achieve better success. For all these reasons it is necessary to work on continuous improvement of all team members. Motivate and stimulate them to achieve the best possible results, create a team spirit within the organization and all that in order to achieve greater success.

THE AIM OF THE RESEARCH

The research team work, communication modes and the impact they can have on business performance, we in terms of the student to better understand the link between performance and the way in which communication is carried out and to finding solutions to improve collegiality and improve interpersonal cooperation. We want to develop a team spirit and present the advantages of working in a team. Our desire is to present how teamwork can enhance and improve business and collaboration among colleagues. We believe that this study can contribute to raise awareness among people who have not been great importance was placed teamwork communication in the team. We believe that the team spirit is very important to develop in early childhood to later much easier to collaborate with people: by developing a team spirit, develop communication skills.

RESEARCH HYPOTHESES

The main hypothesis - There is a correlation between the years of service of the respondents and their attitudes about communication in teamwork.
Hypothesis No.1.- Employees up to 15 years of service are more oriented teamwork and consider it necessary to spend more time communicating with other members of the organization.
Hypothesis No. 2. - Excessive analysis work colleagues on a small scale at present employed

Hypothesis No. 3. - Respondents under 15 years of service think that inclusion of all members in decision making is of greater importance than the respondents who have more than 15 years of work experience.

Hypothesis No. 4. - A large number of employees often feel uncomfortable if meetings are not well organized and controlled.

Hypothesis No. 5. - A clearly defined goal can often help team members to more easily identify with the goals and vision of the organization and therefore the employees is crucial that the goal is clearly and precisely defined.

METHOD OF RESEARCH

Data was collected by a questionnaire in which it was pointed out that the survey is anonymous and the results will be used exclusively for research work. The research work was conducted in the city of Zrenjanin. In the research we included 65 respondents of different qualifications, age, gender and years of service. Data were collected from employees in this area that are in different positions in the organization and carrying out other tasks. With this research, we wanted to show the state in the city of Zrenjanin. The questionnaire included questions related to the importance of organizing meetings, a clear definition of objectives, the impact of poor communication on teamwork, problem arising in the case that not all team members involved in making decisions. The views of respondents were assessed using Likert scale. Applied scale represents a five-degree scale, by which the respondents expressed their level of agreement or disagreement. The scale includes the following statements: Strongly disagree 1, I disagree 2, himself undecided 3, I agree 4, strongly agree 5. Based on the data analysis was performed using Microsoft Excel.

ANALYSIS OF RESULTS

Structure učestalosti responses to individual questions is shown in Table 1. The study included two groups of patients. Subjects were divided into two groups in order to allow a comparison of attitudes between group 1 consisting of the respondents or employees up to 15 years of service, while group 2 consisted of respondents over 15 years of service.

Table1: Structure of the frequency response

	Strongly Disagree		Disagree		Undecided		Agree		Strongly Agree	
	1	2	1	2	1	2	1	2	1	2
Often over-analyze the work of their colleagues	1	2	1	2	1	2	1	2	1	2
Problem inside of a team may occur if all team members are not involved in all decisions	6%	0%	23%	46%	12%	15%	35%	31%	24%	8%
I feel uncomfortable when meetings are not well organized, controlled and generally well conducted	0%	0%	23%	0%	6%	0%	65%	77%	6%	23%
It's hard for me to start working if the goal of the team is not clear	0%	0%	0%	0%	6%	8%	59%	38%	35%	54%

If we are too focused on the work of our colleagues, we are not able to carry out the task assigned to us in the right way, you can also slow down teamwork. Research has proven that it is often the case anliza colleagues and a number of subjects can be identified with this fact and is prone to analysis of their colleagues. It is also exploring dolveo to the conclusion that respondents with a higher number of service often exhibit dictatorial traits when it comes to the work that must be done, with a total of 85%, while respondents with a lower number of working years from 76% believe that this trait

characterizes for therefrom. Author Stuart Tabs, status of a person visibly affect the way this communication and so the topic and length of communication is often controlled by people with higher status (Tabs, 2013).

When making a decision, it is important to listen to everyone's opinion. Problems can arise in a team if they are not all members involved in all decisions. It is important to emphasize the management of equal opportunities and diversity. "Companies are increasingly seeking their workforce is balanced in terms of race and ethnicity and gender and not because of legal obligations, but because of personal economic interest which they have become aware" (Dessler, 2007). Although the largest number of respondents believe that the involvement of all members in all decisions can prevent the occurrence of the problem, as opposed to the underlying assumptions for those with more than 15.years seniority involvement in decision-making is more important.

The average number of meetings has increased and is considered to be business people spend 25 to 60 percent of the time in meetings, of which up to 25 percent of the time of the meeting dealing with unimportant things, and half the time spent in meetings is considered unproductive (ABA Section of Business Law, 1998). The purpose of the meetings is to discuss various topics related to the company's work on the problem, objectives, for action to be taken to achieve the vision, etc. Precisely for the reason that in the meetings talking about things of great importance for the future of any company, it is necessary that the meetings are well organized. The largest number of respondents often feel uncomfortable if meetings are not well organized, and there is no visible difference between the attitudes of groups of patients.

Last hypotheses related to the importance of clearly and specifically defined goal has led to the conclusion that the group of respondents with a higher year of service to a greater extent, agrees with this fact, while 46% answered affirmatively, in subjects who have up to 15 years of service is only 35 % of affirmative answers. According to the author of the book "Five deficiencies in the work of the team," teams that are focused on a common goal and a result of "retain workers oriented achievements, minimize selfish behavior, really enjoying success i im very sorry when they see the success" (Lension, 2008). If the goals are clearly defined and greatly assists team members to identify with the vision of the company and are willing to contribute in order to achieve a common goal.
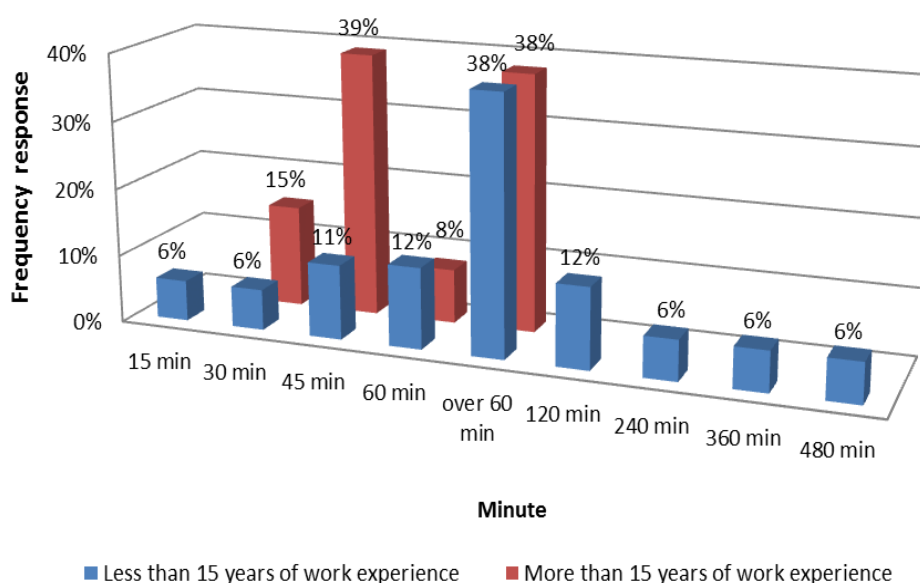

Figure 1: The optimal time spend in communication

Figure 1 shows the oscillation of views on the optimal time to be implemented in communication. Regarding the questions about the optimal time spent in the interview was not offered answers more respondents based on their positions in your answers. Respondents 15 years of service considered that

the optimal time needed for communication in a team of about 82 113 minutes. While respondents who have over 15 years of service considered that the optimal time needed for communication in a team an average of 50 minutes. These results confirm the hypothesis from which we started the research work that the employees up to 15 years of service more oriented teamwork and consider it necessary to spend more time communicating with other members of the organization.

CONCLUSION

The work of all members within the team contributes to the final performance and the result of their joint work of all the members are responsible in equal measure. Based on these results, we concluded that most respondents agree with the fact that one of the most important characteristics to establish cooperation with all team members. Respondents believe that it is necessary to spend as much time as possible talking with colleagues. Interesting is the fact that we have come to this research, interviewing employees from different areas, we came to the conclusion that the younger generation more interested in working in a team of their older colleagues. Adequate motivation can encourage them to be more successful to work on improving team relations, and thus enhance the work and success of companies and institutions in which they are employed.

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EDUCATION SYSTEMS AND QUALITY MANAGEMENT

UDC: 37:005.6

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ABSTRACT

Modern society is characterized by dynamic changes, intensive development of production, information and telecommunication technologies, which make conditions for quality changes in all spheres of life, and especially in education. Scientific research and everyday practice prove that it is necessary to implement modern concepts, techniques and technologies of research in education system managements. Quality management in education system is a perception of the quality of education process, quality of management structure and its impact on the success of education system functioning. The status and value of indicators and performance of quality must be defined and measurable in order to manage all processes and operations of education system by feedback information.

Keywords: education system, management, quality, indicators of quality.

INTRODUCTION

Modern society is characterized by dynamic changes, intensive development of production, information and telecommunication technologies, which make conditions for quality changes in all spheres of life, and especially in education. The appearance of new knowledge has created the society of information, in which the acquisition of new knowledge, transfers, usage and storage of knowledge is based on contemporary information techniques and technologies and methods which are permanently changed and improved.

Information technique and technology has fundamentally changed the education infrastructure and all management process elements. Telecommunication net has become not only the source of knowledge, but also an instrument for transfer, usage and storage of knowledge, as well as a tool which can enlarge the efficiency of education institution management. In the second half of the twentieth century, the concept of total control management gained special importance in the management process, as a universal concept applicable on all kinds of organizations. Having become such a concept, it has been applied successfully in education systems.

EDUCATION AS A SPECIFIC SERVICE

Education belongs to the sector of services. A large number of people takes part in it, some of them having the function of providing services and other of using services. The fact is that during last ten years there has been an intensive development of the menas of teaching, teaching methods and forms, and all this with the aim of higher efficiency and effects of the teaching process, which has changed the design of education institutions. Only in the last ten years, with greater reliance on computers in

schools, the conditions for quality innovations of education technology were created. Multimedia programs created for PCs make the creation of electronic books with texts, pictures, sound animations and movies possible. Interactivity and the quality of presented materials along with multimedia and hypertext provides significantly richer contents in comparison with the teaching process which takes place in a traditional classroom. The development of telecommunication technology and mass usage of Internet have made possible the interactive distance learning, which is based on a system approach with the usage of multimedia electornic sources of information.

The education systems of high-developed countries are the basis on which the characteristic of economy and society of these countries are founded. In a reverse connection, education systems affect the development and success of other systems.It has been proved that this influence is stronger compared to mutual influences of other subsystems, which makes it necessary for education systems to be designed in the best possible way, and then managed in a proper way, in order to achieve a stronger effect on a national, as well as international level. This further impies the tendency of internationalization, i. e. globalization of education services and the tendency to make special strategies in that internationalization.

The main objective of the integration of European education systems is the achievement of the highest possible level of knowledge in the European Union through constant improvement in order to achieve the European politics of employment and acknowledgement of diplomas obtained in individual European countries and in all countries of European Union. In this way, the European Union would become the most concurrent and the most dynamic education, research and economic space in the world which is based on knowledge. Therefore, the strategy of internationalization should be regarded as an instrument of establishing the integrated management of education study programs in a few languages and using professors and students exchange and other programs of the European Union (The Europe 2020 Competitiveness Report , 2014).

The integration of European higher education area EHEA (*European Higher Education Area*) and ERA (*European Research Area*) inludes (Figure 1) the integration of research programs for education development (Tempus, Erasmus, Socrates, Leonardo, Naric and other) and research programs which are financially supported by European Union (Framework Programme, Eureca, Cost, Alpha and other).

According to the presented model, many teaching disciplines of the bachelor and especially master and doctoral studies, should be derived from the field of the teacher's and high education institution's research. That means that the lectures are orientated towards the results of research, and modules and programs orientated by projects should also exist.
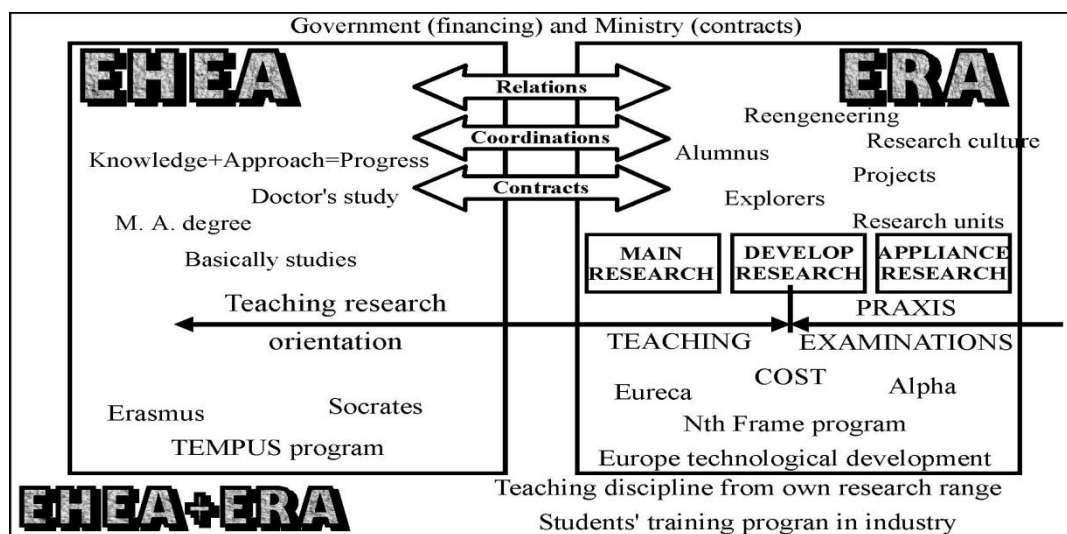

Figure 1: The integration of education and research by European programs

THE NECESSITY OF THE INTRODUCTION OF THE INTEGRATED SYSTEM OF QUALITY

It is necessary to adjust the total business of the high education institutuions to European standards. This means that a high school institution should define the business performances in teaching, research and for business management. A high education institution business needs to be transparent and comparable with other high education institutions in the country, Europe and the world. That is achieved by uniform procedures of quality and standard of quality implementation in the integrated system of quality which is a part of the integrated information system on a larger level. Business performances, quality indicators and adequate variables represent a part of the integrated base of knowledge about the total business of an education institution. A high education institution obligations are transparent and regular reports on the quality of teaching, research results, study programs, evaluation and accreditation results, business performances and other reports on the integrated system of quality (Spasić, 2007).

The quality of education is estimated with regard to the following components:
– Quality of teaching modules and study programs;
– Quality of academic performances and students' working characteristics;
– Quality of academic performances and profesors' andragoghic ability;
– Quality of teaching process and students' learning;
– Quality of teaching materials in the function of available material resources;
– Degree of fulfillment of students' expectations regarding university teaching;
– Universities need to prepare the domestic industry for integration processes of Europe, defined by Bologna declaration. Cooperation in the common EHEA+ERA European area is a necessity which requires a special definition of the future common projects.

STANDARDS AND PROCEDURES OF THE INTEGRATED SYSTEM OF QUALITY

The development of quality standards and accompanying instructions should be a part of the convergent procedure of the development of the integrated system of quality on European high education institutions. There are different national approaches for internal and external procedures and standards of quality, as well as restrictions for their convergency (ENQA, 2003).

The second purpose of the quality standards is to raise the education level of students and other forms of teaching in high education institutions so that those institutions would fulfill their missions in a successful society. In research activities, the role of education institutions is to contribute to the economy development through fundamental, development and applied research, achieving results which provide new products, high technologies and applicable business methods. Standards must provide a uniform access, professionalism, credibility, transparency to education and research users, as well as a comparability of the indicators of quality and business performances in European quality dimensions.

Procedures of quality represent a basis for the implementation of integrated system of quality in a high education institution. Procedures describe all activities of education, research and management of education institution, in a standardized way, which is agreeable with ISO 9000 standard specifications,. Procedures of quality are internal (within institution) and external (consider education-business surroundings as well). Graphical presentation of the procedures of quality by a diagram of activity flow includes a precise definition of all necessary inputs and outputs of integrated activities with the definition of single and group responsibility with terms of execution of all assignments. Procedures of correction should define extra activities which should be performed in case of variation from the defined procedure due to the activity of disarrangement factors (ENQA, 2005).

High education institutions through reform and Bologna process must accept new models and forms of total business. Performances management is realized on three levels: the level of total education, the level

of institution and the level of centralized and decentralized business functions. Business performances of high education institutions are related to the teaching process, research programs and administrative activities of non-teaching staff. Business parameters with main indicators of business performances values are defined for each of the three mentioned fields. The status and values of indicators and performances must be defined and measurable in order to manage through feedback all processes and operations of the education-business system of high education institutions (IQASU, 2004).

THE QUALITY OF UNIVERSITY ACTIVITIES

In the management of university activities it is necessary to make a difference between three notions of the system of quality introduction at the university and these are: quality control, quality management and quality assurance (Deming, 2006).

Quality Control (QC) is a process through which the realized quality is monitored, in order to achieve the wanted quality determined by the values of the managed variables, indicators or business performances. Monitoring the process of quality has the objective of eliminating certain causes which give the dissatisfactory functions and results. It is also successfully applied in education (university activities quality control), where high education reform according to Bologna process has set numerous and strict, but justified requirements for new systems.

Quality management (QM) is a set of management and leading measures which are systematically conducted on an institutional level in order to accomplish the total quality of faculty and university business.
Quality Assurance (QA) is a wide general notion for continuous and always present continual process of the validity of quality (tracking, account, accreditation, preservation and further improvement). For high education systems in European countries, the main contents and request of Bologna process is quality assurance with the accreditation of study proframs. In each institution of high education, the activities of internal and external quality assurrance are regarded separately, as a pre-requisite of the implementation of accreditation procedure.

A good pracitce in prestige European institutions of high education contributes to the setting of generally accepted procedures and standards via ENQA net of institutions (European Commission, 2015). For this reason it is important that these standards are integrated in the processes which are applied in the organizations for accreditation ahd high education institutions. All standards can be divided into two basic groups:
−   Internal quality assurance standards and
−   External quality assurance standards

In order to collect information essential for the promotion of the system of quality of the education institution, the system of complementary questionnaires should be created in order to achieve continual quality promotion (Kellermann, 2004). Questionnaires of the system of quality can be divided into a few groups:
−   Questionnaires of previous secondary schools,
−   Questionnaires for students of the first and second study degree
−   Questionnaires for students of doctoral studies (the third degree)
−   Questionnaries for employees of the education institution

CONCLUSION

The achievement of high quality of all university activities is the main objective of the academic world as an environment which is capable of and responsible for the setting of the criteria of quality for other fields and whole society. The integrated system of quality defines university activities which start

from the requirements of Bologna process and European trendencies in the development of national systems of quality assurance for European unierstities.

Study programs evaluation is a pre-requisite of accreditation, obtained diplomas reputation and a postulate for the high rating on the future rang list of European universities. Academic institutions evaluation refers to universities and institutes. Internal organization units of universities and faculties (institutes, centers and laboratories) can also be valued through internal evaluation. The system of questionnaires with statistic analysis results represents information for the promotion of all university activities. Accreditation (national or international) is a standardized procedure which is regulated by the Act on university.

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RESOURCE PROTECTION - GREECE AND USA ARMY EXPERIENCE

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ABSTRACT

The organizational structure of the armed forces of any country represents a complex system, which within the wider community operates and exists under specific conditions and circumstances. Starting from its basic purposes, the regular armed forces of any state do not have unknowns regarding the rules and their core roles. However, the complex structure and the interdependence of different organizational structures within the country and of the armed forces have an impact on the implementation of measures in the field of resource protection and management of risk both in war and peacetime. This paper presents experiences in the field of resource protection within the army of a country similar to Serbia (Greece) and a highly developed country (US army).

Key words: resources, protection, army, Greece, USA

INTRODUCTION

Environmental and resource protection is possible by means of systematization and integration of environmental and resource protection into organizational management. Natural resources and the environment affect the performance of primary activities of an organization and must be in compliance with the law. Implementation of environmental and resource protection is possible only if the organization allocates the necessary funds. Aspects of resource protection include the following (Gaćinović, 2008):
− measures of prevention and reduction of negative impact in order to preserve natural resources and protect the environment;
− incompliance with legal requirements and standards of environmental protection and preservation of natural resources;
− consequences of the damage inflicted to natural resources and the environment.

Organization of environmental and resource protection pertains to (SRPS ISO 14001:2005):
− protection policy dedication to compliance with relevant legal and other requirements;
− planning legal and other requirements; an organization must establish, implement, and maintain procedures for identification and access to relevant legal and other requirements to which it is subject. Aims and objectives should be quantifiable wherever possible;
− auditing evaluation of compliance; the organization must establish, implement, and maintain procedures for periodical evaluation of compliance with relevant legal requirements; and
− re-evaluation by the managing bodies results of internal audits and evaluations of compliance with legal and other requirements to which the organization is subject.

An organization whose activity negatively impacts natural resources and the environment must take measures to:

– preserve natural resources and a clean and healthy environment;
– conserve natural resources and prevent environmental pollution; and
– continuously improve the efficiency of the resource protection system and the environmental protection system.

The system of implementation of environmental and resource protection is based on the implementation of legal regulations and international standards. Planning and organization of resource protection must be focused on prevention of negative impact on humans and social, occupational, and environmental systems. This requires a complete shift in the way of thinking and forming of opinions, and the fundamental value human-environment-nature as a new starting point. Activities towards environmental protection and the number of rules regulating this field resulted in the setting of environmental standards. Organizations adjust their business and operations and direct them towards environmental protection needs.

The International Organization for Standardization (ISO) recognized the issue of environmental protection, which resulted in the ISO 14001 standard, defining the requirements for environmental management. This standard has undergone several changes, the last one being added in 2004. The methodology on which ISO 14001 is based is the PDCA model (Plan-Do-Check-Act), by means of which an organization establishes its environmental policy, goals, and processes that ensure its adherence to the policy, and takes suitable measures to improve its efficiency and showcase the system compliance with the standard requirements (US EPA).

ISO 14001:2004 defines the requirements for establishing environmental protection procedures, determines the environmental impact factor of products and services, predicts environmental systems that are negatively impacted, measures that negative impact, and provides guidelines for preventing undesired effects. It also predicts steps and procedures for preventing environmental disasters, identifies the potentially most vulnerable points, and helps to define safety environmental procedures.
ISO 14001:2004 sets requirements for the environmental management system (EMS), while ISO 14004:2004 provides general guidelines for EMS implementation.

An EMS that complies with ISO 14001:2004 is a managing tool that allows the organization of any size to:
– identify and control the environmental impact of its activities, products and services;
– improve its treatment of the environment; and
– implement systematic approaches with which it aspires to reach its goals and which pertain to environmental protection and provision of proof that the organization has achieved its goals.

Adherence to ISO 14001:2004 is not legally required and its implementation is completely voluntary. It was developed on the basis of the concept of sustainable development. It is implementable by organizations performing any activity, it is easily combined with the ISO 9001 standard, and it is used for certification. The advantages of an ISO 14001 EMS implementation are the following:
– reduction of negative environmental impact;
– reduction of risk of environmental accidents;
– ability of quick and efficient intervention;
– development of trust in the surrounding regions;
– competitive advantage;
– legal security;
– better use of energy, water protection, careful selection of raw materials, and controlled waste recycling;
– reduction of financial load due to reactive management strategies such as repairs, cleaning, payment of fines due to incompliance with legal requirements;
– improvement of job quality and employee morale.

The organizations implementing this standard are subject to external audits by certification bodies, which issue them with certificates as evidence of compliance. The process of implementation involves several stages. First, top management is expected to define the organization's environmental policy, ensure that it

corresponds with the nature, scope, and environmental impact of the organization's activities, products, or services, and undertake to continuously improve and to harmonize with the relevant legal and other requirements (ISO 19011:2012).

EXPERIENCE FROM GREEK AND UNITED STATES MILITARIES

In the U.S. Armed Forces, risk management is adjusted to the needs of the military organization and is implemented in any situation, with no separation of incidents and hazards, either in combat situations or in peacetime. It is a management process that identifies the risks of hazards whose consequences include fatalities, property damage, and events which in any way disturb or prevent task completion (U.S. Army, 2003). Composite risk management is a process conducted through various stages, which are not discrete, but complementary:
–   hazard identification;
–   hazard assessment in order to determine risk level;
–   preparation of control and decision-making measures;
–   implementation of hazard control measures;
–   control and improvement.

Hazard identification during task study is very significant for risk management. If the hazard is not identified, it will not be taken into consideration, so the assessment of its consequences and probability of occurrence will not be conducted. Hazard identification can be facilitated by compiling a list of hazards that can cause undesired effects as well as by creating simulations according to envisaged scenarios and considering potential causes of hazardous events. Previous experience and knowledge are irreplaceable allies during risk identification of this kind (U.S. Army, 2005).

Hazard assessment is conducted by comparing the probability of occurrence with possible consequences. The first step is the assessment of the probability of hazard occurrence or the circumstances that can affect the tasks, personnel, equipment, and property, whereby the hazard itself is assessed as frequent, likely, occasional, seldom, or unlikely. The consequences of the hazard are subsequently assessed as: catastrophic, critical, marginal, or negligible. Through readings and comparison in a standardized table, commanding officers determine the first risk evaluation based on the assessed hazard probability and consequences. The first evaluation assesses hazards as having an extreme, high, medium, or low risk level. The processing priority is given to hazards with a higher risk level, and control measures are established for them. Verification of success of a hazard control measure ends with reassessment of the remaining risk level according to the same criteria. Preparation and implementation of control measures, as well as reassessment of risk level, is conducted until an acceptable risk level has been reached or at least until all risks are reduced to a level in which the gain exceeds the loss. If the criteria of suitability, feasibility, and acceptability are met, every control measure can be successful. Decision making is entrusted to an authorized person, who decides on further course of action with the given assessed risk level. The authorized person determines the manner of operations and enables and ensures the implementation of hazard control measures compliant with regulations and prescribed procedures by issuing written and oral orders and by delegating tasks to her/his subordinates (U.S. Army, 2007). Control and improvement of operations are necessary and they are present during every risk management stage. In the Hellenic Armed Forces (Military of Greece), the responsibility for the implementation of resource protection and occupational safety rests with "administrative authorities" on all levels. The manner of organization and implementation of measures in the Hellenic Armed Forces is presented below (Hellenic Republic, Ministry of National Defence, 2014). Administrative authorities assist with the activities of occupational health and safety (OHS) personnel on all administrative levels and on the level of a unit – subunit independent of the corresponding OHS departments. Anyone in breach of these regulations is liable to administrative sanctions, as well as criminal prosecution, pursuant to applicable law.

The General Staff of the Greek military gives special attention to personnel safety and requirement of complete and continuous provision of information to all persons involved in operations or activities, whether military or civilian personnel or private contractors, all for the purpose of ensuring the highest level of personnel health and safety. The Inspectorate General of the Greek military is responsible for observation and

implementation of the OHS system, acting in parallel with the Council for Occupational Health and Safety (SYAE), by conducting announced and unannounced inspections. Specifically, the Inspectorate General's responsibilities in relation to OHS are as follows (Hellenic Army General Staff):

−   to implement OHS procedures and instructions as they are recorded by the SYAE, and integrate them into the system;
−   to proceed with the inspections of prefectural inspectorates at least once a year (and take samples from lower levels) in order to ensure proper implementation of the OHS system;
−   to inform the SYAE on the results of inspections and on collected statistical data and to cooperate on drawing conclusions and improving system measures and procedures; and
−   to propose improvements of procedures and necessary measures for OHS upgrades to the SYAE based on the conclusions drawn from inspections.
−   The implementation of an integrated OHS system forms the basis of resource protection in the Hellenic Armed Forces.

CONCLUSION

The concept of resource protection is a highly complex social phenomenon and a scientific discipline within both the social and technical-technological sciences. Resource protection has multiple meanings. In the most general sense, it refers to absence/elimination of threats, i.e. pressures that can threaten resources, or their reduction to the lowest acceptable level. However, the concept of resource protection also involves ethical, ideological, and normative elements, which warrants a more precise definition. It is a socially oriented concept, which attains a certain meaning only within a given social context, which is why this paper analyzed the experiences from two very different countries (in terms of demographics, economy, culture, tradition, etc.).

ACKNOWLEDGEMENTS

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RESOURCE PROTECTION - SERBIAN ARMY EXPERIENCE

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ABSTRACT

Efficient and effective resource protection from the perspective of society usually involves minimizing costs and capital commitment in any way, while maximizing the percentage of resource utilization. Effective resource management from the perspective of the environment means leaving them in their natural, intact, state. On the other hand, effective and efficient resource protection management activities from the perspective of the military involve efficient resource protection measurements both in peacetime and emergency, even war situations. Simultaneous development of environmental, military and society friendly management practices is a necessary requirement for the development and improvement of an effective, inter-entity resource protection system at the national level.

Key words: resources, protection, military, Serbia.

INTRODUCTION

This paper should be interpreted as attempting to study the required measures and procedures to improve the existing measures and procedures for resource protection as well as to find the optimal way of implementing such measures and procedures as required by the Serbian Ministry of Defence (MoD), which is not possible without acknowledging the results obtained by scientific research and international standards and experience. The following terms are important for the topic of this paper:

− integrative model involves a holistic approach, in this case a view of the model as a whole, which enables combining the best aspects, thus leading to the optimal solution for a given model;

− resource fr. *la ressource*, "means, source"; lat. *resurgere*, "rise again, reappear, be restored", is a means necessary for the undertaking or completion of an action. A resource may be material or non-material. The basic division of resources is into human, natural (renewable and non-renewable), and material resources;

− resource protection utilization of resources on a scientific basis, identification of the ways to use resources rationally and complexly, and development and improvement of all forms of cooperation within scientific research;

− integrative model of resource protection improvement − a learning process used to define the model and the important features of a complex resource protection model required by the Serbian MoD, and to provide scientific knowledge about the organizational structure of the bodies in charge of implementation and realization of measures and procedures of resource protection for the Serbian MoD.

As confirmed by positive practical experience, the knowledge so far acquired through scientific means suggests that measures and procedures for resource protection cannot be completely identified,

monitored, assessed, and predicted, so their effects also cannot be prevented. Therefore, taking preventive measures for resource protection should not be understood as a burden for the organization but as a factor of preventive influence that allows the organization to develop (Cenar, 2009). Timely organization and establishment of functionally integrated management systems in resource protection during all stages significantly reduces and limits the threats and consequences for the organization's resources. The process of resource management begins with the risk and threat assessment stage, continues with preventive measures, and ends with the coordination of dynamic action measures and activities of resource protection.

Modern work conditions and variable conditions in the surrounding require a modern organization. Therefore, an organization is faced with requirements for fundamental changes and managing bodies are faced with transformational challenges. Changes in the organization also involve activities directed towards efficient provision and distribution of human, natural, and material resources in order to achieve the desired goal.

Management of an organization involves the management of elements necessary for the performance of an organization's activities, and these include: organization's strategic documents mission, vision, aims, and objectives; organizational structure; and operational process and resources. Each element affects the management of an organization. Resource management is conducted through resource grouping, resource accumulation, resource connection and addition, and prevention of resource deterioration. Resources are a structural element of the management system and an important element of every organization.

Resources are essential for the implementation and realization of an organization's goals. As such, they are classified into:
– human resources
– infrastructure
– occupational environment
– natural environment
– financial means.

Since resources are the object of management, this implies the responsibility of managing bodies to provide and protect the available resources and those required for operational needs, whereby the following aspects have to be considered:
– the reality of the size and structure of resources;
– timely provision of required resources according to the needs;
– nonmaterial resources;
– resources and mechanisms that enhance innovations and continuous improvement;
– organizational structure, including the needs for project, matrix, and process management;
– information management;
– completion of education and training;
– use of natural resources and environmental impact of resources; and
– planning of future resources (ISO 9004:2000).

Operation of an organization in modern times requires a different understanding of the significance of resources for the organization. As the success of any organization depends on resources, there is the need for a new approach to organizing operations dealing with resource protection. Contemporary literature usually refers to resource protection as denoting natural resources and environmental protection, or human resources in the context of occupational safety and safety of human life and health. Material resources are mentioned only as raw materials required for work and manufacture of products. Modern conditions and needs of a modern organization necessitate that resources be viewed as being in a synergy and, as such, forming a structural whole (Figure 1).
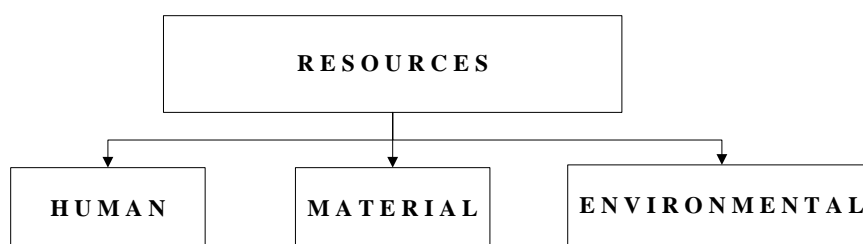
Figure 1: Resources synergetic structure

The primary resources of any organization are the human resources, whose abilities contribute to the realization of organizational goals, which makes them the most important resources of every organization, especially in terms of HR Strategy for Researchers. (http://ec.europa.eu/euraxess/index.cfm/rights/strategy4Researcher).

A SERBIAN ARMY EXPERIENCE

Current organization and functioning of resource protection in the MoD and Serbian Armed Forces (SAF) is based on twenty-year-old concepts. So far, there has been no comprehensive analysis of the issue of resource protection (with special focus on human resource protection and introduction of safety standards) aimed at the MoD and SAF. The present organizational structure of Serbian MoD is presented in Figure 2.
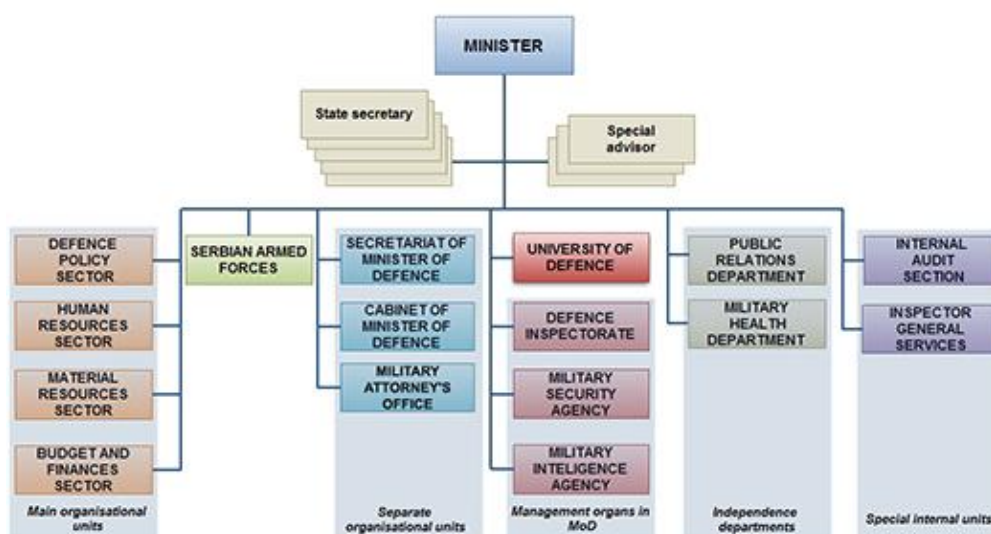
Figure 2: Serbian MoD - organizational structure

Resources have a key role in an even and strategic development of every organization. Active work on resource protection is an important internal stability factor of an organization, as it strengthens its institutional capacities and its influence on resolving important issues. In the long term, by achieving results in resource protection, an organization attains financial sustainability, higher flexibility and independence, and, consequently, higher chances of achieving better operational results (Defence strategy, 2009). Every large organization has complex operational activities, which require optimal work conditions. Organization of operations in resource protection implies adapting operational processes and work conditions to the employees. Operational processes are an integral part of every organization. In complexly structured organizations such as the MoD and SAF, which are in part not production-oriented, operational processes are not clearly defined and are difficult to describe, as is the organization of resource protection itself (Mesko, Dimitrijevic, Fields, 2011).

Optimization of work conditions has to include a psychophysical component – the mental and physical ability of employees – so that conditions for sustainable development could be created.

A human resource cannot be treated as a work instrument. Modern technology and work have resulted in stressful work environments and inefficient jobs. Work processes and work organization has to be adapted to the employees and founded on their actual needs. In order to protect human resources, every organization has to organize, arrange, and supervise the implementation of occupational safety and health operations. The OSH system involves a synthesis of various factors, such as legislation, technical knowledge and solutions, information sharing, and education in occupational medicine and healthcare. Factors originating in the occupational environment and in workplaces, which can cause occupational injuries or damage health, represent hazards in terms of OSH regulations. Risk assessment and implementation of measures for safe and healthy work are the fundamental principles of prevention of occupational injuries, occupational diseases, and work-related diseases (Bulat et al., 2007). Risk assessment is based on continuous recording and monitoring of all factors, hazards, and harms in the work process. The assessment is a continuous task and it requires constant additions and revisions. This requires good knowledge of an organization's operations from every aspect: work, work process, work tools and materials, and OSH and personal protective equipment.

CONCLUSION

Completion of tasks of organizational units of the MoD and SAF requires resources. The connection to the civilian structures of society is reflected in the use of material and natural (renewable and non-renewable) resources. This necessitates coordination of military and civilian structures regarding the use of material and, in particular, natural resources the latter involving environmental and natural wealth protection, especially in locations where military drills are conducted for the purpose of protecting the environment after military use and maintaining its usability by the local population. Good coordination of military and civilian social structures is the key to resource protection in Serbia.

ACKNOWLEDGEMENTS

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MODELLING AND OPTIMISATION POSSIBILITIES OF PRODUCTION PROCESS FOR PROVIDING SUSTAINABILITY

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ABSTRACT

Marketing decisions in modern-day business are made under conditions of growing uncertainty, which cannot be measured, and business risks, which are measurable. Marketing decisions have always been made under the conditions of uncertainty and risk, but modern-day pace of change and intensity of shock are more extreme than ever. For this reason, market decision makers should be qualified for appropriate assessment of acceptable risk level, so as to secure the best effects and control the damage from made marketing decision. Applying the fuzzy set theory is a good example of such approach to marketing decision making. The main goal of this paper was to present the fuzzy decision model that will provide more successful and efficient decision making in the area of marketing, in relation with dilemma "to produce or to purchase", because the make-or-buy methodology is one of the most critical strategic decisions within logistics outsourcing and should be taken in a structured and consistent manner. Methodology in the paper obtained analysis of the theory of marketing and knowledge based systems, the development of the specific model for decision making, so as the application of developed model on production process which has to be sustainable.

Key words: marketing and knowledge based systems, make-or-buy methodology, fuzzy decision model, sustainable production process

INTRODUCTION

Sustainable marketing management is the management of material, information and capital flows, as well as cooperation among companies along the supply chain, while taking into account goals from all three dimensions of sustainable development – economic, environmental and social – derived from customer and stakeholder requirements (Seuring and Muller, 2008). In doing so, the focus on environmental management and operations is moved from local optimization of environmental factors to consideration of the entire supply chain during the production, consumption, customer service and post-disposal disposition of products (Linton et al., 2007). The research problem in this paper was proposed in terms of model development. Authors developed model for decision making, based on successful integration of marketing and knowledge based and fuzzy theories. Also, this was proposed as universal model which can be implemented in each production system considering the experts knowledge, opinion and experience. The expert knowledge may consist of a combination of a theoretical analyses and heuristic problem-solving principles collected from experience. They implemented the model in decision making problem related to the debate "to produce or to purchase" on one real decision problem and data in Serbian production system.

LITERATURE REVIEW

Marketing decisions in modern-day business are made under conditions of growing uncertainty, which cannot be measured, and business risks, which are measurable. In most cases, marketing decisions are made under conditions of uncertainty and high risk. According to some authors (Sedlak et al., 2013) this is most contributed to by:
− a relatively high number of relevant variables;
− impossibility of controlling relevant variables;
− their instability and nonlinearity, stochasticity of relevant variables;
− difficult quantification and measurement of effects of relevant variables;
− shortage of marketing information.

The "produce or purchase" dilemma has been very often the subject of research in economics, at first in the paper by Coase (Coase, 1937). The transactions cost theory developed by Williamson (Williamson, 1985), explains the key roles of incomplete contracts and asset specificity in the "produce or purchase". The property rights theory in Grossman and Hart paper (Grossman and Hart, 1986), considers how the incentives to integrate or outsource depend on which investments. From Gibbons (Gibbons, 2005) we learn that the input supplier's or the final good producer's – are relatively more important for the success of the joint relationship. Namely, authors tried to develop a model that will be suitable for making marketing decisions and sustainable in production systems, like Peng Jia et al (i.e. the authors want to make supplier selection with sustainability considerations) (Jia et al., 2015). Methodology in the paper obtained analysis of the theory of marketing and knowledge based systems, the development of the specific model for decision making, so as the application of developed model on production process which has to be sustainable (Tan et al., 2011). Vorhies and Morgan in their paper recognized that the key mechanism for identifying, building, and enhancing of production process capabilities to deliver sustainable competitive advantage, through marketing decision models (Vorhies and Morgan, 2005).

PROBLEM FORMULATION

In any real-life situation, including the decision making and management fields – whether it is about setting goals and formulating strategies, or selecting, implementing and monitoring the selected strategy – many processes are unfit for mathematical modelling. Fuzzy systems enable us to model the universe in linguistic terms, rather than forcing us to write a mathematical model of the universe. The technical term for it is model-free function approximation (Sedlak et al., 2013). Here is important to emphasize that for many knowledge-intensive applications, it is important to develop an environment that permits flexible modelling and fuzzy querying of complex data and knowledge including uncertainty (Koyuncu and Yazici 2005). A very common problem encountered by marketing decision makers in companies, also related to production, finance and purchase, is the dilemma whether a certain product, part or semi-manufactured product should be produced by engaging their own resources, at their own plants, or obtained from suppliers.

This problem requires coordinated approach to solving, and can manifest itself in practice in three forms:
− produce or purchase a product previously not used by the company;
− independently produce the product previously purchased from suppliers or
− purchase the product currently produced by engaging their own resources at their own plants.

In recent decades, the "make-or-buy decision" shifted from the level of reactive clerical function to the center of business strategy. It was realized that sourcing decision have a great effect on business strategy and that sourcing decision has a great effect on a business future survival. The make or buy decision can often be a major determinant of profitability making a significant contribution to the financial health of the company (McIvor and Humphreys, 2000).

Resolving the given problem can be approached along three avenues:
−   by the classical method;
−   by applying the expert system and
−   by applying the fuzzy set theory.

Since the make or buy decision is presented in wide range of researches in the world, there have been made several attempts for creation the framework for "make or buy" decision making process (Cheshmberah et al., 2011).

PROBLEM SOLUTION

It is due to the importance of additional criteria that a prototype of the expert system was developed (including software solutions). As the economic model in Figure 1. shows, the number of attributes taken into account is far greater compared to the classical decision making method.
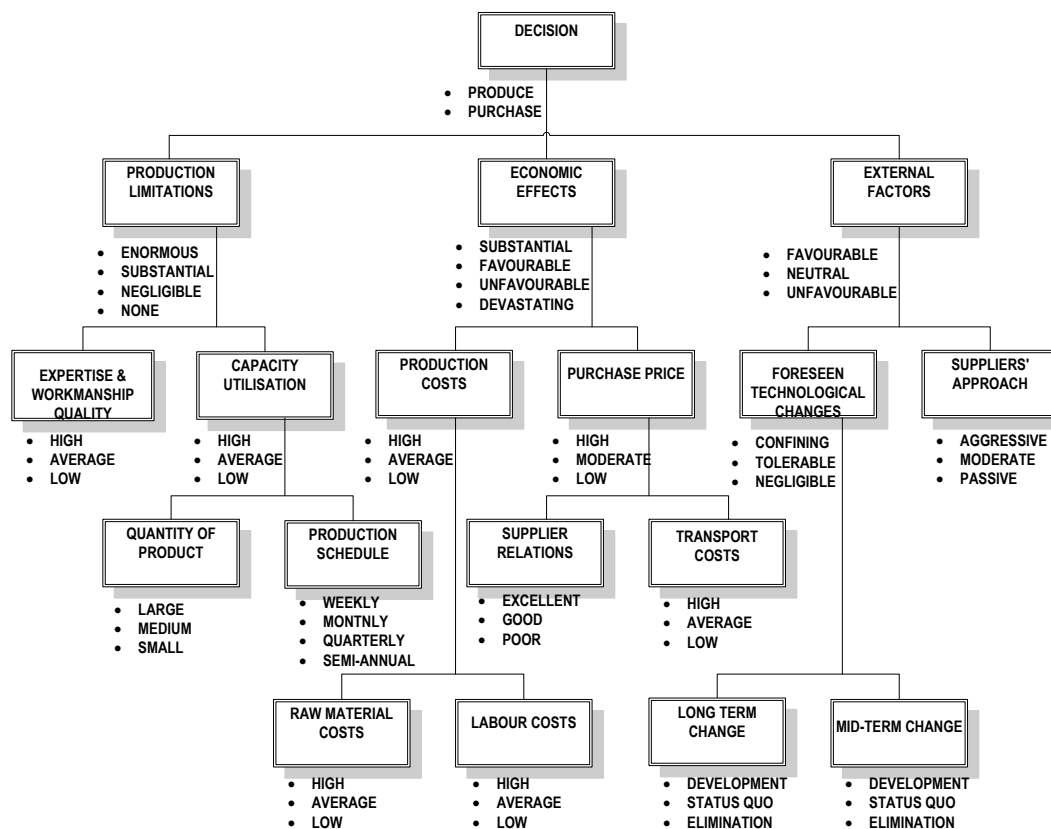
Figure 1: Decision tree for problem solving: "Produce or purchase"

The decision maker communicates with the expert system by choosing the domains of values for the attribute of the decision making leaf nodes. Using the built-in logarithm, the expert system proposes a solution with explanation based on these data. The risk of making a wrong decision is thus multiply reduced, which was the basic objective of developing the expert system (Humphreys et al., 2002). Fuzzy systems enable us to make optimum approximations of the non-linear universe. If it is possible to build a mathematical model, we shall use it. Fuzzy systems enable us to model the universe in linguistic terms, rather than forcing us to write a mathematical model of the universe. The technical term for it is *model-free function approximation*. The Fuzzy Approximation Theorem claims that a graph can always be covered with a finite number of fuzzy patches. The more uncertain the rule, the larger the fuzzy patch. According to the Fuzzy Approximation Theorem, a fuzzy system can approximate a continuous system to a sufficient degree of accuracy. This includes almost all systems

studied by science. Fuzzy systems can model dynamic systems changing over time (Munakata and Jany, 1994). It is hard to deny that modern-day knowledge is fuzzy. Meanings of statements are undoubtedly fuzzy. Knowledge has always been regarded in terms of rules. If knowledge is fuzzy, then rules are fuzzy as well. Fuzzy rules connect fuzzy sets. Fuzzy patches cover the system graph. It is the Fuzzy Approximation Theorem and fuzzy patches that explain the functioning of fuzzy systems.

Fuzzy logic is very often successfully applied for modelling problems where interdependences between individual variables are highly complex. This is how resolving the above described problem was approached. Input and output variables were defined as different fuzzy sets, both continuous and discontinuous. Defining fuzzy sets intrinsically implies that the appropriate degree of belonging is ascribed to all possible values, followed by defining inference rules, which mandatorily includes the operation of logical implication with input conjunction and/or disjunction. Having determined the degree of belonging, values of output variables, with minimum but certain and guaranteed degrees of belonging, are chosen for every rule, considering all the input variables. After this, the observed output variable is still not unequivocally defined, for it has different values with different degrees of belonging at all points, depending on the number of used rules. The next step is choosing the output variable values with maximum degrees of belonging. An output variable is thus obtained and subsequently defuzzified, i.e. a specific numeric value is determined, which is either the input variable on the next, higher level, or the decision, i.e. solution to the problem, on the last level. Thus, the final decision is made by using multiple steps, taking into account all possible circumstances and all the possible variable values occurring in it. Such complete consideration and problem analysis would be impossible to do without fuzzy logic, relying only on experts' knowledge, experience and intuition.

According to their belonging functions, the above fuzzy variables in the observed problem can be observed as follows:

−   Group I: raw material costs, labour costs, production costs, transport costs, purchase price, quantity of product, capacity utilisation, external factors (Figure 2). The value interval (a,b) is determined in each specific case. The observed variables are measured in monetary units, excluding capacity utilisation, foreseen technological change and external factors expressed in percentage.
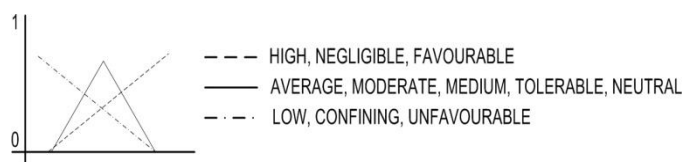

Figure 2: Group I

−   Group II: long term change, mid-term change (Figure 3). The measurement unit is the degree of expected change.
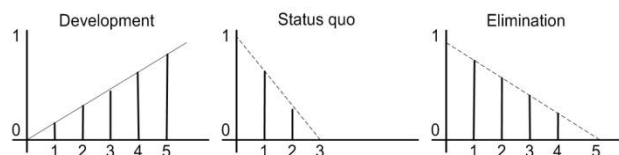

Figure 3: Group II

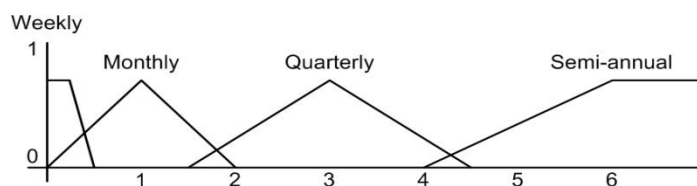−   Group III: production schedule (Figure 4). The measurement unit is time expressed in months.
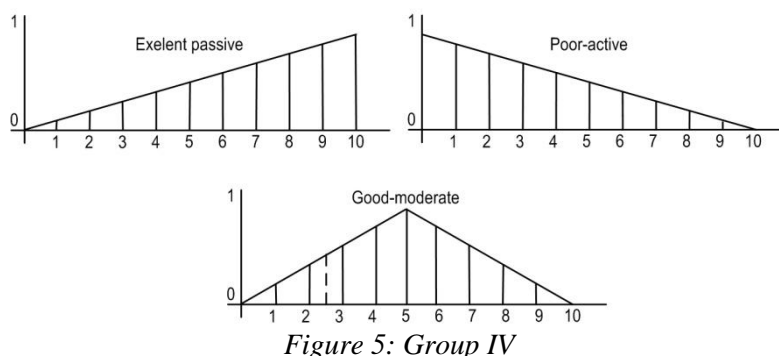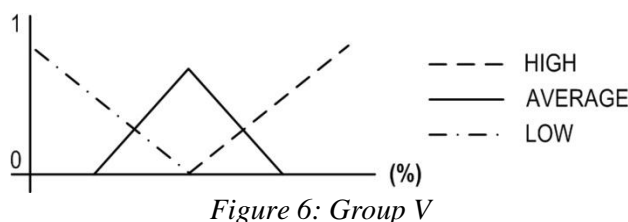

Figure 4: Group III

– Group IV: relations with suppliers, suppliers' strategy (Figure 5). The measurement unit is assessment grade for suppliers.
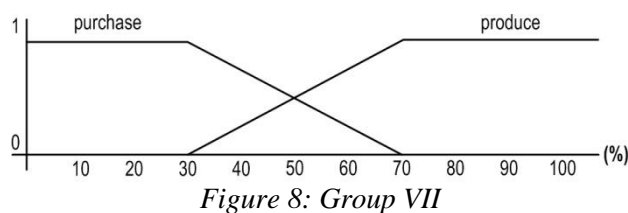

Figure 5: Group IV

– Group V: expertise (Figure 6). Presence of higher qualification is expressed in percentage.

Figure 6: Group V

– Group VI: production limitations, economic effects (Figure 7); measured in percentage, from the "produce" aspect.
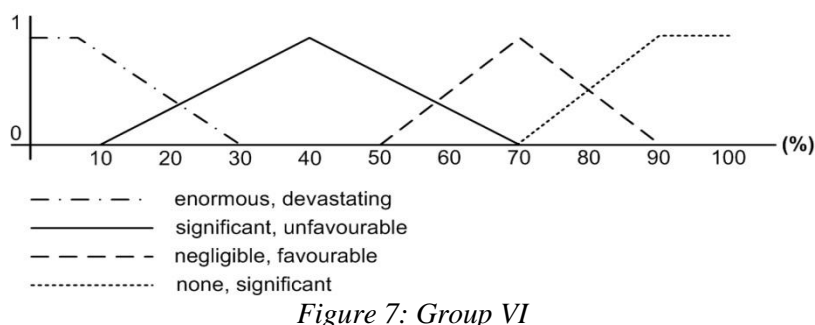
Figure 7: Group VI

– Group VII: decision (Figure 8); expressed in percentage, from the "produce" aspect.

Figure 8: Group VII

The approximate reasoning algorithm for making the business decision whether to produce or purchase consists of three basic steps. Each basic step is divided into several interconnected steps. Each of these substeps, or steps, contains a logical inference rule defined by experts.

As specified numeric values directly entered at the given moment of making the "purchase or produce" decision, the input data are as follows: expertise, quantity of product, production schedule, raw material costs, labour costs, supplier relations, transport costs, and long- and mid-term changes. As illustrated in Figures 2-8 above, fuzzy sets are already prepared at all levels. Direct entry of the above listed first- and second-level data activated the above defined algorithm.

CONCLUSION

This article has developed a heuristic diagram for making the "purchase or produce" business decision. The problem per se has all the characteristics of uncertainty. A serious problem, therefore, is determining input variables and forecasting all possible circumstances, which is only possible based on subjective estimate. An estimate with a degree of accuracy is much easier to obtain for a range of data than for an individual value.

Fuzzy sets can be introduced into the existing decision making models in several ways. As an economic institution, a company bases its existence on the environment, both from the aspect of providing input and from the aspect of achieving and valorising input. Miscellaneous knowledge and experience, and also decision making in the areas of investment, market operations, financial function, production function or research and development, can be considered more fully and exactly applying fuzzy sets.

The fuzzy set theory provides a solution to this. Individual steps of the algorithm are based on fuzzy logic rules. The algorithm was verified on multiple numeric examples, and development of an appropriate software product is in progress. The essential feature of this algorithm is that there is no possibility of "setting up" a desirable decision by tailoring input data.

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SYNCHRONIZATION OF THE PROCESS OF MAKING POSITIONS AS AN ELEMENT OF EFFICIENCY OF THE PRODUCTION PROCESS

UDC: 658.5

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ABSTRACT

The paper presents some of the possible organisational and technical measures for shortening the duration of the production cycle of a complex product, which is a prerequisite for improving the overall organizational performance. In particular, we emphasized the influence of the load level of production machines on which operations with the longest duration to the length of the production cycle are carried out. As an example, we analyzed the manufacturing process of a complex product, which is a part of the production program of the Company JSC "Sloboda" Cacak.

Key words: the production cycle, production capacity, level of utilization of machines

INTRODUCTION

There is a permanent tendency of manufacturers to reduce the length of the production cycle, which has a direct impact on the delivery of products, an important factor in the battle for dominance on the competitive market. Modern business conditions and the complexity of production processes require the use of various techniques to optimize production processes in the function of time as an important factor of efficiency. Theoretical and practical studies have shown an increasing interest in the application of different methods and techniques for solving the problem of reducing the length of the production cycle and optimizing the utilization of the capacities of a production (Radojicic et al, 2012a; Klarin et al, 2010; Cala, Klarin, Radojicic, Erceg, 2011; Radojicic et al, 2012b, Wang et al. 2010, Radojicic et al, 2012c). The overload of production capacity over the determinated technical capabilities, particularly during the realization of operations with the longest duration, creates bottlenecks in the production process which causes a longer production cycle, and thus the drop in efficiency. Optimization of utilization of production capacity occurs as an important tool in optimizing the production cycle as a function of better organizational performance. The possibilities of a certain production corporation to produce a certain amount of products, depends on the production capacity, to a large extent. The notion of capacity, from the point of view of the production, represents the ability of a production company to produce a certain amount of material goods for a certain period of time. It is primarily related to the ability of people, then to the means of production and work organization, that is, on the combination of human resources and of the property of a company (Bozin and Radojicic 1997). Discussed efforts are primarily related to the rationalization of internal reserves in fixed assets, working capital, working hours of staff and general reserves in exploitation of resources (Greasley A., 2009). The paper (Jodlbauer and Reitner 2012) develops an approach (material and capacity requirements planning; MCRP) to integrate capacity planning into MRP. An additional

procedure, capacitating, was inserted between the lot sizing steps and offsetting to guarantee capacity feasible production plans. The relation between capacity and output is shown in the figure 1.
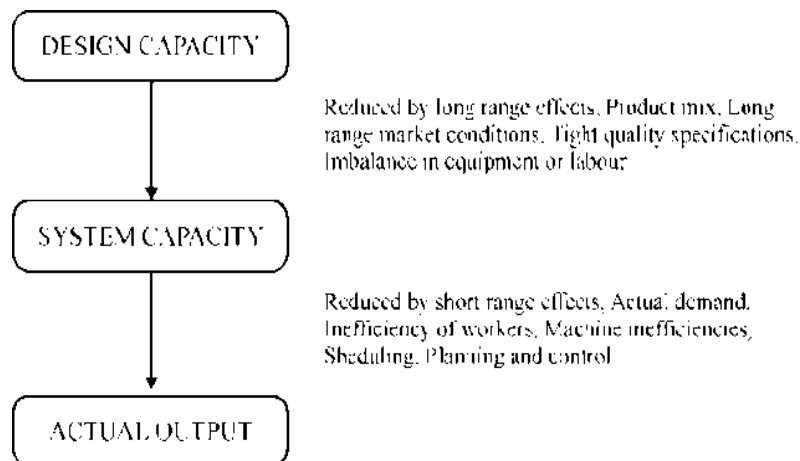

Figure 1: Capacity and output relationship, Source (Anil Kumar and Suresh 2008, 122)

The data used for detailed analysis of the impact of levels utilization of production capacity on the length of the production cycle are the results of recording the production process of a complex product "Missile laborated " which is a part of the production program of the Company JSC "Sloboda" Cacak. The product consists of 9 positions whose development requires implementation of a series of different operations, of different duration, realized on different machines.

A POSSIBLE APPROACH TO ORGANISATION AND SYNCHRONIZATION OF THE PROCESS OF MAKING POSITIONS

The length of the production cycle does not depend only on the duration of operations from which it is consisted, but on the way in which the work objects are moving, or on the manner in which the operations are changed. The highest degree of synchronization of work processes, and therefore the greatest efficiency is achieved by using a parallel-type organization of sequencing operations. Despite the eminent advantages, the main disadvantages of this approach are presented in between-operation setbacks, which hapen due to an inconsistency in duration of successive manufacturing operations.

In This way, the interest of the producers for the optimisation of the production operations with the longest duration time is very significant, bearing in mind that these operations determine the overall technological time to a great extent. For the aforementioned product, a detailed analysis of the technological process has been performed, as well as the analysis of used machines and their capacities, available workers, the number of shifts, based on which, for each position precisely a specified time for creating a piece for a series of 200000 pieces which is necessary to produce on a monthly basis in order to meet the planned delivery dates. Limitations of production capacity of the Company (in all operations using only one machine for each type) cause the exceeding of this deadline due to the overload of individual machines. Table 1 shows the results of the calculation of the duration of production cycle for the position   „Missile laboration" which is a part of the observed position.

By the recognition of the nature of the technological process, conditionality of the operations and their duration, we created a Gantt chart for the observed production process (Figure 2), which consists of two sets a "lighter" and a "Grenade", whose production can take place in parallel. In addition to the process of making positions, which represents production operations, the production cycle includes some non-productive activities such as ordering and receiving materials and testing whose duration is determined, mainly by organizational facts. Creating a first circuit takes 188 days and is largely conditioned by sub-position "Creating guides" whose development lasts 154 days, so most of the

optimization measures should be directed towards this sub-position. The most critical subposition of the second unit, which lasts 312 days is the "The compound of the liner and rotating band" which lasts for 277 days.

Table 1: Position of a Laboration of missile

SKLOP		
POSITION NAME	LABORATION OF MISSILE	
DRAWING NUMBER:	D12 - 86905	
CODE	10944000	

NO.	OPERATION NAME	MACHINE - DEVICE	REQUIRED NUMBER OF WORKERS	CAPACITY FOR A SHIFT (7.5H) ZA 7,5h	NUMBER OF SHIFTS	DAILY CAPACITY	NUMBER OF MACHINES	TOTAL CAPACITY	MAKING TIME PER PIECE IN cmh	TOTAL TIME MACHINE FOR EVERY DAY IN NORMA TIME	NUMBER OF PRODUCT	TOTAL TIME FOR A MONTH IN NORMA TIME	TOTAL MONTHLY CAPACITY IN PIECES (20 DAYS)
1	Transport between workshops	Freight electric vehicle	1	10000	2	20000	1	20000	75	15,00	200000	150,00	400000
2	Weighing explosively flammable mixtures	Technical scales	2	800	2	1600	1	1600	187,4	3,00	200000	374,80	32000
3	Assembly, removal tools and filling mixture	Worktable - HP "Manurhih" 30t	1	800	2	1600	1	1600	187,4	3,00	200000	374,80	32000
4	1st i 2nd pressing explosively combustible mixture in the jacket shell	Hydraulic presses "Manurhin" 30t	1	800	2	1600	1	1600	187,4	3,00	200000	374,80	32000
5	Clean the coils on the tee and depth control	Working table - manually	1	800	2	1600	1	1600	187,4	3,00	200000	374,80	32000
6	Preventive control	Manual - visually - technical scales	OVERHEAD OPERATIONS										
7	Transport between operation	Manual - wheelbarrow	0,5	1500	2	3000	1	3000	500	15,00	200000	1000,00	60000
8	Application pressurizers the thread lighter and partially winding	Working table - manually	2	1500	2	3000	1	3000	500	15,00	200000	1000,00	60000
9	Finally winding lighter	Working table - manually	1	1500	2	3000	1	3000	500	15,00	200000	1000,00	60000
10	Clean excess pressurizers and workshop control	Working table - manually	1	1500	2	3000	1	3000	500	15,00	200000	1000,00	60000
11	Degreasing of lighter and shell granate	Working table - manually	1	1500	2	3000	1	3000	500	15,00	200000	1000,00	60000
12	Lacquir the lighter	Turning pneumatic	2	1500	2	3000	1	3000	166,6666667	5,00	200000	333,33	60000
13	Repair lacquir peak lighter - manually	Working table - manually	1	1500	2	3000	1	3000	500	15,00	200000	1000,00	60000
14	Workshop control	Working table - manually	1	1500	2	3000	1	3000	500	15,00	200000	1000,00	60000
15	Technical control	Working table - manual - visually	OVERHEAD OPERATIONS										
16	Transport between operation	Manual - wheelbarrow	1	3000	2	6000	1	6000	250	15,00	200000	500,00	120000

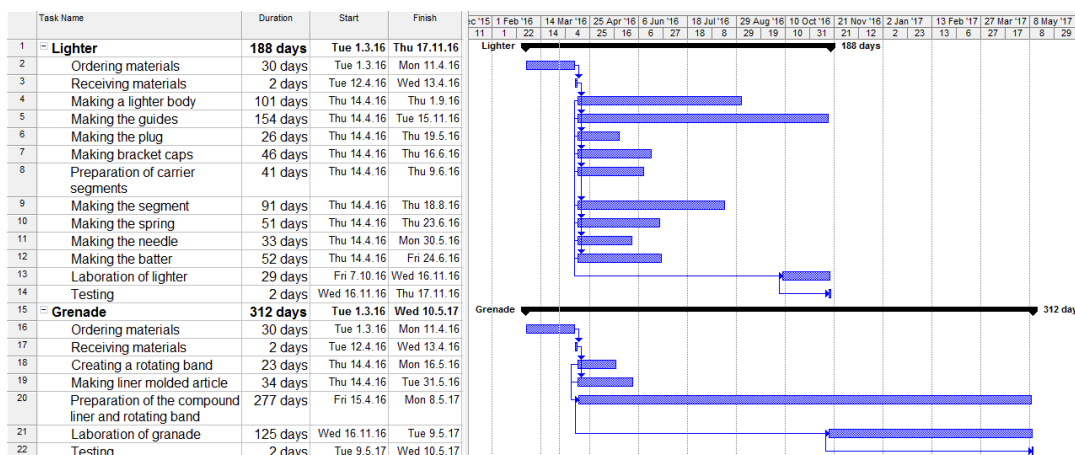| #	Task Name	Duration	Start	Finish
1	Lighter	188 days	Tue 1.3.16	Thu 17.11.16
2	Ordering materials	30 days	Tue 1.3.16	Mon 11.4.16
3	Receiving materials	2 days	Tue 12.4.16	Wed 13.4.16
4	Making a lighter body	101 days	Thu 14.4.16	Thu 1.9.16
5	Making the guides	154 days	Thu 14.4.16	Tue 15.11.16
6	Making the plug	26 days	Thu 14.4.16	Thu 19.5.16
7	Making bracket caps	46 days	Thu 14.4.16	Thu 16.6.16
8	Preparation of carrier segments	41 days	Thu 14.4.16	Thu 9.6.16
9	Making the segment	91 days	Thu 14.4.16	Thu 18.8.16
10	Making the spring	51 days	Thu 14.4.16	Thu 23.6.16
11	Making the needle	33 days	Thu 14.4.16	Mon 30.5.16
12	Making the batter	52 days	Thu 14.4.16	Fri 24.6.16
13	Laboration of lighter	29 days	Fri 7.10.16	Wed 16.11.16
14	Testing	2 days	Wed 16.11.16	Thu 17.11.16
15	Grenade	312 days	Tue 1.3.16	Wed 10.5.17
16	Ordering materials	30 days	Tue 1.3.16	Mon 11.4.16
17	Receiving materials	2 days	Tue 12.4.16	Wed 13.4.16
18	Creating a rotating band	23 days	Thu 14.4.16	Mon 16.5.16
19	Making liner molded article	34 days	Thu 14.4.16	Tue 31.5.16
20	Preparation of the compound liner and rotating band	277 days	Fri 15.4.16	Mon 8.5.17
21	Laboration of granade	125 days	Wed 16.11.16	Tue 9.5.17
22	Testing	2 days	Tue 9.5.17	Wed 10.5.17

Figure 2: Parallel type of performing organization of manufacturing operations

From the previous Gantt chart, we can conclude that the major bottlenecks in production occur in sub-position "Creating guides" and "The compound of a liner and the guide ring." A long process of making these positions is conditioned by the overload of certain machines which are used in the realization of operations with the longest duration. An overload is present with the other machines used in the production process as well. An overview of all machines which are used in the observed production process with calculated available capacities obtained on the basis of the duration of the production operations realised on them as well as the level of utilization of these machines, compared to the amount of products which is necessary to produce - are given in Table 2. In the production, a total number of 39 machines is used, with different levels of load ranging from 25 to 714.29%. In accordance with the eminent problem of overloading the individual machines, suggestions for unloading the machines with an extremely high degree of load are given, in the form of hiring new machines. Hence, we suggested introducing 6 new machines of number 7, by which the burden of these machines with 714.29% is reduced to 196%, 4 new machine of number 1, so that the burden of this machine would be reduced from 625% to acceptable number of 160. The expansion of production capacity is limited by an economic factor of profitability. For machines with extremely low level of utilization, we propose a reduction of available capacity by routing the aforementioned machines on other production processes (machines number 34, 36, 37, 38, 28, 17 and 16).

The current load of the machines and results of the proposed measures are given in Figure 3.

Table 2: The degree of utilization of machine capacities

| MACHINE No.	MACHINE (DEVICE)	NECESSARY QUANTITY OF PRODUCTS	CAPACITY OF MACHINES	UTILIZATION OF PRODUCTION CAPACITY OF MACHINES	EXPANDING THE NUMBER OF MACHINES	NEW CAPACITY OF MACHINES	NEW UTILIZATION OF PRODUCTION CAPACITY OF MACHINES
1	Hydraulic presses "Manurhin" 30t	200,000	32,000	625.00%	+4	160,000	125.00%
2	Turning pneumatic	200,000	60,000	333.33%	+2	180,000	111.11%
3	Aggregate machine "Witzig Frank"	200,000	48,840	409.50%	+3	195,360	102.38%
4	Grinder "Lidkoping"	200,000	140,000	142.86%		140,000	142.86%
5	Lathe finishing "Munktels"	200,000	200,000	100.00%		200,000	100.00%
6	Lathe finishing "Dubied"	200,000	104,000	192.31%	+1	208,000	96.15%
7	Milling cutter for thread "Heller"	200,000	28,000	714.29%	+6	196,000	102.04%
8	Centrifuge "Heine"	200,000	202,160	98.93%		202,160	98.93%
9	Hydraulic presses "Hatrex"	200,000	76,000	263.16%	+1	152,000	131.58%
10	Lathe finishing "Index"	200,000	60,000	333.33%	+2	180,000	111.11%
11	Lathe finishing "Muller Montag"	200,000	176,000	113.64%		176,000	113.64%
12	Marking machine "Škoda"	200,000	200,000	100.00%		200,000	100.00%
13	Machine for painting "Sprimag" Φ1520	200,000	246,000	81.30%		246,000	81.30%
14	Machine for painting "Sprimag" Φ800	200,000	246,000	81.30%		246,000	81.30%
15	The device for pad printing	200,000	160,000	125.00%		160,000	125.00%
16	Machine for crushing "Caddy"	200,000	520,000	38.46%		260,000	76.92%
17	The furnace electrical transient "IWK"	200,000	600,000	33.33%		200,000	100.00%
18	Lines for dressing	200,000	1,080,000	18.52%		270,000	74.07%
19	Lines for phosphating	200,000	880,000	22.73%		220,000	90.91%
20	Multistage presses "Formmaster"	200,000	360,000	55.56%		360,000	55.56%
21	Single spindle automat "Schwerdtfeger"	200,000	180,000	111.11%		180,000	111.11%
22	Hydraulic presses "Karla Hurt"	200,000	200,000	100.00%		200,000	100.00%
23	Device for degreasing elements "Wacker"	200,000	240,000	83.33%		240,000	83.33%
24	Machine only liquidation	200,000	241,560	82.80%		241,560	82.80%
25	Machine for winding	200,000	140,000	142.86%		140,000	142.86%
26	Sixth spindles automat "Gildemeister" AS-25	200,000	72,000	277.78%	+1	144,000	138.89%
27	Lathe finishing "Auerbach"	200,000	40,000	500.00%	+4	200,000	100.00%
28	Sixth spindles automat "Tornos" AS-14	200,000	305,800	65.40%		152,900	130.80%
29	Aggregate machine "SAS" - Bagat	200,000	96,000	208.33%	+1	192,000	104.17%
30	Single spindle automat "Tornos" M-4	200,000	156,240	128.01%		156,240	128.01%
31	Milling cutter table	200,000	272,000	73.53%		272,000	73.53%
32	Hand press	200,000	248,000	80.65%		248,000	80.65%
33	Drill table	200,000	181,160	110.40%		181,160	110.40%
34	Spindle automat "Tornos" M-7	200,000	587,280	34.06%		293,640	68.11%
35	Horizontal Milling cutter "Makers"	200,000	240,000	83.33%		240,000	83.33%
36	Coil winding machine "Schenker"	200,000	600,000	33.33%		200,000	100.00%
37	Furnace for leaving	200,000	400,000	50.00%		200,000	100.00%
38	Sanding machine "Schenker"	200,000	440,000	45.45%		220,000	90.91%
39	Line for cadmium	200,000	800,000	25.00%		266,667	75.00%
AVERAGE UTILIZATION OF PRODUCTION CAPACITY OF MACHINES				156.87%			100.61%
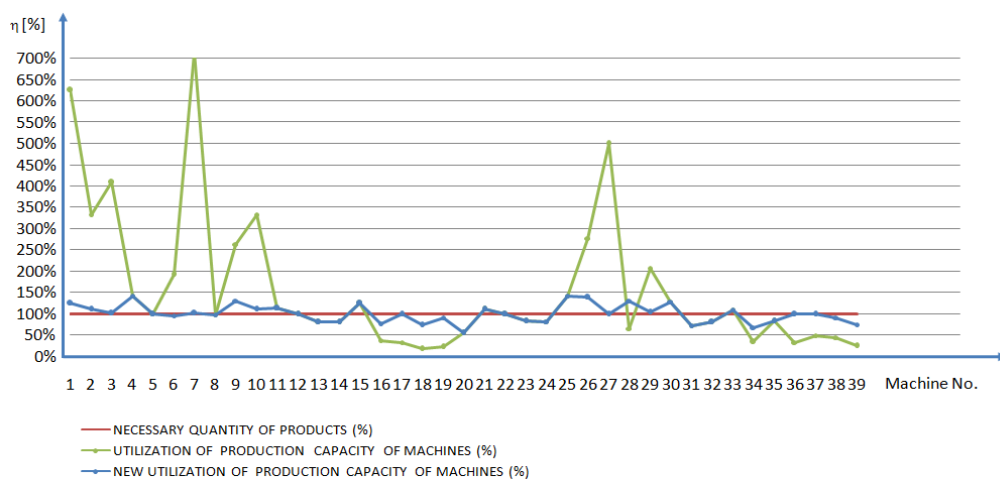
Figure 3: The degree of utilization of machine capacities

The average workload of machines, after the correction of available capacity is now within the optimal limits. Despite the implemented measures, the utilization of each machine is at a level below the optimum, but that is mainly the machinery of the lower level, so, in terms of the degree of value-time utilization of capacities, we achieved an acceptable level. Measures taken in the form of expansion of production capacities lead to a shorter duration of the making of specific sub-positions. The savings in time which are achieved are given in Figure 4.
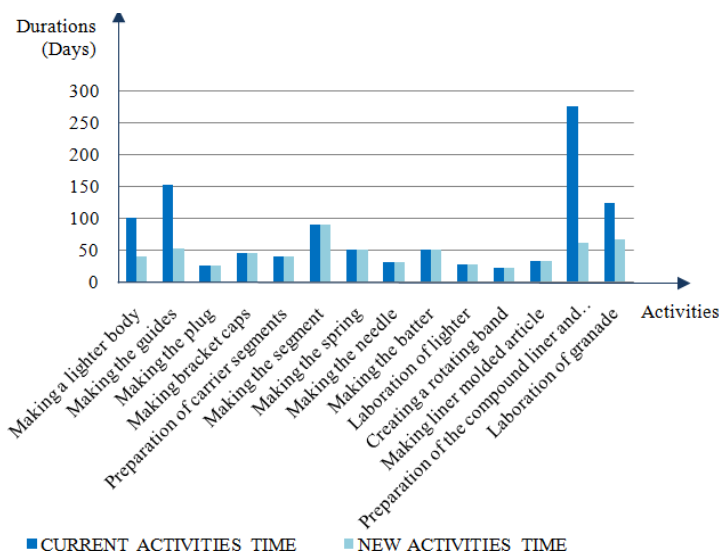
Figure 4: The degree of utilization of machine capacities

It is evident that there are significant savings in time for implementation under the position "lighter body" (60 days), "Development of turntables" (101 days), "The combination of liner and guide ring '(214 days) and" laboration grenades "(58 days), since in their preparation additional equipment is needed. The results of the applied measures are represented in the Gantt chart of the production process of observed products with reduced duration of activity (Figure 5). The production cycle now lasts 125 days, with production activities which last 93 days, while non-production activities (Ordering and receiving materials and Testing) last 32 days since the applied organizational and technical measures have no impact on this type of activity.
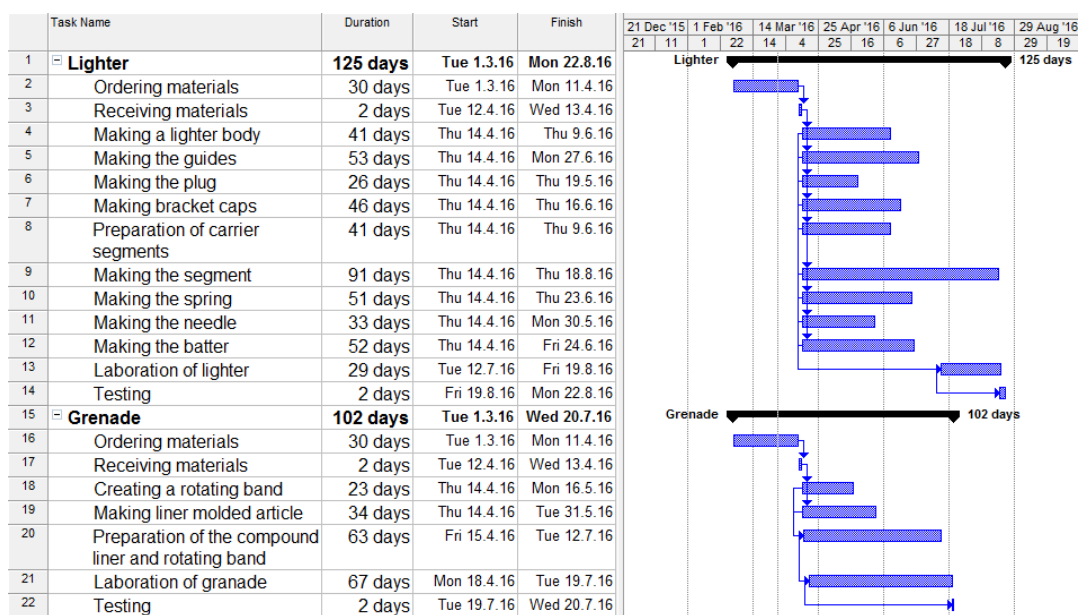
Figure 5: Parallel type of performing organization of manufacturing operations

CONCLUSION

The imperative of shorter delivery times and faster work flow of objects through the production process as a direct factor which has an effect on the costs and the total production and operating results, imposes requirements for the application of a number of organizational and technical measures in the process of optimization of production processes. As it is shown in the paper, the load of individual production machines has a significant impact on the overall length of the production cycle. The research which we conducted points to a substantial reduction of the duration of certain activities by optimizing the level of laod of production capacities. The necessary financial support for expansion of capacities can be justified by considerable cost savings achieved by a shorter production cycle.

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THE ELEMENTS OF PRODUCTION CYCLE TIME IN SMALL AND MEDIUM-SIZED ENTERPRISES

UDC: 658.524:334.72

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ABSTRACT

The paper presents the method for determining the elements of production cycle time using a modified work sampling method. The production cycle (PC) time, as a very important economic indicator of freezing current assets, involves the time needed to make a unit or a series of units from putting them into production until their storage, and is rarely discussed in literature, although it should be also analyzed and as short as possible. One of the most important organizational-technical indicators of production successfulness is the production cycle. Authors present some of the results obtained by surveying result in a medium-sized company in Serbia. Research was conducted in the same period 2014 and 2015, for the purpose of monitoring and comparative presentation of results.

Key words: production cycle, elements of production cycle time, work sampling method, small and medium size enterprises

INTRODUCTION

Production function is that part of an organization, which is concerned with the transformation of a range of inputs into the required outputs (products) having the requisite quality level. Production is defined as "the step-by-step conversion of one form of material into another form through chemical or mechanical process to create or enhance the utility of the product to the user." Thus production is a value addition process. At each stage of processing, there will be value addition.

The PC time involves the time needed to make a unit or a series of units from putting them into production until their storage, and aside from being significant as a technical indicator, it is also important as an economic indicator of freezing current assets, especially raw materials. There can hardly be any enterprise that does not monitor PC time through documentation and analytically, but rarely do they monitor the elements of work within the PC and by analyzing those elements affect their reduction and thereby PC time reduction.

For developing and transitional economies in particular, SME development holds the added allure of being a key component of wider economic development and poverty alleviation. The SME community is seen as a major and sustainable generator of employment and income (and therefore tax revenues) for citizens working outside of the State sector. In the case of transitional economies, although many

State-owned enterprises can also be SMEs, SME development is broadly synonymous with private sector development. In developing countries, SMEs can also serve as a useful bridge between the informal economy of family enterprise and the formalized corporate sector. Some of a country's more able SMEs may also be a source of foreign exchange earnings, if they are able to meet the quality and quantity standards required to export their products or services overseas (ESCAP).

PRODUCTION CYCLE TIME AND SMALL AND MEDIUM-SIZED ENTERPRISES

SMEs are defined by the European Commission (ec.europa.eu) as having less than 250 persons employed. They should also have an annual turnover of up to EUR 50 million, or a balance sheet total of no more than EUR 43 million (Commission Recommendation of 6 May 2003). These definitions are important when assessing which enterprises may benefit from EU funding programmes aimed at promoting SMEs, as well as in relation to certain policies such as SME-specific competition rules. European Commission policy in relation to SMEs is mainly concentrated in five priority areas, covering:
−   the promotion of entrepreneurship and skills;
−   the improvement of SMEs' access to markets;
−   cutting red tape;
−   the improvement of SMEs' growth potential, and;
−   strengthening dialogue and consultation with SME stakeholders.

A special SME envoy has been set up in the European Commission Directorate-General for Enterprise and Industry with the objective of better integrating the SME dimension into EU policies. Annual structural business statistics with a breakdown by size-class are the main source of data for an analysis of SMEs. A limited set of the standard SBS variables (number of enterprises, turnover, persons employed, value added, etc.) is available mostly down to the 3-digit (group) level of the activity classification (NACE), based on criteria that relate to the number of persons employed in each enterprise. The number of size-classes available varies according to the activity under consideration. However, the main classes used for presenting the results are:
−   micro enterprises: with less than 10 persons employed;
−   small enterprises: with 10-49 persons employed;
−   medium-sized enterprises: with 50-249 persons employed;
−   small and medium sized enterprises (SMEs): with 1-249 persons employed;
−   large enterprises: with 250 or more persons employed.

The technological capability and national innovation systems approach reveals a different channel through which firm behavior affects export performance. Focusing on innovation and learning processes in developing countries, proponents emphasize the acquisition of technological capabilities as a major source of export advantage at firm-level (Bell and Pavitt 1993; Lall 1992; Iammarino et al. 2008). The underlying evolutionary theory of technical change emphasizes that difficult firm-specific processes and complex interactions with institutions are needed to absorb imported technologies efficiently (Nelson and Winter 1992) In most theories is the notion that SMEs are at a disadvantage in participation in production networks compared with large firms. SMEs face, to a higher extent than large firms, resource constraints (in terms of finance, information, management capacity, and technological capability) (Levyet all.,1999; and Hallberg 2000.)

The probability of SMEs joining production networks (as direct exporters, indirect exporters, or overseas investors) is lower thanthat of large firms. Furthermore, justification exists for public policies to support the entry ofSMEs in production networks. In the main, such support should be geared to an enablingenvironment that opens access to markets, reduces bureaucratic impediments against SMEs,and provides appropriate SME institutional support services (eg., technological, marketing, and financial support).

Technological machine time t_{tm}, viewing production against machinery, is exclusively linked to machine performance and the quality of technological calculations, and is mainly a deterministic category. However, if the production cycle is viewed from the aspect of a serial sequence of operations, the elements of working time differ, depending on the automation level. If production is automated, then t_{tm} for a series will be simply a sum of individual n equal operations. However, if each part has to be manually or mechanically conveyed for processing from a joint crate or some other room where a certain series of parts is stored, manual placement on the machine is ancillary manual time t_{pr} (in theory, this refers to individual pieces). Such time is not frequently encountered in literature (rear examples are papers (Klarin et all, 2002) dealing with the division of working time elements . In theory, the PC time t_{pc} is divided into production time t_p and non-production time t_{np} and production time is then further divided into technological time t_t , with machine t_{tm} and lead time t_{pf}, non-technological time t_{nt} - with time of control t_c , transportation t_{tr} and packaging t_{pk} . Non-production time is classified according to various causes of stoppages in production, and we have carried out a screening of the most general and common ones caused by the lack of raw materials t_{mr} , organization t_o , machine breakdown t_b and other problems t_{ot}.

According to Gits (Gits,1992) production is one of the key and primary function of the organization. Huang et al. (Huang et all.,2003) argued this requires the companies to be efficient, work to optimize, and improve the productivity level. Muchiri & Pintelon (Muchiri & Pintelon, 2008) are of the view that production losses lead to decrease in productivity due to an inefficient manufacturing process.

METHODS

A modified work sampling method will enable the determination of the participation percentages of working time elements against the total duration of the production cycle and production. As this method is statistic and is based on a certain number of instantaneous observations of a certain activity, it is simpler to use and more efficient than the continual streaming method. Monitoring within the production cycle will involve technological time with lead time and manufacturing time, non-technological time with times for transport, control and packing, while non-production time includes stoppage due to poor production organization, lack of materials, lack of tools, including the failure or breakdown of machinery and other types of stoppage, their interdependence, as well as impact factors such as series size, organizational level and product characteristics pertaining to the factors mentioned.

Representative screening time is related to the length of the production cycle time. Production and productivity are also related to the production dynamics which are planned at the operational level on a daily, weekly or monthly basis. Hence, the production cycle for the above mentioned periods is also provided for the purposes of monitoring and comparing. A data sheet for the application of the method to determine the elements of production cycle time is shown in Table 1.

Table 1: Data sheet for the application of the method to determine the elements of production cycle

N_o	Time		Production time					Non-production time				
	Hour	Minutes	t_{pt}	t_{tn}	t_c	t_{tr}	t_{pk}	t_{mr}	t_{tl}	t_o	t_b	t_{ot}
1												
2												
…												
N												
Σ												

Screening performance requires the precise definition not only of technological and mathematical problems, but also of the practical screening process and the establishment of working time elements. Thereafter, the elements of production cycle working time should be defined and, in particular, the difference against the elements of working time related to machinery, i.e. for the purpose of

establishing the machine capacity only or within the production cycle, because these two are not the same.

RESULTS AND DISCUSSION

In this paper we present some of the results obtained by surveying result in a medium-sized company. The company has 210 employees. Research was conducted in the same period 2014 and 2015, for the purpose of monitoring and comparative presentation of results. The diagram 1 shows the present percentage share elements of the operation of the production cycle for 2014 year.
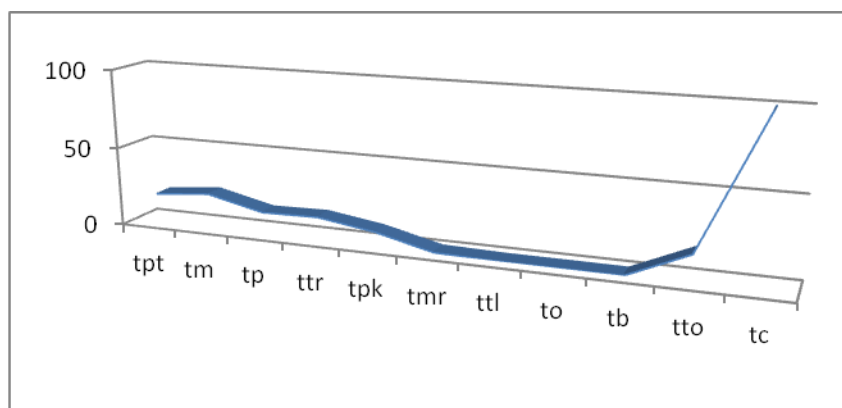

Diagram 1: Elements of time production PC for 2014.year

The diagram 2 gives an overview of elements of time for each recording cycle , 32 cycles with observations in 2015 year. Diagram 3 shows the recorded duration of the production cycle progress in minutes, where we can see the PC with the shortest duration of 214 min to 380 min longest.

For the 2014 year a total time of 43 production cycles is 14.526 min . , After a production cycle is 14,526 / 43 = 338 min. For the year 2015, 32 production cycles is 10296 minutes per production cycle 321 minutes. We conclude that despite the large series production in the total duration per cycle reduction with 338 to 321 minutes in 2015 year. Comparison of results showing all changes such as those that there has been a change in production time.
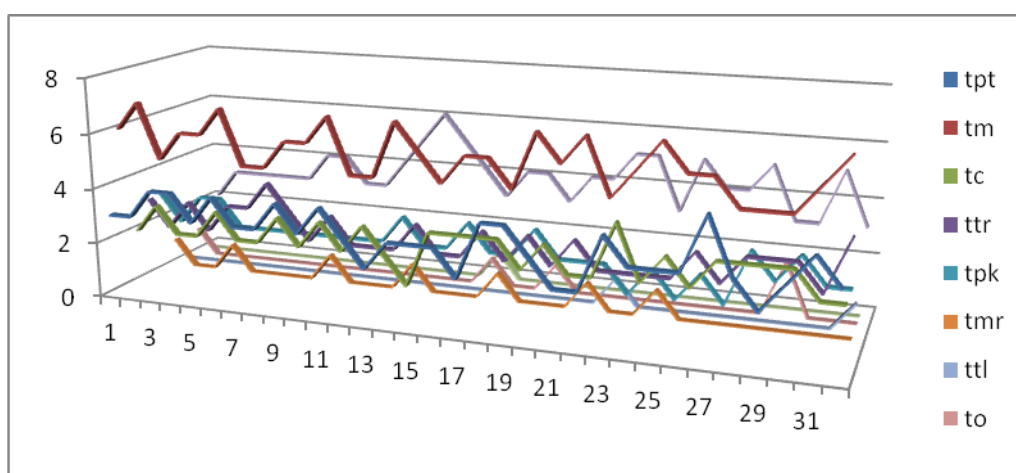
Diagram 2: Elements of time production for 32 cycles in 2015 year
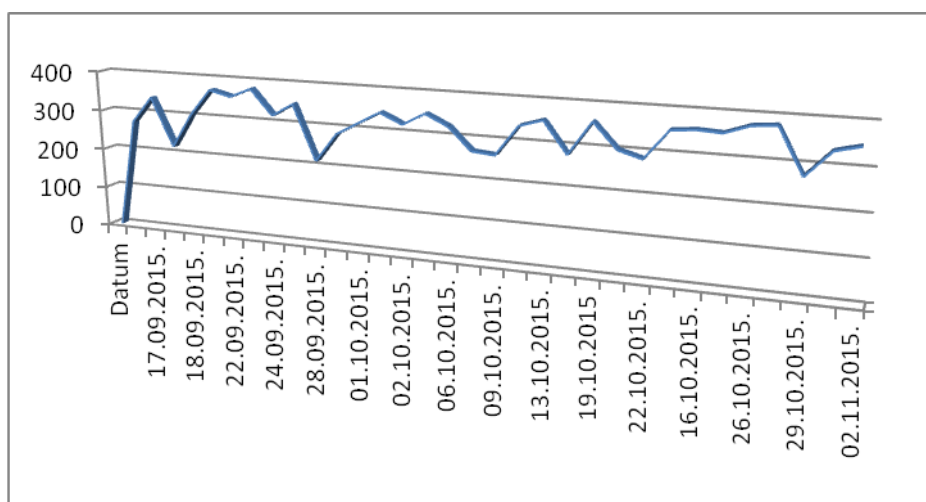
Diagram 3: Production cycle runtime progress expressed in min for 2015 year

CONCLUSION

It can be concluded that the provision of rational production and deadlines required in the production of high-quality production planning and appropriate technical- technological calculation, which give modes machinery and duration of operation as well as activities in the production process. Particular emphasis is placed on small and medium enterprises as the bearers of economic growth and development and reducing production cycle in them as a means of improving productivity and achieving competitiveness.

The most important organizational-technical indicators of production successfulness are the level of capacity utilization and the production cycle. These indicators are actually influenced by a series of organizational-technical, mutually interconnected, factors which impact on the elements of working time related to the machine capacity utilization and production cycle of a certain product. The goal is, in general, to reduce the total production cycle time, especially that associated with different types of stoppage and the optimization of lead time and machine time within the sphere of machine capacity utilization. Additionally, the optimization of time for transport, control, and packing is also of importance for the production cycle. Reduced cycle time can be translated into increased customer satisfaction. Quick response companies are able to launch new products earlier, penetrate new markets faster, meet changing demand, and make rapid and timely deliveries. They can also offer their customers lower costs because quick response companies have streamlined processes with low inventory and less obsolete stock. The PC is the most significant technical-technological indicator in production and it is necessary to steadily monitor and reduce it: PC reduction is possible by influencing the factors related to the duration of individual working time elements.

ACKNOWLEDGMENT

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MANAGEMENT OF PRODUCT CHANGES IN METALWORKING INDUSTRY OF BOSNIA AND HERZEGOVINA

UDC: 658.5:669(497.6)

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ABSTRACT

This paper is the result of the research that was conducted in the metalworking industry of Bosnia and Herzegovina in the period June 2014 December 2015. The survey included 10 companies of metalworking industry in Doboj, Zenica, Sarajevo, Mostar and Banja Luka. The answers to the questionnaire gave 103 managers in the metalworking industry of Bosnia and Herzegovina.Through this work the basic principles and rules of product change management in metalworking industry of Bosnia and Herzegovina will be presented. This work will provide answers to questions like what is the goal and what are the strategies of product change management, what segments are used for product change management and how to choose adequate procedures that will provide, not only product change management principles, but implementation in production processes. The aim of this paper is to present modern method in product change management of metalworking industry of Bosnia and Herzegovina to scientific and business community. This rules and principles of product change management will in near future present key for survival on global market for all companies in metalworking industry.

Key words: product, production management, change management, light manufacturing.

INTRODUCTION

We are everyday witnessing that companies from Bosnia and Herzegovina, especially in the field of metalworking industry, have difficulties to survive on open global market. The culprit for this, among other things, is slowed political, economic and scientific development of this country. If we are looking only development of metalworking industry, it can be concluded, primarily based on available literature, that modern methods of product development, new production technologies, maintenance, control and recycling are applied poorly in Bosnia and Herzegovina. In most cases in Bosnia and Herzegovina the manufacturing and product development is taking place in the way in which importance to environmental protection, energy saving and all available resources is not given. The tendency of Bosnia and Herzegovina is, ultimately, to join the European Union, and that tendency has contributed to improvement of some segments of production technology process, but it is considered that it is not enough for survival of companies in metalworking industry on market and for production of competitive products. Changes in management are one of the modern methods in metalworking industry, which is aimed, primarily, in production management changes in metalworking industry, which directly impacts environmental protection and reduction of resources and energy usage. It has also been harmonized with the conditions in which Serbia companies (production and services)

operate and was created to facilitate management of these processes with the aim of achieving BE (Ćoćkalo, Djordjevic, Seifert, 2011). As a result of this development, the world community began to replace the traditional quality control approach with progressive wuality continuous improvement approaches (Elshennawy, 2004). QUARNEWSS was designed by intergrating the two pillars of Six Sigma DMAIC namely (stands for define, measure, improve, analyze, improve and control) improvement methodology and belt system based training infrastructure (Brun, 2011). It was also noticed that, some authors have reported the reseaches dealing peripherally the ways of increasing reability of new products (Swan and Pitt, 2006; Brun, Saetre, and Gjelsvik, 2009). This method of product development will find application in metalworking industry of Bosnia and Herzegovina, and that's why is very important to adequately approach its research. Cooperation between experts in metalworking industry of Bosnia and Herzegovina is a prerequisite to ensure the expansion and its implementation, and therefore competitiveness of all interested in this field for efficient and faster development (Schmid, Loogen, 2012). Ergonomic adaptation of the interior space of a passenger vehicle does not necessarily have to mean adapting to a certain range of anthropometric measurements, such as the measurements from the 5th-percentile woman to the 95th-percentile man (Klarin, Spasojević-Brkić, Sajfert, Djordjevic, Nikolić, and Ćoćkalo, 2011).

DEFINITION, FIELD AND IMPLEMENTATION OF CHANGE MANAGEMENT

The main purpose and objective of manufacturing is the existence, or the growth of the company and meeting the needs of people. Instrument, which should maintain production and to meet the individual needs and needs of society is the product. Such product must have quality, and so that with its quality be in maximum possible extent accepted by consumers. The concept of change management is defined through various research authors, who have the problem of relief structures (Burkardt, Majic, 2013) approached in different ways, or in the construction of the space in the cab car drivers (Klarin, Spasojević-Brkić, Sajfert, Žunjić, and Nikolic, 2009). Change management has the task to reduce the weight of the technical structures:

− by going to distribute the load evenly and generally throughout the construction, using the allowable stresses, in order to create the possibility of obtaining construction of high strength and ductility (Schapitz, 1968)
− so that this does not endanger the capacity and other features of the structure (Wiedermann, 2007).
− Anthropometric limitations on the construction of passenger cars (Klarin, Spasojević-Brkić, Stanojevic, and Seiffert, 2008).

Change management is an interdisciplinary science that is based on knowledge of the science of strength of materials, computational engineering, materials and general characteristics of the production technologies (see more: Rajic, Desnica, Stojadinovic, and Nedelcu, 2014), Stojadinovic, Pekez, Bajic, (2012). Product change management is a completely new structural approach whose main goal is to reduce the weight of the product, or its mass and increase space. Degischeru and Lueftlu (Degischeru and Lueftlu, 2009) in their book offer engineers and scientists budget optimization components, the development and selection of materials, all the way to the technical production.

APPLICATION OF PRODUCT CHANGE MANAGEMENT IN METALWORKING INDUSTRY OF BOSNIA AND HERZEGOVINA

Effects of weight reduction elements in the metalworking industry are reflected firstly in the fact that increases the load capacity and the speed of launching of mass element equipment, reduces power consumption and rolling resistance, acceleration and climbing. Lack of these materials is their high price compared to steel. A general hypothesis in this paper: to change the design of product in the metalworking industry in order to produce desirable products. (General hypothesis will be confirmed or disproved in total sample of

metalworking industry companies and based on diversity in dimensions determine the influence factors of design).

The importance of the role of individual manager
> *Auxiliary hypotheses*: The higher the impact of design in metalworking industry, it is increasingly influential in the business changes.

Factor analysis of 8 factors
Factor analysis was done in this case and it has the following characteristics:
- Factor analysis was based on an analysis of the main components as a method for extracting factors.
- By the analysis was selected 8 factors and that is the maximum number of factors that are optimal in the model.
- Minimum eigenvalue value is 1, which is the usual variance height of the main components. This means that the rotation of the factors to be included is only those who have a greater eigenvalue from 1.
- After the first extraction factors their rotation was carried out by varimax normalized method. It is best known methods for the rotation of factors. Otherwise, the rotation is performed to factors in order to easier interpret.

Eight factors together explain 39.5% of the variation of the original data, which can be considered satisfactory in the given model. The analysis used Scree criterion. Based on this criterion, the number of significant factors is determined on the basis of determining factors after which the values of the characteristic roots are stabilized. In Figure 1, on the horizontal axis, there are factors and scree plot or graph showing eigenvalue of each factor. Based on images breakpoints are found which help to determine how many factors should be taken into account in the analysis.

The figure shows that the first factor is more important than the others. On this basis, the first factor explains the largest part of the variance, and covers approximately 7.54% of the variation of the original data. After the first factor, the value continuously decline until the tenth, after which it stabilized in value. Next eigenvalue for eventual ninth factor is less than 0.8, and it can be concluded that the addition of new factors do not significantly contribute to the understanding of the model.

Analysis of the 8 factors was done because in terms of concrete research provides understandable information and clear grouping variables given around 8 factors. Table 1 shows the eigenvalues for models with one, two and three all the way to eight factors. The same table in the last column shows how has the growing proportion of explained variance with increasing the number of factors was changing.

Table 1: Disposition of eigenvalues to different models of factor analysis

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3,768	7,536	7,536
2	2.834	5,669	13,204
3	2,440	4,880	18,085
4	2,378	4,757	22,842
5	2,272	4,543	27,385
6	2,149	4,297	31,862
7	1,998	3,997	35,679
8	1,913	3,827	38,505

Table 2 shows the factor loadings and correlation coefficients obtained with the original variable factors. Identified factors should be interpreted on the basis of these results. The table below shows that factor loadings, which are the most important, and that are greater than 0.4.

Thus, for example, observed that the factor 1 is in significant connection with four original variables, etc. The minus sign in the factor analysis has no greater importance because it is a multi-dimensional rather than two-dimensional space.

Table 2: Correlation coefficients of variables (parameters) with the given factor

	Factor							
	1	2	3	4	5	6	7	8
Serial production	.939							
production design	.930							
Modern prod. methods	-,880							
mass production	.614							
the environmental impact		.601						
energy use		.482						
recycling		.482						
noise transmission		.446						
the life of the structure			.609					
tolerance of elements			.465					
product comfort			.411	.446				
capacity				.419				
construction rigidity				-,403				
Product exploitation					.588			
maintenance					-,418			
Product functionality						.523		
Product assembly						.425		
techniques of network plan.							.522	
linear Programming							.503	
capacity machines								-,672
Factory capacity								.430

Extraction Method: Principal Axis Factoring
Rotation Method: Promax with Kaiser Nomalization

Based of Table 2 certain variables are together, or why they behave in space in the same way. For example, variables "Serial production", "Product Design", "Modern production methods", "Product Installation" behave the same way and the most characterized the first factor (Factor 1). Variables "Environmental performance", "Energy usage", "Recycling" and "Transmission of noise" behave the same way and most characterized the second factor (Factor 2). Variables "The lifespan of the structure," "tolerance," and "comfort" is behaving in the same way and most characterized the third factor (factor 3). The variable "Comfort", "capacity" and "rigidity" behaves in the same way and most characterized the fourth factor (Factor 4). Variables "Exploitation of products", "Maintenance" behave the same way and characterized the highest fifth factor (Factor 5). Variables "Functionality Product" and "Product Installation" behave the same way and most characterized sixth factor (Factor 6). Variables "Technique network planning" and "Linear programming" behave the same way and the most characterized the seventh factor (Factor 7). Variables "Machine capacity" and "capacity of the plant" behave the same way and most characterized the factor eight. (Factor 8).

CONCLUSION

Management of design changes in the metalworking industry of Bosnia and Herzegovina is possible by using the factor analysis that gave listed variables. As have been already discussed various variables are characterizing different factors. Through this work it has been presented the basic principles and rules of design management application in metalworking industries of Bosnia and Herzegovina as part of product change management. Using factor analysis gives answers to what is the goal and what are the strategies of design management application. In this work it is shown what are the segments that are used in design management, and how to select adequate procedures in order to get not only principle of design management but its implementation in production process as integral part of product change management.
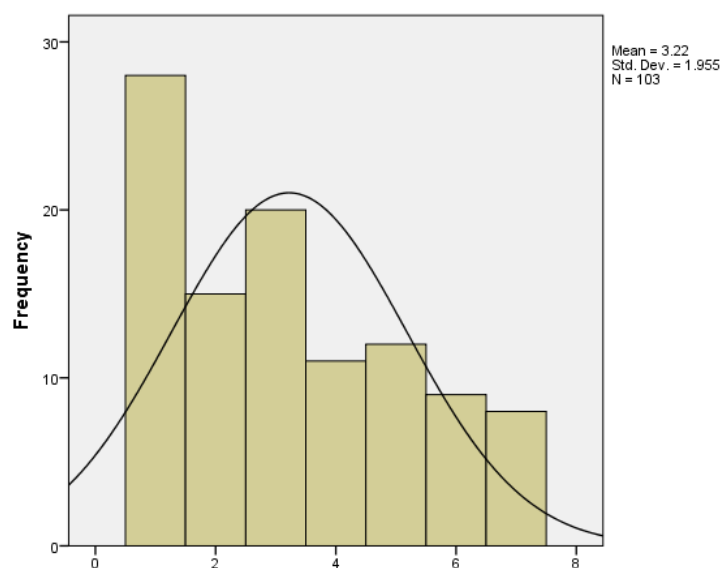
Figure 1: Eigenvalue of each factor

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Session B: HUMAN RESOURCE MANAGEMENT

ANALYSIS OF OPPORTUNITIES FOR IMPROVING TEAMWORK IN THE FUNCTION OF MORE EFFICIENT BUSINESS

UDC: 005.551

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ABSTRACT

Potential problems that may arise and disturb the successful realization of business goals in organizations, include a number of different deficiencies. In each company if the people are not able to create a favorable atmosphere and if there is a reciprocal intolerance present, it can lead to a reciprocal conflicts that often may cause a poor success of the company. The respondents mostly agree with our initial assumptions. Problems within a team can arise if not all members are involved in the process of decision making. It is very important to emphasize the management of equal opportunities and differences. The survey includes two groups of respondents and the research was conducted on the territory of the city of Zrenjanin. The research includes two groups of respondents, one group includes respondents who use virtual communication, and the second group constitute the respondents who often use direct contact. We want to find out to what extent the problems in an organization are present by virtual communication which is a basic lack of successful cooperation and if the co-operation is at a higher level in the organization by using direct contact as a method of communication.

Key words: problems, deficiency, virtual communication, direct contact, misunderstanding, co-operation

INTRODUCTION

The success of business organizations as well as the implementation of a series of activities required to achieve the ultimate goal, is affected by a number of factors of different character, such as a type of management, a way of motivating, dynamism and flexibility, available resources, etc. But, the degree of success largely depends on how we transmit and distribute ideas and information but it also depends on the interactions between the members of an organization. One of the most important factors for the success of the business is communication. The term communication involves transmitting or exchanging information, ideas or opinions from one source to another. Depending on the number of participants and whether there is a feedback, communication can be unidirectional or bidirectional. Also, the communication process can be realized by the transfer of information from one person or group to another person or group (Sajfert, Đorđević, Bešić, 2006). Communication is a process of dissemination of information and in order to enable in any organization an effective and efficient work, it is necessary to ensure good communication at all levels of one organization, because that is the basis of good co-ordination within an organization. The information must be qualitative i.e. they should include needed and useful information as well as to be accurate and timely. Every person spends an average of about 75 percent of his life in communication but, we have to distinguish quality from quantity (Tabs, 2013). The number of time spent in communication does not guarantee that the process of communication will be successful.

Changes in the style and manner in which we handle everyday tasks, requires from us more often using new technologies in everyday lives, including the use of new methods of communication. There are different opinions about whether the new technology for communication and thus the virtual

communication, limits or helps you entering in contact and communicate with others. The survey, done by Robert Kraut and his colleagues from the Carnegie Mellon University came to the conclusion that people who use the internet more frequently, are lonely to a greater extent and show symptoms of depression. But already in the subsequent study, these findings he explains as a phenomenon that depends on the characteristics of people, above all, whether it is an extrovert or introvert person (Tabs, 2013). Virtual communication, or technology that enables communication between people in different locations significantly increase the efficiency of business operations, affecting the speed and volume of information that is sent.

Area of research. The research was conducted in the city of Zrenjanin, the administrative center of the Central Banat district which has a population of 76,511, and on the territory of the municipality, the population is 123,362. The total area of the municipality is 1324 km^2 (Zvanična prezentacija grada Zrenjanina, 2011).

The problem of the research. Deficiencies in organizations occur in different segments and they are often very present. Organizations where a bad and inefficient teamwork is present, have bad competitive skills, they lose employees that are oriented towards achieving common goals and the process of growth and development is more difficult. The area that includes the type of communication in the city of Zrenjanin is not much emphasized and researches are not carried out on this subject sufficiently. There isn`t a lot of data about the presence and use of communication devices in this territory. Information on reciprocal co-operation is poorly analyzed in previous researches. Research works on the topic of virtual and direct communications on the territory of the city is poorly presented, which can be one of the main causes of the problems in organizations.

The subject of the research. According to Yancey, teamwork in the organization has many benefits. Teams can provide and enable a faster flow of information which leads to an increase in the flexibility of the work in organizations. This type of business operation can be achieved through increased communication and by involving employees in the process of decision-making (Kunčić–Posinković, 2003). In the center of this research are placed human relations and the connections between the success of the co-operation and the present forms of communication that are used. First of all, the main question is to what extent the attitudes of respondents and the level of orientation to cooperate differ depending on what types of communication are present within an organization.

The method of the research. The collection of data was done with a questionnaire in which it was pointed out that the survey is anonymous and the obtained results will be used exclusively for the research work. Having in mind the complexity and diversity of business in the territory of one city, our aim was to collect data from a large number of employees. In this research we've included 65 surveyed respondents. The respondents are employees of different professions, age, gender, years of service and qualifications, and they are located at different positions within the organization, performing different tasks, so that we would be able to form a picture about the situation of the teamwork and to display the situation on the territory of the city of Zrenjanin in general as good as possible. Table 1 represents the structure of respondents divided into two groups according to qualification and by the years of service. The research includes two groups of respondents, *group 1* includes respondents who use virtual communication, and *group 2* constitute the respondents who often use direct contact. The questionnaire had include questions related to verbal, virtual, non-verbal communication, time spent in collaboration with colleagues and the speed of making contacts. The attitudes of the respondents are graded using a Likert scale. The applied scale represents a five-point scale, by which the respondents have expressed their level of agreement or disagreement. The scale includes the following statements: Strongly disagree 1, disagree 2, undecided 3, agree 4, strongly agree 5. The analysis of the collected data was carried out using Microsoft Excel.

Table 1: Structure of the respondents in both groups

YEARS OF WORK EXPERIENCE	Number of respondents		
	1	2	Total
Less than 5 years	10	5	15
6 - 10 years	6	10	16
11 - 15 years	2	4	6
16 - 20 years	8	2	10
21 - 25 years	0	0	0
Over 25 years	6	12	18
QUALIFICATIONS			
I level - Primary education	0	0	0
II level - Semi-skilled worker	0	0	0
III level - Skilled worker	4	4	8
IV level - Secondary education (4 years)	6	4	10
V level - Highly-skilled worker	7	2	9
VI (VI1 i VI2) level- Post-Secondary education	5	12	17
VII1level - Higher education	10	7	17
VII2 level - Magistracy	2	2	4
VIII level - Doctorate/PhD	0	0	0

THE AIM OF THE RESEARCH

We carried out this research in order to find possible defects that are present in organizations, and disturbing the success of the organization as well as a good placement in the market. We want to reach adequate solutions that can improve the business performance, and therefore to reduce the impact of deficiencies. Possible deficiencies that may occur in organizations and disturb the achievement of business objectives include a number of different problems. Our aim is to find adequate solutions how to reduce to a minimum these deficiencies. In addition, the goal of the research is to find an answer on the question what forms of communications are the most present and to what extent specific communication methods are used.

ANALYSIS OF RESULTS

Structure of frequency response in percentage is shown in table 2. Group 1 consists of respondents who use virtual communication, while group 2 includes respondents who use direct contact.

Table 2: The structure of the frequency response

Group / Ascertainment	Strongly Disagree		Disagree		Undecided		Agree		Strongly Agree	
Verbal communication encourages greater equality and a better team collaboration	1	2	1	2	1	2	1	2	1	2
I can co-operate well with different people	0%	0%	0%	0%	0%	0%	53%	53%	47%	47%
I am able to step in contact quickly with other people	0%	0%	0%	0%	34%	27%	33%	60%	33%	13%
Nonverbal communication may cause misunderstandings between team members	0%	0%	7%	0%	7%	7%	46%	46%	40%	47%
Verbal communication encourages greater equality and a better team collaboration	0%	0%	0%	0%	54%	20%	33%	73%	13%	7%

The first hypothesis is related to the importance of verbal communication which can be a factor of great influence on the effectiveness of co-operation and on the business results. All respondents regardless of the manner of communication agree that verbal communication is of great importance for the successful co-operation and one of the most influential factors on productive co-operation and effective interpersonal relationships.

If we consider the hypothesis regarding the collaboration with different people it is not possible to notice a huge difference compared to the collected answers. However, the first group expressed a greater extent undecided on the issue of co-operation in their organizations, while the second group of respondents believe that they can achieve much easier to collaborate with different people. It is considered that the verbal statements can more often be very insincere and mistrustful which is why it is necessary to observe other immediate factors to, and all because the verbal statements are under conscious control of the speakers (Kuzmanović, Štajnberger, 2008). Regardless of the communication method, the largest number of the respondents believes that they can make contact quickly. However, unlike the initial hypothesis in which is assumed that respondents who often use virtual communication what means that the communication is made by using certain media, are able to make contacts quickly, the research results shows the opposite. Although it is not possible to notice a huge difference, the respondents who prefer direct contact during the conversation consider that they can quickly make contact and enter into conversation with other people.

The following hypothesis is related to the problems that can arise by nonverbal communication and so that can easily lead to misunderstandings and problems. Nonverbal communication includes all messages which do not contain spoken or written words, it includes communication with symbols like body language or facial expressions. The way one person talks, and also the body movements can tell us a lot about the person, or in this case about the collocutor. During talks we send much more nonverbal than verbal signals to our interlocutors, and the problems of interpreting nonverbal signals can arise for a various reasons, for example caused by differences in culture or other differences. Members of the group 1, i.e. users of virtual communications are largely undecided declared, while group 2 agrees with the fact that non-verbal communication can be a common cause of misunderstanding.
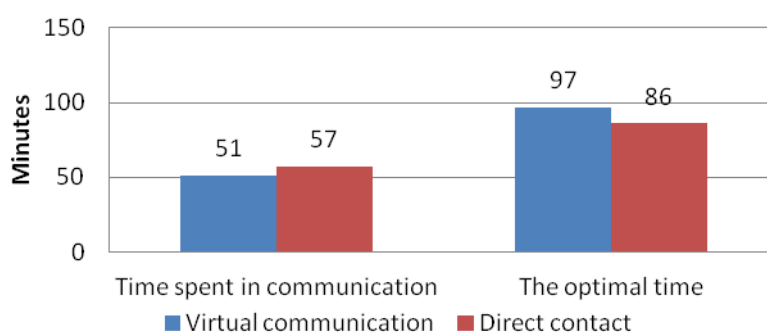

Figure 1: Dependence between spent time and the optimal time

In contrast to the assumption that, respondents who communicate using telecommunication devices, or more commonly use virtual communication, spend more time talking than respondents who use direct contact, it is not possible to notice a huge difference between these two groups. However, it is possible to express the fact that both groups considered that the optimal time spent in communication is greater than the actual time they spend communicating. The differences between the attitudes of conducted and the optimal time is shown in figure 1. The respondent who use virtual communication, on average, spend 51 minutes in conversation and consider that the optimal time is 97 minutes. The respondents who prefer direct contact, on average, spend 57 minutes and consider that the optimal time to spend in communication are 86 minutes. Usually it takes a very short time to create an image of another person and that is mostly based on physical appearance, but to create an exact picture and opinion about a person due to communication, we take into account the facial expression, body movements, the way

and the speed of speech, and the tone of the voice. Exactly these factors are missing or they are only partially present in virtual communication, what causes that much more often we form a wrong picture and an incorrect assessment of the mood, intentions and desires of the person we're talking to. The effectiveness of communication largely depends on the channels through which the information is distributed.
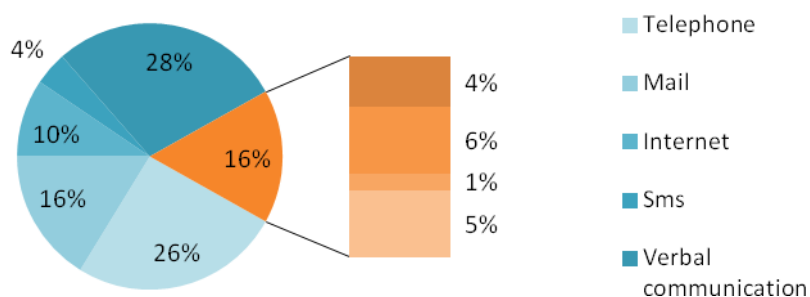

Figure 2: Types of communication

In order to find an answer on the question, which is the most commonly used forms of communications by collaborating in the organizations, the respondents provided a list of media and ways of communication that are most commonly used, and the frequency of certain answers is shown in figure 2.

CONCLUSION

Based on the results, we came to the conclusion that the respondents most agree with the fact that one of the most important characteristics is to achieve cooperation with all members of the team, and they considered that it is necessary to spend as much time in conversation with the colleagues as possible. They mention that it is important to combine different forms of communication for a successful co-operation. Virtual communication allowed the conversation not to be primarily limited by time, it allowed employees to communicate information or to leave a message, which will later be the subject of discussion. After the research conducted on the territory of the city of Zrenjanin, we came to the conclusion that they are more present problems that arise while virtual communication which is a basic lack of successful co-operation on all levels of the organization. By the employees who are using direct contact in the organization the co-operation is at a higher level and therefore we substantiate the hypothesis from which we started this research.

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MEDICAL STAFF ROSTERING: RELOCATION OF DOCTORS TO DIFFERENT HEALTHCARE INSTITUTIONS IN CASE OF STAFF SHORTFALL

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ABSTRACT

This paper will present a problem of rostering the medical staff, which in time has become more and more complex. The cause of this complexity is the fact that almost every type of medical institution has a specific way of deployment of its employees, which occurs as a result of specific working conditions and often lacking of staff. The paper refers to the problem of rostering physicians working in dislocated infirmaries. The problem will be formulated and solved by the 0-1 goal programming model. This approach will be shown on the real-life example of rostering doctors working at five infirmaries belonging to the health center located in the borough Voždovac in Belgrade, Serbia.

Key words: medical staff rostering, modeling, goal programming

INTRODUCTION

Medical staff rostering falls into one of the most complex forms of scheduling employees because it is almost impossible to devise a universal deployment plan that can be implemented at any time and in any place. Each type of healthcare institutions is a unique entity that has its specific ways of functioning as well as its own personnel and organizational structure in accordance with legal provisions characteristic for each country. In most cases, shift work is a common feature for all health care institutions, while the type and size of the institution can determine a different number of shifts (one, two or three) as well as on call work during weekends and national and religious holidays. Also, depending on the aforementioned factors, there may be a large number of subsets of doctors, nurses and support staff required for normal operating activities of each health institution. For example, in health centers as institutions engaged in healthcare at the primary level, staff can usually be divided into three groups: doctors, nurses, and administrative and support staff who are usually not the issue of rostering. The problem of medical staff rostering has been recognized as an optimization problem for more than 50 years and various models and solution methods have been developed. This problem has usually been presented as rostering of nurses, so the common name given for this type of optimization problem is *Nurse Rostering Problem* (NRP). A comprehensive literature overview of the results in the area of medical staff rostering is shown in (Burke et al, 2004) and (Hall, 2012). In modeling the NRP two dominant approaches were established (Cheang et al, 2003): nurse/day that considers each day of the observation period individually and nurses are assigned working shifts every observed day; nurse/shift pattern, comes down to the problem of covering sets, where schemes are defined and each of the nurses is assigned the scheme which will be operated during a particular period (Clark & Walker, 2011). The variety of medical staff rostering problem solving approach can be found in literature. Jaumard, Semet and Vovor (1997) presented a general model of linear programming for the NRP. Topaloglu and Selim (2010) applied fuzzy set theory to the problem of rostering nurses to resolve preferences of the nurses and uncertainties in the target values of the hospital management. Wright and Mahar (2013) examined the impact of centralized

decision-making on the deployment in hospital wards. Azaiez and Al Sharif (2005) developed a 0-1 goal programming model of rostering nurses. One of the more recent works, Lin et al (2015) solved the NRP problem using integer programming, where the different shift preference ranks were introduced. When the NRP is being solved using the nurse/shift pattern approach, usually the issue of feasibility occurs. This problem can be overcome in various ways. Belien and Demeulemeester (2008) introduced a procedure for generating new schemes. Bard and Purnomo (2005) introduced variables representing the number of additional nurses to be assigned the work in order to meet all the conditions. Ikegami and Niwa (2003) used the goal programming approach. Gunal and Pidd (2010) developed an optimization model that minimizes penalizing costs that arise when a nurse is assigned to a different shift. Aickelin and Dowsland (2004) explored the manner in which the constraints are actively used in order to construct the heuristic, which reduces the reliance on the function of penalty. A detailed model and an effective methodology for solving the monthly shifts and other tasks of hospital medical staff are shown in (Valouxis and Housos, 2000). All of the research above, as well as other research that can be found in the literature related to the deployment of medical staff, is usually connected to one type of healthcare institutions, usually single hospitals or single departments, without a possibility of relocating medical staff among different hospitals or departments. This paper presents a problem of rostering doctors working in different infirmaries, where if necessary, they could be moved from one infirmary to another. The remainder of the paper is organized as follows. In Sections 2 and 3, the problem of rostering physicians working in dislocated infirmaries and its mathematical model formulation are presented. Section 4 gives application of the proposed approach to real-life scheduling problem and obtained numerical results.

PROBLEM DESCRIPTION

This paper discusses the real problem of determining the optimal schedule of doctors working in five infirmaries located in the borough of Voždovac in Belgrade, Serbia, where primary healthcare services are provided. The health center consists of 17 independent infirmaries located separately, where five of these have the same chief of staff. These infirmaries are characterized by identical mode shifts (morning and afternoon) and a very similar staffing structure, while the number of employees varies depending on the size and location of a specific infirmary.

If there is a shortage of personnel in some of these five infirmaries within a certain period of time (due to annual leave, sick leave or days off), it is compensated from other four infirmaries if available, though at reduced capacity, to continue normal functioning in this period. The chief of staff and the head nurse are in charge of the deployment of doctors and nurses in these infirmaries; these schedules are made at the end of each month manually, without software support, and this method can be found in the literature under the name *self-rostering* (Silvestro&Silvestro, 2000). Due to the fact that all five infirmaries are small in size and provide only primary healthcare services, all doctors employed in these infirmaries are general practitioners. In the largest of these infirmaries (Infirmary 1) there are six doctors employed, in the Infirmary 2 there are four doctors, Infirmary 3 has three doctors, while Infirmaries 4 and 5 have one doctor each. All doctors have structured working schedule which includes shift work from Monday to Friday. The morning shift starts at 7:00am - 1:30pm while the afternoon shift starts at 1:30pm - 7:00pm. There is a strong tendency to alternate shifts each week for each doctor, except for the doctors working in the Infirmaries 4 and 5: since there is no substitution for them provided in the other shift, these doctors alternate the shifts on a daily basis. However, in Infirmaries 1, 2 and 3, there is another problem caused by capacity limitation. Infirmary 1 has three examination rooms (doctors' offices), while Infirmaries 2 and 3 have two each.

In addition, the doctors who share the examination room should work in different shifts. The desirable number of doctors is equivalent to the number of examination rooms in each shift, while the minimal number is at least one doctor in each shift every working day. The main problem occurs when there is a shortage of staff in any of these five infirmaries. Due to the lack of staff generally, these shortages must be overcome by re-assigning someone from the other four infirmaries as a substitute if a bare staff minimum for that particular infirmary cannot be provided.

MODEL FORMULATION

In the formulation of mathematical model for optimal scheduling of shift work, the following notation has been used.

I – set of doctors in all of the infirmaries, $i \in I$
N – set of days in one month, $j \in N$
S – set of shifts in one day, $s \in S$, $S\{morning, afternoon\}$
A – set of infirmaries, $a \in A$
Q – set of weeks in one month, $l \in Q$
D_l – set of days in week l,

$$\bigcup_{l \in Q} D_l = N, D_l \cap D_k = \varnothing, \forall l, m \in Q, l \neq m$$

U – set of doctors who share the office, $U_o \subseteq I$,
O – set of examination rooms, $o \in O$

In the application of the 0-1 goal programming model, the variable X could be described as follows:

$$x_{ijsa} = \begin{cases} 1 & \text{if doctor } i \text{ is assigned to the shift } s \text{ for the day } j \text{ in the infirmary } a \\ 0 & \text{otherwise} \end{cases}$$

The matrix B shows the absences of doctors during the day and the assigned shift. The elements of the matrix B are:

$$b_{ijs} = \begin{cases} 0 & \text{if the doctor } i \text{ is absent on the day } j \text{ and the shift } s \\ 1 & \text{otherwise} \end{cases}$$

As the infirmaries are limited spatially due to the number of examination rooms in which every doctor has to work, while sharing these rooms in the same shift is not permitted, additional parameters are introduced. Parameter pb represents preferred number of doctors in a particular infirmary with the assigned shift on a particular day. Because the "soft" nature of this condition, a deviating variable dw_{jsa}^- is introduced. Parameter mb represents a "hard" condition relating to the minimal number of doctors for that day, shift and infirmary respectively because the necessity to have complete coverage during working hours.

Each doctor is assigned to one position in a particular infirmary, usually called the base infirmary. This affiliation is shown in the matrix Z, the elements of which are described below:

$$z_{ia} = \begin{cases} 1 & \text{if doctor } i \text{ is assigned to infirmary } a \text{ as his base infirmary} \\ 0 & \text{otherwise} \end{cases}$$

The aim is that each doctor spends the most of working days in the base infirmary. Therefore, the second deviating variable dz_{ij} is introduced which provides a relocation of doctors from their base infirmaries for a certain period of time. As each health center is very dynamic system, changes that occur daily could affect the presence of employees. These changes could be known in advance (e.g. holidays, days required for further education), or could be sudden ones (sick leave or emergency meetings) not known in advance, often lasting for several days or even being on a daily basis. However, in order to maintain the work continuity and facilitate scheduling patients, there is a tendency for doctors to work the same shift within a particular set of days (usually one week). This is another "soft" condition and a deviation from it is defined by deviating variables: dg_{ijks} and dd_{ijks} which represent the upper and lower limit deviations respectively, from assigning the same shift to a doctor within a week.

Also, attention should be paid to make sure that doctors who share the office should not work the same shift. However, it is possible to deviate from this requirement and another deviating variable is been introduced du_{sjo}.

Mathematical model of medical staff rostering, is formulated as follows:

$$\min P_1 \cdot \sum_{a \in A} \sum_{s \in S} \sum_{j \in N} dw_{jsa} + P_2 \cdot \sum_{i \in I} \sum_{j \in N} dz_{ij} + P_3 \cdot \left(\sum_{i \in I} \sum_{l \in Q} \sum_{j \in D_l} \sum_{k \in D_l, j \neq k} \sum_{s \in S} dg_{ijks} + \sum_{i \in I} \sum_{l \in Q} \sum_{j \in D_l} \sum_{k \in D_l, j \neq k} \sum_{s \in S} dd_{ijks} \right) + P_4 \sum_{s \in S} \sum_{j \in N} \sum_{o \in O} du_{sjo}$$

s.t.

$$\sum_{a \in A} \sum_{s \in S} x_{ijsa} = \max_{s \in S}\{b_{ijs}\}, i \in I, j \in N \tag{1}$$

$$\sum_{a \in A} x_{ijsa} \leq b_{ijs}, i \in I, j \in N, s \in S \tag{2}$$

$$\sum_{i \in I} x_{ijsa} + dw^-_{jsa} = pb_{ajs}, a \in A, j \in N, s \in S \tag{3}$$

$$\sum_{i \in I} x_{ijsa} \geq mb_{ajs}, j \in N, s \in S, a \in A \tag{4}$$

$$\sum_{a \in A} \sum_{s \in S} z_{ia} \cdot x_{ijsa} - dz_{ij} = 1, i \in I, j \in N \tag{5}$$

$$\sum_{a \in A} x_{ijsa} - \sum_{a \in A} x_{iksa} + dg_{ijks} - dd_{ijks} = 0, i \in I, s \in S, l \in Q, j, k \in D_l, j < k \tag{6}$$

$$\sum_{j \in N} \sum_{a \in A} x_{ijsa} \leq y_{is}, i \in I, s \in S \tag{7}$$

$$\sum_{i \in U_o} x_{ijsa} - du_{sjo} = 1, j \in N, s \in S, o \in O, a \in A, \tag{8}$$

The objective function minimizes the following: the deviation from the desired number of doctors working in each of the infirmaries, the deviation from sending doctors to the other infirmaries if not necessary, deviation from not assigning the same shift each day of the week and the deviation from sharing the examination rooms. Parameters P1, P2, P3 and P4 represent assigned weights for each deviation formulated in the mathematical model. Constraint (1) provides the assignment of only one shift during one day in the specific infirmary, while constraint (2) provides assignment of the shift *s* for the doctor *i* if the doctor *i* is present in the day *j*. Parameter $\max_{s \in S}\{b_{ijs}\}$ from the constraint (1) means that if a doctor is not present in one shift and is in the second, that shift must be assigned to him that day regardless of the fact that it may differ from other shifts that week. Constraint (3) shows the desirable number of doctors in an infirmary *a* on the day *j* and the shift *s*. It is possible to deviate from this constraint. From constraint (4) it is not possible to deviate because it relates to the minimum number of required physicians in an infirmary *a*, on the day *j* and the shift *s*. Constraint (5) refers to the assignment of the doctor *i* to his base infirmary and, given that it is a "soft" condition, it is possible deviating from it. Constraint (6) is achieved by obtaining the same shifts in a week and this limit is also defined by the conditions of "soft" type. Constraint (7) refers to the permitting doctors to work always the same shift during a month. The parameter y_{is} represents the maximum number of the same shifts that can be assigned during a month. Constraint (8) prevents the assignment of the same shift to doctors who share the doctors' office.

NUMERICAL RESULTS

In the five mentioned infirmaries, there are 15 doctors in total hired and assigned unevenly depending on the infirmary size and its location as well as on the number of registered patients. The problem being discussed is based on finding the optimal working schedule for these doctors for the working days (Monday – Friday) in the month of June 2015. This month is quite specific since, in that period, most doctors use the paid vacation days left from the previous year and start annual leaves for the current year. For that reason, it is rather hard to apply all the conditions for the given problem. During this period of time, a total of five doctors were absent in different periods, with four of them belonging to Infirmary 1 and the fifth one to Infirmary 2. Also, one of the doctors from Infirmary 1 was doing residency at the time; therefore, he had to be assigned only afternoon shifts. Table 1 presents the periods of absenteeism for each doctor.

Table 1: Absenteeism period for each doctor

Name of the doctor/physician	Period of absence
M.S	10-28. June
B.P	15-28. June
B.S	1-28. June, morning shifts
M.B	1-14. June
J.V	22-28. June

The problem was successfully solved using GNU *Linear Programming Kit* (GLPK, 2015), open source software for solving problems of linear and mixed integer programming (GLPK, 2015), on the computer with following specifications: *Intel Core* 2 *Duo CPU* E8400 (3 GHz), *RAM* 3.25 GB the process of finding the optimal integer solution took 2.1 seconds. This problem contains 20389 variables. The optimal solution is multiple and one of the possible schedules is shown in the Table 2.

Table 2: One of the possible schedules given for the month of June, 2015.

		Working schedule for the period 1-28. June																				
Name		Week 1					Week 2					Week 3					Week 4					B.I.
		M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	
M.S		M	M	M	M	M	M	M														1
N.K		M	M	M	M	M	A	A	A	A	A	M	M	M	M	M	A	A	A	A	A	1
B.P		A	A	A	A	A	M	M	M	M	M											1
D.M		A	A	A	A	A	M	M	M	M	M	A	A	A	A	A	M	M	M	M	M	1
B.S		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	1
M.B												M	M	M	M	M	A	A	A	A	A	1
A.M		M	M	M	M	M	A	A	A	A	A	A	A	A	A	A	M	M	M	M	M	2
Z.D		A	A	A	A	A	M	M	M	M	M	M	M	M	M	M	A	A	A	A	A	2
I.N		M	M	M	M	M	M	M	M	M	M	A	A	A	A	A	A	A	A	A	A	2
I.M		A	A	A	A	A	A	A	A	A	A	M	M	M	M	M	M	M	M	M	M	2
N.J		A	A	A	A	A	M	M	M	M	M	A	A	A	A	A	A	A	A	A	A	3
J.V		M	M	M	M	M	A	A	A	A	A	M	M	M	M	M						3
J.K		A	A	A	A	A	M	M	M	M	M	A	A	A	A	A	M	M	M	M	M	3
O.K		A	M	A	M	A	A	M	A	M	A	A	M	A	M	A	A	M	A	M	A	4
D.G		M	A	M	A	M	M	A	M	A	M	M	A	M	A	M	M	A	M	A	M	5

M - Morning shift; A - Afternoon shift; B.I. – Base infirmary, where number 1 stands for Infirmary 1 etc.;

All doctors were scheduled according to their preferences, in their base infirmaries, where all the constraints concerning preferred and minimal numbers of doctors in each infirmary were respected. Also, shift work covers a maximum of 15 working days in which doctors can operate in the same shift. Weights are assigned as follows: $P_2 > P_3 > P_1 > P_4$.

CONCLUSION

The subject of this paper is the problem of rostering medical staff working in dislocated infirmaries using 0-1 goal programming. Although this problem was recognized in the last century, in most healthcare facilities this kind of work has still been usually performed manually by the head nurse or the head chief of the relevant department. For this reason it is necessary to find a solution that would facilitate the work of those responsible

for staff deployment. In addition to legal provisions on working hours and types of absence, solving the staff scheduling problem should include preferences of staff working in these facilities for particular shifts, working days and days off in order to increase personnel motivation and, consequently, work performance of employees. Considering that each type of healthcare institutions operates under specific rules depending on their size, number of employees and methods of work, it is almost impossible to come up with a unique solution that would solve every rostering problem of medical personnel. Therefore, many suggestions for various solutions to this problem can be found in the available literature. However, all these approaches are based on the examples of a single hospital, clinic or health center. In this paper, a mathematical model was formulated so that it relates to the rostering of doctors working in more than one branched infirmary under the supervision of the same chief of staff in charge of rostering. The formulated original mathematical model has been illustrated on a real example of the health center of Voždovac located in Belgrade, Serbia, where rostering of doctors is shown working in five different infirmaries. Fifteen doctors were unevenly assigned to these five infirmaries depending on their size and location as well as on the number of patients who are in need for healthcare services. The shift work rostering model has been presented using the nurse/day approach. The described problem was translated into a mathematical model which was then solved using the GLPK software. It is possible to alter the input data on a monthly basis and the same models will give new solutions, depending on staff availability. In this paper, the problem was formulated for the month of June 2015 since this is specific month when the deficit of employees is at the highest level because in this month staff have to use the paid vacation days left from the previous year and start annual leaves for the current year.

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A SYSTEMS VIEW ON MANAGING GROUP DYNAMICS: GROUPS AS VIABLE SYSTEMS

UDC: 005.961:005.64

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ABSTRACT

The present study makes an analysis about groups from a systems perspective. It applies postulates and principles of the Viable Systems Approach (VSA) to groups. The first attempt is to define groups as viable systems. The study focuses the attention mainly on VSA's fundamental principles. First an introduction to the Viable Systems Approach is offered, and then the VSA's principles are applied to groups for managing them effectively. Also some aspects from Beer's Viable System Model are mentioned, such as group's hierarchy and recursion and the definition of groups as viable systems. Then, through the VSA, it has been analyzed the dichotomist view of groups as structures and systems trying to analyze structure's and system's boundaries, starting from reductionism and arriving to holism. Also, communication and feedback mechanisms are considered under the mechanisms of autopoiesis, homeostasis, and self-regulation. Finally, complexity management and team decision making are treated, showing that groups like individuals too, when the consecutive decision rely more on information units is rational. Instead, when they rely more on values the decision making is basically emotional. Regarding methodology, this is a conceptual paper based on the interpretivist paradigm, using the method of literature review and theory development.

Keywords: Group Dynamics, Viable Systems Approach, Interactionism, Complexity

INTRODUCTION

Writing about groups and their dynamics through a system perspective is almost mandatory. It is a requisite because groups are characterized by the principle of interactionism which gives to them a dynamic nature (Lewin, 1951). Since the group is a composition of two or more individuals in continuous interaction for common goals and interests, then it seems logical to perceive the group as a system. The preceding definition of the group coincides with the following definition of the system which can be defined as a set of two or more interrelated elements with the following properties:
− each element has an effect on the functioning of the whole;
− each element is affected by at least one other element in the system;
− all possible subgroups of elements also have the first two properties (Ackoff 1981: 15-16).

For Kurt Lewin (1936) which was a gestalt and a social psychologist, a group is a "Gestalt", or a unified system with emergent properties that cannot be fully understood by focusing the attention only on isolated parts. It was Lewin that in1930s coined and popularized the term "group dynamics" with the scope to describe the way groups and individuals act and react to changing circumstances. Considering groups as a system is quite obvious; considering it as a viable system seems to be clear but it is more challenging if we take into account the infrequent references. However, interesting notes on the concept of viable system and on its postulate of survival can be traced in the psychotherapy of groups. Quoting Agazarian and Peters (1981, pp. 111): "If the therapist in the psychotherapy group is both an effective and a successful leader, then every member in the group eventually emerges as a

self-leader. Only thus can the individual in this sophisticated culture take up the responsibility of his social role, which is to maintain himself as a viable system and to choose viable systems to relate to, and finally to create new systems for his own and for cultural survival". Nearly, the same view from an organizational perspective can be found in Beer's Team Syntegrity Model (1994) used for large groups in order to ensure the viability of the system through knowledge dissemination and effective communication. According to Espejo and Reyes (2011), in order to consider groups/teams as viable systems they need to respect the principles of autonomy and cohesion. In reference to the Viable Systems Approach (VSA), the group is a viable system when it possesses the fundamental principles and respects all the postulates of the VSA (Golinelli, 2010; Barile, 2013). Generally, a viable system (e.g. a group) can be described as a system that survives, remains united and is complete; it is homeostatically balanced both internally and externally and furthermore has mechanisms allowing it to grow and learn, develop and adapt, and thus become increasingly more effective in its environment (Beer, 1972).

GROUPS AS VIABLE SYSTEMS: APPLYING THE FUNDAMENTAL CONCEPTS OF THE VIABLE SYSTEMS APPROACH TO GROUPS

The following are the ten fundamental concepts of the VSA applied to groups, considering them as viable systems:

FC.1. Systems approach for group analysis: Because of Lewin's principle of interactionism the group is a Gestalt, or a unified system with emergent properties that cannot be fully understood by focusing the attention only on isolated parts. For instance, if we analyze only the psyche and the behavior of a single member we lose the general phenomenon of the group that emerges as an interpersonal process flanked by the relationships projected and activated between members (formal/informal leader included). This analysis is coherent with the 4th postulate of VSA (i.e. interactionism and finalization), which states that every viable system, in its existential dynamics, is projected toward pursuing purposes and attaining objectives by interaction with suprasystems and subsystems, with which exchange respectively pressures, expectations, guidelines and rules.

FC.2. Group's hierarchy and recursion (Beer, 1959, 1981, 1985): Every social entity defined as a group enjoys the recursive property. Hence, a group (level L) identifies several suprasystems (level L+1) (e.g. the family, the organization, the community, the industry sector, the socio-economic system, the ecosystem, etc) and subsystems (level L-1) (i.e. the individuals inside it). In accordance with the 5th VSA's postulate (i.e. exhaustiveness), for a viable system, all the external entities that populate the surrounding environment are viable systems too, or components related to a viable system of a higher level. So, a viable system, as an autonomous entity, may be dissolved within the suprasystem to which it refers during a specific time-frame, because of consonance and resonance conditions.

FC.3. Reductionism and holism: Given the complexity of groups as social systems, it is necessary to study the individuals separately (e.g. their personality, motives, perceptual world, values, attitudes, unconsciousness, and emotions), and in relation with each other seeing the group as a whole (e.g. group cohesiveness, group consonance, group performance, etc). In this context the VSA serves as a bridge between reductionism and holism shifting the attention from parts to the whole (Capra, 1997)

FC.4. Groups as open systems and the system's boundaries: To accomplish the purpose of survival, groups, as purposeful systems, exchange material and immaterial resources (e.g., products, projects, energy, money, information, etc) with the surrounding environment (e.g. with other groups inside or outside the organization, with the organization as a whole, with single individuals, etc) (Ackoff and Emery, 1972. So, they are undoubtedly open systems (von Bertalanffy, 1968). From the structural standpoint groups have physical boundaries defined by the total number of components (i.e. individuals) they are composed and by their interaction that produces the group's process (Parsons, 1951). From the VSA perspective, boundaries are both structural and systemic. The demarcation line between the activities performed inside the group and those outside it defines the structural boundary of the group. From the systemic outlook the boundary

is invisible physically and decided from the leadership of the group (formal or/and informal). Only the leader determines the openness degree of the group as a viable system. Thus, the group is a partially open system and contextualized. The range of government action and the strength of the relationship between groups in terms of intergroup consonance and resonance, define the system's boundary.

FC.5. Autopoiesis, homeostasis, and self-regulation of groups (Vernadsky, 1998; Gare, 2000): The group is an autopoietic machine (Maturana and Varela, 1980, 1992): its individuals are able to generate new internal conditions with the purpose of self-regulation (continuously aligning internal and external complexity), maintaining at the same time a dynamic equilibrium (homeostasis). For example, an internal conflict might serve as a feedback for change. Individuals (with or without the aid of the leader) generate new communication patterns to solve the conflict. From the moment the conflict is solved, or better dissolved – as Beer suggests in his Designing Freedom (1974) – as a consequence, a new state of equilibrium is automatically reached. Thus, considering groups like autopoietic machines, individuality, autonomy, and unity become the basic features of these self-referring and self-reproduced living systems. In the basics of all group members' interaction is the communication. The group as autopoietic system tries to reproduce itself through communication flows between participants, creating a linguistic domain. Information units are distributed among members who behave as observers that perceive a subjective reality. Hence, group's autopoiesis process generates the group's cognition domain through perception and distribution of information among group members in order to ensure autonomy, identity, unity, homeostasis, and survival. Finally, groups as autopoietic systems show emergent behaviors and properties that can be measured using techniques and metrics such as biometrics (Markus, 2008).

FC.6. Group's structure and group's system: From a static viewpoint the group can be described like a structure. In fact groups has a structure constituted by the individuals inside the group, to which are assigned functions, roles and tasks to be performed in consideration of norms, constraints and rules. When the structure is activated, namely, when the individuals begin to perform (by interaction), the group is set in motion as a viable system where emergent properties can be revealed (e.g. cohesion, decision making, social pressure, conformity, productivity, etc). Hence, respecting the 2nd VSA's postulate (i.e. eidos), the viable system in its ontological qualification can be conceived in a double perspective: that of the structure and that of the system. The dichotomist perspective of the group as a structure and as a system is not new in the field of group dynamics. As cited in Forsyth (2006, pp. 4):

> Structure "A group is a social unit which consists of a number of individuals who stand in (more or less) definite status and role relationships to one another and which possesses a set of values or norms of its own regulating the behavior of individual members, at least in matters of consequence to the group" (Sherif & Sherif 1956, pp. 144).
> System "Groups are open and complex systemsa complex, adaptive, dynamic, coordinated, and bounded set of patterned relations among members, tasks, and tools" (Arrow, McGrath, & Berdahl 2000, pp. 34).

FC.7. Group's consonance and resonance: In the field of group dynamics, consonance may refer to the compatibility degree between individuals within the same group, or between individuals of different groups considering the respective values, attitudes, and information background. Some author defines it empathy (Goleman, 1998). When the relation is established only between two viable systems (individuals or groups) the consonance must be labeled dyadic; instead, when more actors become part of the relation, consonance should be considered contextual. On the other side, resonance is the activation of the relation, transforming it into an interaction. For example, when group members are rallied to accomplish a project it can be said that a relation is founded and an initial consonance is ensured. When the work starts, the relation is transformed in interaction and the group begins to resonate due to the teamwork (work done by members' interaction).

FC.8. Group's viability: When group members (leaders included), through the conditions of internal/external consonance, internal/external competitiveness, and group cohesiveness, are able to guarantee a separate existence of the group as a whole, at that time the group can be considered as viable. In other words, when individuals feel harmony with each other and simultaneously develop a competitive

spirit as a necessary impulse for improvement, the viability increases and makes the "survival" (i.e. the 1st VSA's postulate) more secure and clear.

FC.9. Adaptation and relationship expansion: The group is only a part of the whole organization or the general community. Thus, everything that happens to the whole affects also the group and its members. Because of it, groups have the obligation to adapt their structures in a changing environment, by means of systemic re-equilibrium interventions (i.e. simple adaptation, transformation, restructuring, and reconversion), with the purpose to secure the first postulate of VSA: the survival. This end can be achieved only if the group activates, reinforces, and expands relationships inside and outside the system's boundaries, developing effective communication channels.

FC.10. Complexity and decision-making (Golinelli 2010; Barile 2011; Rullani 1989; Bocchi and Ceruti, 2007): Groups live in complex environment composed by three components: variety (or the number of states that a phenomenon presents to an observer in a specific moment, interpreted as a differentiation of the possible cases that can occur in one and the same time); variability (or the changes undergone by that phenomenon over the time, namely, how the variety at time (t1) is transformed at time (t2), and so on); indeterminacy (the percentage of understanding during the perception of a certain phenomenon). The complexity makes decisions more difficult from the rational standpoint, because tends to increase the cognitive alignment gap between the observing system (member, leader, or/and team) and the observed system (any kind of situation), due to a lack of knowledge. In substance, the decision making process of a viable system group relies on the 2nd VSA's postulate (i.e. isotropy), which states that the viable system in its behavioral qualification is characterized by the emergence of two logically distinct areas: that of deciding (decision-making area) and that of action (decision-performing/problem-solving/operations area). According to Barile (2011), the decision making process under complexity is mainly intuitive and emotional because of the lack of information and high levels of entropy. Therefore individuals' behavior is based on their strong beliefs which represent their values system, principally acquired from family and society.

CONCLUSIONS AND IMPLICATIONS

This paper has shown in details that groups are dynamic systems with emergent properties. It is valuable for every manager and team leader to know, understand, and possess some capability of dealing with these emergent properties of groups. The reason is that by understanding group dynamics, managers can channelize better their efforts for improving group performance and members' satisfaction, reducing at the same time the likelihood of job turnover and absenteeism. Having a systems perspective on team leadership means respecting one of the most discussed topics like it is that of diversity. Actually, in a mutual and global environment, leaders are facing many challenges about managing people from different countries, ages, social statuses, intellectual backgrounds, and personalities. Therefore, with the VSA's principles applied to groups, managers can handle wisely these challenges by using not anymore a deterministic view, but relying on constructivism. With a constructivist perspective it is easier to understand the particularities and the perceptual world of each group member and the group as a whole. The affecting variables of this kind of systems management on groups are commitment, performance, and satisfaction.

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IMPROVING EUROPEAN COMPETITIVENESS: COMMON QUALIFICATION FRAMEWORKS

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ABSTRACT

European labour market is still fragmented in the terms of scope of knowledge and skills even in the case of the same profession. The study hours, content may vary from country to country. It is disatvantage in the terms of mobility during education and work also. It results insufficiently flexible labor market. European Qualifications Framework (EQF) helps the necessary standardisation. Authors present the results of European projects aimed at the harmonisation of training (Novalog, Central, Metalog). Cases will include competence profiles and recommendations for training programs in logistics. They allow to develop the appropriate national logistics qualification framework.

Key words: competences, EFQ, logistics, NFQ

CHANGES IN THE WORLD OF LOGISTICS

The transport and logistics sector is one of the fastest growing industries in Europe. Most visible trends in logistics systems were in last decade: Supply chain approach. Participants on all level have attention on the whole supply process. The overall objective is the business success of the system. Restructuring of jobs. As a consequence of the above mentioned trend, the content of jobs is changing and becomes more demanding. New occupations appeared and traditional occupations have changed fundamentally. Formal vocational training does not exixts for many occupations. Globalization. Local and international standards have to be followed same time. Elements of these trends are in interaction with each other. There are many publications of competence need analysis, many of them on SCM. (Veres, Locklear & Sims 1990; Heran-Le Roy, Niedhammer - Sandret & Leclerc, 1999); Sandberg, 2000; Sanghi, 2004, Pató, Kovács, & Pató G, 2006). Silva (2012) gives a local analysis of social issues of vocational training. In the case of our researches target groups were logistics companies, employees, training providers, social partners, regulatory bodies.

NOVALOG PROJECT

In the frame of NOVALOG Project (2001-2004) a consortia of European organisations (universities, consulting companies, professional organisation, union) developed a job structure which fits better to the existing tasks in logistics systems and gives a better respond to the challenges in supply chains. This NOVALOG nomenclature can be seen in Table 1.

A white collar (logistics assistance) and a blue collar (warehouse operation) function were analysed deeply. Educational innovation case collection and training database were added to the results.

Table 1. Novalog nomenclature

Group 1: Formulating & implementing logistical strategy Supply Chain Manager Logistics Manager Logistics Analyst Logistics Engineer Logistics Controller Logistics IT-Specialist Logistics Supervisor
Group 2: Purchasing/ Materials Management Materials Manager Packaging Manager Purchasing/ Procurement Manager Purchasing Officer Purchasing Clerk Stock/ Inventory Controller
Group 3: Production Planning and Control Production Planner and Controller
Group 4: Warehousing Warehouse Management Warehouse Manager Warehouse Supervisor Administrative Operations Order Processing Clerk Warehouse Operations Warehouse Operator Forklift Driver Order Picker Warehouse Supporting Activity (examples) Maintenance Supervisor Maintenance Operator

CENTRAL PROJECT

During the CENTRAL project (2010-2012) partly the Novalog results (job classification categories) were refined and partly further developed (competence analysis). By giving clear job descriptions for two concrete occupations and setting up not only a qualification framework including the EQF descriptors for these occupations, but also a training curriculum was developed incorporating the learning outcome approach (Table 2.).

Assigning ECVET points allows the comparision of different programs. Among many advantages it promotes the mobility and flexibility during traning and on the labour market. (Kovacs & Pató, 2014)

METALOG PROJECT

Metalog project (2013-2016) aims were. To improve transparency and comparability of transport and logistics qualifications in Europe by developing a sectoral qualifications framework for transport and logistics (framework). To establish a forum for the anticipation of future skill needs by consolidating a European Logistics Skills Network (network). (http://www.project-metalog.eu) As a first step Metalog project summed up the results of previous related projects (CENTRAL, EUOCOLOG, Prolog, Novalog, EURO TRANS LOG, ProfDRV, Matching Frames, CarEasyVET, NQF-SQF).

These projects were analyzed in order to identify:

− approaches and methods for the definition of a sectorial qualification framework
− approaches and methods for the definition of a logistics qualification framework

Table 2. Training content by CENTRAL project

EP	LO	N° TU	Training unit (TU) Title	Duration	Classroom	Work based activities*
12	0	TU 1	General concepts of business management and logistics, basic ICT and English	220 h	160 h	60 h
		TU 1a	Main concepts of business sectors and the economy	40 h	40 h	
		TU 1b	Introduction to legislation and regulation	8 h	8 h	
		TU 1c	English language	50 h	50 h	
		TU 1e	CT: Use of Excel and Access spreadsheets and databases	54 h	54 h	
		TU 1f	Employability skills	8 h	8 h	
15	1	TU 2	Transport legislation and regulation	130 h	90 h	40 h
		TU 3	Arrange the transportation of goods and materials	80 h	55 h	25 h
		TU 4	Costing transportation services	40 h	30 h	10 h
15	2	TU 5	Management of the supply chain	115 h	80 h	35 h
		TU 6	Transport planning	125 h	85 h	40 h
9	3	TU 7	Monitoring transportation: use of ICT	98 h	68 h	30 h
		TU 8	Health, safety, security and insurance	47 h	32 h	15 h
9	4	TU 9	Methodologies for analysing and assessing service provision	145 h	100 h	45 h
			Sub TOTAL	1000 h	700 h	300 h
			Final evaluation	80 h	50	30
			Visits	20 h		
			TOTAL training	1100 h		

LEGEND: EP: ECVET points; LO : Learning Outcomes; TU : Training Unit

During the METALOG project analysts used the work process based approach that has been applied and validated in the project CarEasyVet under the lead of Institut Technik und Bildung, University of Bremen, Germany (Spöttl, 2014). The main information source about the processes is a semi-structured interview. The advantage of the used methodology is the good depiction of learning outcomes descriptors and the high up-to-date quality of the occupational standards.

The procedure of work-process-analysis, carried out by expert groups with the help of a company-specific questionnaire, encompasses the following steps:
1. identification and brief description of core work processes
2. definition of core competences
3. detailed outline of reference objectives, aiming to illustrate the context of the core work processes. (Table 3.).

Table 3: Work-related categories with description of the context. (Spöttl&Ruth, 2011)

Work related categories	Description of the context		
Core tasks Core work processes	Object of (skilled) work	Tools, methods, organization of (skilled) work	Requirements for (skilled) work and technology

The next step was to identify the required competencies in order to fulfill the tasks (Table 4.)

Table 4: Detailed description of fields of competencies required for a work process. (Example.)

Work Processes	Matrix of Complexity of Tasks / fields of competency		
	He/she		
1. Handle incoming goods and related information	knows documentation procedures for in-coming goods re-labels incoming goods handles scanners maintains order in the warehouse	checks delivery against documentation, e.g. using the information on master la-bels and packing lists checks if delivery is undamaged and free from vermin accepts goods and documents using tally sheets and/or software notes special characteristics for storage, e.g. "non-stackable"	performs quality and quantity conformity inspection records damaged packages and takes pictures detects and reports anomalies /faults in goods received reports defective goods to the customer, asks for instructions from the customer

The last step was the allocation of the work processes to the competency levels of the EQF. The project also addressed the issues of adapting the developed European level qualification framework in the different national frameworks.

CONCLUSIONS

In spite of the harmonization efforts there are still unwanted differences in qualifications in Europe. There are different time consumption, levels of qualifications which are obstacles of labour flexibility and mobility. At present the work content more or less is harmonized by the used common technologies and company, supply chain, national and international standards. There is consensus is also what kind of knowledge, skills and competences that are required in certain occupations. National sovereignty in vocational education still represents a major obstacle for consolidation. The next step is to be taken by policy makers as it happened to the higher education during the Bologna process. That will result the wished flexibility and mobility in education and labour market. EU supported projects play important role in harmonization of competence requirements and training. Possible further steps would be the utilization of results on national levels.

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MANAGEMENT OF ORGANIZATION PERFORMANCE

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ABSTRACT

Management of organization performance is done through several segments and one of them is by all means investing in education of employees, which significantly affects the performance boost of the complete organization. Change in technology, constant increasement of complexity, turbulence, uncertainty of professional environment and modern business ask for new, greater and different knowledge and put men in the first plan not only for development but also for organization survival. These changes make quickly knowledge old-fashioned and ask for new knowledge and permanent education.

Key words: management, performances, organization, knowledge, education,

INTRODUCTION

Today permanent education becomes one of the most important forms of human resources management and development.Education process always has certain outcomes but their nature is often vague and unclear. Even in the vocational education and adult education there are programmes, which are not rare, that have unintentional, inadequate and imprecisely defined outcomes that have a consequence of „production" practise of personnel who have formally acceptable qualifications but they don't have some basic competence that are expected. Knowledge as a factor of state economic growth and development is to be represented by permanent innovations in order to enter world's technology development. Modern companies devote more of their resources (monat, time, energy, information and etc.) to constant education and permanent training of the employees. Insufficient investments in education and development of the employees are one of the key reasons of losing shares on the market and falling behind the competition.

OBSOLESCENCE OF KNOWLEDGE AND INCREASING THE NEED FOR NEW INFORMATION

Upbringing and education have unchangeable role in all this. Having in mind that education means life, it cannot be meant just for small groups, thus it is defined as a vary important society

need. The young should be involved in working process immediately after they graduate. Competition of the skills and market knowledge is to be made as soon as possible. Combinational of professional development and evaluation of the experts will be basis for adequate and right professional promotion. Besides, it is necessary to stimulate knowledge, skills, enterprise and success in order to stop brain going exodus of intelligence. Old knowledge and in creasement of needs for new information demands permanent education. New phase in market economy development asks for well-planned multiplied education, evaluation and promotion system. Modern business system is based on team work. Professional improvement implies the process of enlarging, deepening and specializing of knowledge and skills when performing jobs and working tasks that need some complexity on the given complexity category. Occasional overtaking of more complex jobs and working tasks on the basis of acquired new knowledge and skills is just a preparation for participation in new phase of the degree of qualification. Forms of education are to be directly connected to the working situations and they should be realized not ly in separate educational fpatterns, but also in appropriate working tasks. Contents and levels of training and specialization should be largely in harmony with the aims of the organizations and personal needs and motives of the employers.

VOCATIONAL GUIDANCE IN THE CHOICE OF PROFESSIONS

Career management is an organizational process of preparation, implementation and control of employees' plans. In order to have successful career development it is necessary to be integrated and supported by all other human resources management activities, for they all together have the same function and that is to coordinate needs of and individual to the needs of the organization. Professional orientation in no longer connected only to helping young people to choose the vocation, but it is now often connected to changes in vocation structure and needs to retrain the employees. From all these reasons, professional orientation includes not only help to choose the vocation, but also it includes the tracking of an individual during his career, either for his needs in adaptation, stabilization on his job and further education or for the need to change the vocation.

The program development starts with complete inspection of the working needs, i.e. professions or concrete jobs, based on the analysis of needs with primary outcomes: Professional profile (of jobs, working functions) and Profession standards (of jobs, working functions).

When comparing the abilities people do not differ very much. When career choice is in question, we should know that each of us has abilities to perform several vocations. On the other hand, we cannot say that each of us is capable for all the vocations. Certain vocations ask for big physical effort, certain ask for great hand skills. For an entrepreneur it is necessary to know good economic conditions and thus to know good job opportunities.

PLANNING AND EMPLOYEES CAREER DEVELOPMENT

Planning and employees career development has primary aim to connect needs, knowledge and skills of the employees to present and future organization needs. Career development is a dynamic process that lasts for the whole life and that is realized through several phases by means of continuous permanent education of the young as well as of the adults. Serious approach to employees' career development can provide multiplied effects either for individuals or for the organization itself. Planning and employees career development can be done by two connected processes:
– Career planning on individual level;
– Career management on organization level.

In modern times the role, candidate's responsibility as well as functions and behavior on professional orientation i.e. planning and career development have changed in great deal. Past ideas that included more or less researches of abilities and possibilities of the candidates and their sending to certain vocations opposes to modern concepts , as a very important condition for adequate career choice, that have different attitude i.e. the individual can freely and independently make career choice. Career planning on individual level means that the individual can make freely and independently the decision because he has real view on his abilities, tendencies and characteristics from one point of view and from the other point of view objective possibilities.

Primary professional education in the first professional phase (obtaining first job in career) includes continuous process of understanding subject to work and elements of work from the youngest period and it ends with intensive professional education and obtaining certain vocational career level. Obtained right to work is a potential readiness to perform several vocations, but it does not mean that vocation is obtained. Vocation is obtained during the working start as a very complex social and andragogical process. During working from normative point of view we obtain vocation, but from social and andragogical point of view, it is a relatively complex process of gaining organizational culture. Professional advanced studying includes process of enlarging and deepening of knowledge and skills when performing jobs and working tasks that have certain complexity in the complexity of certain complexity categories.

PERMANENT EDUCATION AND ADVANCED TRAINING OF THE EMPLOYEES

Management understands more and more that permanent education and improvement of employees becomes one of the most efficient ways of competition advantages, entering on market and competing for consumers trust and all these is practicable through development and improvement of secondary vocational education and adult education as well as and adoption of such education to the market needs. Strategic human resources marketing implies systematic and thorough development of human resources, primarily education and development of secondary vocational personnel, who has influence on economic development and prosperity of the State, as well as providing relevant competition advantages in order to realize strategic business aims and develop companies strategy.

Turbulence and uncertainty of business environment are increased and there is also increased connection between strategy and human resources management. The more turbulent and uncertainty business environment is, the more important are people and their resources and the more connected are strategic management and human resources management.

Scientific and technological progress, market, competition, international politics make constant changes that ask companies to adept to the changed conditions and new challenges, to change their business and development strategy, organizational structure, personnel, skill and knowledge in order to be always on the constantly changing environment. A company should be prepared to manage constant changes that are happening in its environment, because doing that it can provide further being and development. Passing from agreed to market economy opens a gap in which all concepts based on agreed industry fall into.The question of internal economy is raised and in that context the question of rationalization and efficiency of jobs. Market economy asks for competition ability, and the latter demands bigger efficiency and productivity. Human work is not the aim itself; it is a means to secure gains and to meet the individual and society needs. It should provide total society development which is a basis of guarantee of human and citizenship freedom. Our tendency and needs to enter world and European markets do not imply just a question of systematic adaptation of property, investments, organizations, personnel, but they also

imply development of certain efficient entrepreneurs. Modern market puts more demands on today's entrepreneurs. Our long economic falling behind and inefficiency of out industry should in total restructuring ask a question of human work efficiency and factors that have influence on. Having in mind fast changes in science and technology, social relationships and future needs of young generations, it is necessary to give to all generations' typology of life aims, so that applying science becomes the main factor that leads to changes in entrepreneurs manner of working.

It is sure that the third technological revolution has made the revolution in education, especially in scientific and research personnel who are asked to have interdisciplinary knowledge. The need for bigger knowledge and its structural applying can be sensed. The expansion of knowledge will follow and contents and methods of educations must be changed. Market economy put education in new circumstances that make and ask for revolution. Educational institutions have had special treatment in society, but today they have to change faster for all future young generations. All of this shows that the society with best educational system will have best position like sometimes societies with natural wealth and industrial potentials had. It is necessary to make adaptive creative experts, brave soldiers in the battle for truth in science. Educational plans should be expanded for mathematic and cybernetic contents, programming etc. Basic changes should be made in the field of organization, programs and educational methods. Today deep changes in science, techniques and technology are realized in short intervals. Our economy based on market economy is a signal that reforms in education should be fast. Development of education will lead to such revolutionary scientific and technological jumps in completely new scientific fields.

CONCLUSION

Old knowledge and incensement of needs for new information demands permanent education of the employees. New phase in market economy development asks for well-planned multiplied education, evaluation and promotion system. Modern companies devote more of their resources (money, time, energy, information and etc.) to constant education and permanent training of the employees. Insufficient investments in education and development of the employees are one of the key reasons of losing shares on the market and falling behind the competition. Management understands more and more that permanent education and improvement of employees becomes one of the most efficient ways of competition advantages, entering on market and competing for consumers trust and all that should enable improvement and management of organization performances.

The employees often have to train for new technologies application and process, and the unemployed should retrain and gain additional knowledge in order to employ. Analysis of needs for knowledge and skills is made by identifying differences between what is and what should be, and analysis of needs for knowledge, and skills of the unemployed, i.e. analysis of needs for knowledge and skills needed on the lab our market is a more complex procedure. Identification of knowledge and skills needed on the lab our market, i.e. new programs, implies systematic analysis of organization, local community or sector having in mind social and economic inputs on macro level. Analysis of needs for knowledge and skills should provide information about people who need them, about the jobs they perform or will perform and about the products themselves or about the processes that are results of their r work.

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RESEARCH OF THE IMPACT OF FIVE MAJOR PERSONALITY FACTORS ON ETHICAL BEHAVIOR OF LEADERS

UDC: 005.32:316.46

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ABSTRACT

Many previous studies are investigating the effects of ethical leadership, not the benefits of leaders' ethics. This paper examines the characteristics of leaders and potential benefits of ethical behavior of leaders. In the study we looked for a link between personality traits and ethical behavior of leaders. Leadership qualities were measured by using the individual rating of the Big Five. The study used a one-dimensional scale of ethical leadership (ELS - The Ethical Leadership Scale). As expected, conscientiousness, and emotional stability are strictly related to ethical leadership. After controlling for other personality traits, conscientiousness is specifically related to ethical leadership. Also comfort and emotional stability are positively related to ethical leadership and decision-making. As expected, openness to experience and extroversion are not associated with the ethical behavior of leaders.

Key words: Ethical behavior of leaders, qualities of leaders, big five traits.

INTRODUCTION

Leaders are very important for companies to achieve their goals. Robbins and Judge (2009) define leadership as the ability to influence a group to focus towards a vision or set of goals. In the modern world of business leaders in addition to financial targets, must meet also environmental and social responsibility. According to Dixon et al. (2001), the leaders are expected to play an important role in the ethical climate of the company. According to Northouse (2008), this is a small number of handouts small group of scientists in the field of leadership, which was established by the institution WK Kellog Foundation (WK Kellogg Foundation was established in June 1930 as the foundation of child protection). This small group of scientists questioned how the theory and practice of leadership can be used to build a more caring society. Ideas and researches of this group were published in the newsroom Joanne Ciulla (Ciulla, 1998) Ethics, the Heart of Leadership in the publication: Grenwood Groop Publishing, Incorporated, Older Edition. Big five initial model was made by Ernest Tupesi and Raymond Christal in 1961 (Tupesi & Christal, 1961) but failed to reach an academic audience unitil the 1980. In 1990 J.M. Digman advanced his five factor model of personality, which Lewis Goldberg extended to the hifhest level of organization. Al least four sets of researchers have worked for independenty dacades on this problem and have identified generally the same five factors: Tupes and Cristal were first, followed by Goldberg at the Oregon Research Institute, Catell at the University of Illinois, and Costa and McCrae at the National Institutes of Health. According to (Đorđević, Anđić, 2004) the issue of business ethics is new and insufficiently researched field of our science and practice, daily gaining in importance. They further state that business ethics is directly related to the principle of social responsibility, which is one of the top principles of modern business.Ethical leaders

take high moral standards on the staff, they encourage their followers to express their opinions and proposals, not only in relation to ethical issues, and other processes related to the work and the working context (Avea, Wernsing and Palanski, 2012 ;. Walumbwa et al., 2012; Walumbwa and Schaubroeck, 2009). So far, the researches (e.g., Brown, Trevino, & Harrison, 2005; De Hoogh & Den Hartog, 2008; Kalshoven & Den Hartog, 2009) on the correlation and the effects of ethical behavior of leaders generally demonstrate positive relationships and behavior, such as commitment, satisfaction with leaders, trust, experienced leader and efficiency of organizational behavior. Studies have shown that personal characteristics seem to influence leadership. However, we still do not understand why some people in the leadership situation choose to affect other manners through ethical behavior, while others choose less ethical behavior. We believe that an important role in this are characteristics.

BIG FIVE FACTORS FOR ETHICAL LEADERSHIP

In recent years, an impressive research confirms that the five basic dimensions are the basis of all others, including variations on the characteristics of people. These factors are:

−   Extroversion, this dimension refers to the level of benefits when it comes to social relations. Extroverted leaders are usually accessible, clear, positive, and social.
−   Agreeableness, this dimension refers to the tendency of individuals to other prices. People who are high on high position of benefits are cooperative, warm and have trust in others.
−   Conscientiousness, this dimension is a measure of the reliability of the person. Very conscientious person is responsible, organized, reliable and persistent.
−   Emotional stability (often called neuroticism) this dimension describes a person's ability to tolerate stress. People with positive emotional stability are usually calm, confident and secure.
−   Openness to Experience. The last dimension refers to the range of interests of the person and its interest in new experiences.

Extremely open people are creative, curious and have a sense to art. Many studies (Judge & Bono, 2000; Lim & Ployhart, 2004) found a significant relationship with the Big Five traits with different behavior of leaders and leadership effectiveness. In theoretical terms (Brown & Treviño, 2006) suggest that the relationship between the leader and the Big Five has conscientiousness, and emotional stability of advantage. Very similarly (De Hoogh & Den Hartog, 2009) suggest that conscientiousness and emotional stability are important to ethical leadership. For example (Sacker & Wanek, 1996) report that the integrity tests are correlated with conscientiousness and emotional stability benefits (neuroticism). Also Mayer et al. (2009) found that conscientiousness, emotional stability, and benefit are the three most important traits to create an equitable environment in the organization.

HYPOTHESIS

Hypothesis 1: Conscientiousness is positively related to ethical leadership and ethical behavior of leaders such as fairness and role clarification.
Hypothesis 2: Agreeableness is positively related to ethical leadership and the ethical behavior of leaders such as justice and power sharing.
Hypothesis 3: Emotional stability is positively related to ethical leadership and the ethical behavior of leaders such as clarifying roles and power sharing.

METHODOLOGY

Authors (Walumbwa & Schaubroeck, 2009) find that the Big Five traits trait is not often associated with ethical leadership and they included only three personal characteristics (conscientiousness, agreeableness and emotional stability), in this paper we included two other traits (extroversion and openness to experience), and so by the inclusion of these two dimensions we provide valuable information to support the theoretical reasoning. Other styles of leadership like transformational leadership are typically related to extraversion.

Second, to determine the independent contribution of conscientiousness, agreeableness, and emotional stability, it is relevant to include the other dimensions as well, because the Big Five traits are not entirely orthogonal (Digman, 1997). The overall goal of this study was to replicate and extend the findings of (Walumbwa & Schaubroeck, 2009) on conciontiouness, agreebleness, and emotinal stability in a different country while controlling for extraversion and openness to experience. The sample consisted of two leaders and their two subordinate in the metal organizations. A leader filled in one questionnaire, and a second questionnaire his/her subordinate. A total of 60 sets of surveys were returned, after sending 100. Set poll contained a survey for the supervisors and a survey for the subordinates. Sample Extraversion is "Feel yourself comfortable around people." Agreeableness is sample item "Accept people for who they are." The sample for the Conscientiousness is "Pay attention to details." Sample items Emotional stability is "Feel comfortable with yourself" and Openness to Experience is "Keep a strong imagination". The Cronbach's α of the scales were 0,76 for emotional stability, 0,72 for extraversion, 0,66 for comfort, 0,77 for conscientiousness and 0,64 for openness to experience. Reliable value for openness to experience was somewhat less than that which was expected. Although the reasons for these responses were unclear, other studies also report a lower alpha for openness to experience. The response rated from 1 to 5. Ethical leadership was measured with 5 items dimensional ELS. A sample item "Listen to what employees have to say." Cronbach α was 0,84. Table 1

Table 1.

Variables	M	SD
Openness to experience	3,12	0,49
Extraversion	3,74	0,49
Agreeableness	3,50	0,46
Conscientiousness	3,91	0,47
Emotional stability	3,82	0,58
ELS	3,75	0,44

HYPOTHESIS TEST

The hypothesis testing is a link between three of the Big Five traits of ethical behavior of leaders, we perceive this correlation and regression analysis. In addition to the correlation analysis regression analysis was conducted. Table 2 shows the results of the regression analysis. Taking the results conscientiousness is significantly the most consistent with the ethical behavior of leaders. Also as expected, openness to experience and extraversion is not related to any ethical behavior of leaders in the study.

Table 2: Regression analysis

Variables	
Openness to experience	0,12
Extraversion	0,03
Agreeableness	0,16
Conscientiousness	0,29
Emotional stability	0,11
Adj. R^2	0,07
R^2	0,12
F	2,45

The results indicate that conscientious was in positive and significant correlation with one-dimensional ELS ($r = 0.24$, $p < 0.01$). Also supporting the hypothesis 1, regression analysis results show that after controlling for other characteristics of the line, conscientiousness was related to ethical leadership is measured with ELS ($r = 0.29$, $p < 0.01$).

Supporting Hypothesis 2 advantage was positively correlated with ELS ($r = 0,16$, $p < 0,05$) in this study. Hypothesis 3 relating to the emotional stability, was highly correlated ($r = 0,14$, $p < 0,01$).

DISCUSSION

The aim of this research is to contribute to the currently still insufficient data in this area. According to the available test required literature feature of The Big Five are the most conscientiousness, and emotional stability of advantage with the ethical behavior of leaders. The results of this research we used a somewhat different measurement, the results are identical. Walumbwa and Schaubroeck, (2009) found a weak but significant relationship between the Big Five traits and ethical leadership. Although correlations were not high, they are similar in size to those found in previous research linking other styles of leadership. Thus, similar to other styles of leadership qualities seem to play a role in the ethical lidersvu. As expected in this study, a similar research Walumbwa and Schaubroeck, (2009) the diligence, look like the most relevant advantage for ethical leadership. For specific ethical leadership behavior, conscientiousness seems most important feature for a role clarification, but it looks like the most important benefit for honesty and power sharing. The literature suggests that the benefit is important for ethical leadership as an agreement of individuals who strive to be kind, carrying for others, warm, selfless and concerned for material state of employees. According to Judge and Bono (2000) - the moderate inter correlations among the Big Five traits explain why the unique effect of a line of leadership behavior affects other attributes. Emotional stability is not related to ethical leadership in the study. It can be concluded that for the Big Five the most important are conscientiousness and emotional stability of advantage in the general ethical leadership as rare different behavior of ethical leaders. The study revealed a weak but significant relationship between the Big Five traits and ethical leadership. Although correlations were not high, they are similar in size to those found in previous studies integrating other styles of leadership. Thus, similar to other styles of leadership qualities seem to play a role in ethical leadership. In parallel with the findings Walumbwa and Schaubroeck (2009), conscientiousness and convenience seem most relevant to ethical leadership. For specific leadership behavior, conscientiousness seems to be the most important for clarification of the role and look important advantage for honesty and power sharing. Our results show that conscientiousness is not related only to general ethical behavior of leaders, but also the focus is given to clarify the role of specific behavior. Such leaders communicate transparently and clarify roles, and performance goals, including the subordinate knowledge, what will be applied what they need to be successful on the job. Conscientiousness explains the significance of the variance in the role of clarifying when Big Five traits are not controlled.

Benefit is the second most important feature of ethical leadership. As expected benefit is positively correlated with ethical leadership, honesty and power sharing. In this study, the Big Five traits, diligence and convenience are most relevant in binding to the ethical behavior of leaders. Taking these results together, they show that the different character traits are important to the different styles of leadership and the characteristics of the different links further strengthen the argument that ethical leaders are very conscientious. This research has many good sides. We did a separate study and collect data and multiple sources and organizations from diverse metal-processing industry. In the study leaders assess their qualities, and each one subordinate leader assessed the behavior of a leader (subordinate). We measured the Big Five dimensions using the results of many studies, which allow comparison with other studies linking properties using a variety of leaders and operationalization of ethical leaders' behavior. Despite the advantages, the study also has various limitations. One limitation is that the leaders chosen subordinates who participated in the study. This procedure is normally used in the survey of leadership; however, this can lead to positive diagonal limitations of variance.

Future research will be able to use this feature in the study of the role of ethical leadership development over time. Researchers will also investigate the role of specific basic aspects, particularly of good benefits. For this type of research there is a long tradition. Judge and Bono (2000) have found that the specific aspects of the Big Five predict are for ethical leadership less important than the general characteristics. Research could go in finding solutions, under any circumstances whereas individuals can be seen as a more ethically.

CONCLUSION

In conclusion, this study contributes to the field of examining the links between the Big Five personality traits and ethical leadership. Our study suggests an important role for conscientiousness and facilities in this area. It has potential practical implications for screening, identifying leadership qualities as related to the

ethical behavior of leaders. In this way, organizations can select leaders to behave more honestly, share power and clarify roles. The selection and development of leaders who act ethically at work is as important as ethical misconduct, it can be disastrous for reputation of leaders and organization. These measuring instruments are often used in recruitment selection. Current measures of integrity are sensitive to faking (Rieke & Guestello, 1995) and organizations are afraid that applicants will react negatively to integrity tests resulting in a damaged organization reputation (Sackett & and Wanek, 1996). Moreover, integrity tests are not clearly distinguishable from the Big Five dimensions measures (Sackett & Wanek, 1996). Becker (1998) argues that integrity tests actually measure conscientiousness. In any case, our results show the potential importance of understanding the role of leaders' ethics from the role of differences of individuals, especially that conscientiousness, emotional stability advantages in ethical leadership are very important.

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INFLUENCE OF ETHICAL LEADERSHIP ON THE SELECTION OF FLLOWERS

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ABSTRACT

The first and primary duty of HR professionals is finding and bringing people necessary for a successful business. A good part of modern literature on career development shows that there has been a general shift to long-term careers in organizations (long-term organisationally based careers) towards the creation of individual portfolios (individually managed portfolio), or careers that have no limit (boundaryless careers). In this paper a research was done on what impact has leaders ethics on the choice of followers. A total of 150 questionnaires were distributed, we received valid responses from 65 leaders from 43 companies. A number of responses we received in 2015, but because of low turnout we continued the research in 2016. The selected sample is representative, so the results of research are passing valid conclusions. In the analysis of the research results, we used the statistical software package SPSS.

Key words: Career development, leader ethics, qualities of leaders, followers.

INTRODUCTION

According to Weichun et al. (2015) there is a relationship between ethical leadership and many positive reactions of followers. They have learned using the Romanian sample that ethical leadership has an indirect effect on the choice of follower. Although the implicit support manager theory revealed that it supports the procedural law in the selection of employees (Heslin, Latham & Vandewalle, 2005; Heslin & Vandewalle, 2011), and that the implicit theory proved to be a special impact on individuals to understand and relate to the proper moral situations (Chiu, Hong & Dweck, 1997; Dweck, Chiu, & Hong, 1995), the research has not revealed how this moral beliefs significantly affect the selection of ethical leaders in the selection of his followers. The implicit theory of morality seems to be very relevant to the study of ethical leadership because implicit assumptions based on ethical people, and systems should not affect how the election of followers is done. Therefore, we suggest an implicit theory of morality that would help to explain why individuals with different implicit moral beliefs react differently to ethical leaders.

We have chose this study to evaluate the operating results of selected followers and their attitude towards the leaders, because it is an important business performance outcome (Piccolo et al., 2010; Walumbbwa et al., 2011). Second, the ratio of followers is an important type of contextual effect (LePine & Van Dyne, 2001) where ethical leaders attribute to influence the choice of followers (Walumbwa & Schaubroeck, 2009). Behavior refers to voluntary ideas that followers bring, or suggestions, comments and questions, and it has profound implications for their choice (Detert et al.,

2013; Detert & Burris, 2007). In addition, a type of cooperative behavior has ethical implications (Lepine & Van Dyne, 2001).

Morris and Wiley (1996) believe that technical skills are not required for all new jobs, but skills for socialization, as well as effective work without strict supervision are necessary. Although a considerable number of people get a formal qualification at all levels (HMSO, 1999), knowledge and skills are still missing. On the labor market there is still a very small number of people with high IT and scientific qualifications, but too many of those who lack the basic knowledge. It is possible, of course, to recruit people without adequate knowledge and skills, but they need to have an opportunity for the necessary training and development.

Malone (1998) discusses the study in which participated 24 former managers from one branch of the public sector, and the study referred to the detailed biographical interviews conducted to find out how they explain their career advancement. Based on collected data, the participants were divided into three categories: "Refugee", "missionary" and "missionaries disinterested". Kanter (1989), believes that managers can no longer rely on the organization and planning of their career and they must learn to govern themselves and their work, as many professionals do. Kanter (1989) considered that embedding a human resource managers need to build a portfolio of their accomplishments and abilities, develop networks, create himself/herself "name" and must be offered to the market in the relevant industrial sector, not only in the organization where they work.

Handy (1994) uses the term "portfolio career" as a "substitute permanent employment for independence", which involves a number of different tasks performed for different clients. Arthur (1994) speaks of "career without limitation" ("boundary less career"), which involves the movement between the organization and movement within the organization. According to Smithson and Lewis (2000) manifestation of the growing uncertainty in the public, may be associated with the characteristics of those affected by this uncertainty affects. They allege that younger workers accept uncertainty, almost as a norm (Smithson, & Lewis, 2000), while older workers are considered to be in breach of the psychological contract. Adamson (1998) considered that in the interest of the organization is to maintain the illusion of such a career structure in order to conserve the employees who earn high scores (high-performance employees).

If we look at a career as a property of the individual, then the responsibility for career management bears an individual. Every individual should set goals in his career, adopt a strategy that will support them and develop plans to achieve these goals. Arthur and Rousseau, (1996b) believe that individuals need to develop resilience career.

ETHICAL LEADER IN HIS ROLE AS MANAGER OF HUMAN RESOURCES

Human resource management begins and before the reception of employees in the company. The leader on the basis of his/her creative idea, gives the proposal to a manager of human resources and he/she should initiate and implement the planning of the need for new people and to organize a competition, but also to continue to care about the employees after their retirement. By such an operation, he can certainly help preventing in possible conflicts. The introduction of standard processes and procedures in the field of training of new workers and to acquaint them with current cultural values in the company may not contribute significantly increasing their satisfaction, but people can certainly prevent the occurrence of discontent which is in itself important in organizational life. However, in addition, human resources manager can strongly motivate employees, which will contribute to their better efforts at work. This particularly applies to the evaluation of work and remuneration.

Apart from promoting their own people in senior positions, it is possible to bring experts from outside. This allows the arrival of established specialists who bring a new experience to the company. On the other hand, this introduces instability in the existing organizational structure. Depending on whether it

wants to strengthen the existing structure of staff and the introduction of a new way of thinking in the company, human resources manager should suggest to the leader of one way or another to improve new follower. Previously described activity suggest that the role as manager of human resources in a modern company consists of a series responsible tasks related to the assessment of enterprise development and evaluation of new and existing capacity of people to find optimal development. In table 1 one can see that domestic personnel managers assess the performance criteria in the performance of their work, thereby indirectly giving the assessment of the significance of some of their activities.

DESIRABLE CHARACTERISTICS OF FOLLOWERS AND THEIR LEVELS IN THE OPINION OF ETHICAL LEADERS

According to Cowling (1989) detailed analysis of selection in the UK shows that leaders are elected followers primarily based on individual characteristics. According to him typical list of qualities that are applied in the selection, are: energetic, ambitious, intelligent, creative, business-minded, self-confident, communicative, analytical, decisive. An interesting problem is the question of whether the job done by followers at different levels, affect the perception and feeling of the importance of certain characteristics that they should possess. Although between these variables is not a statistically significant correlation, qualitative analysis shows variations and evaluation. Complete results shown under table 1.

Table 1: Ranking the importance of desirable features of followers

| Desirable traits | Level of follower | | | | | |
| | Highest | | Higher medium | | Medium | |
	%	rank	%	rank	%	rank
Energetic	64	1	69	2	62	4
Ambitious	62	2	63	3/4	67	2
Intelligent	54	3	63	3/4	72	1
Creative	44	4	21	8/9	64	3
Business-minded	33	5	85	1	36	8
Self-confident	31	6	45	6/7	41	7
Communicative	28	7	52	5	46	6
Analytical	26	8	45	6/7	49	5
Decisive	23	9	21	8/9	23	10
Penetrating	20	10	18	10	26	9

As it can be seen in Table 1. Ethical leaders considered most desirable for their followers to have the highest rank energetic followed by ambition, intelligence, and creativity. The least important traits, in their opinion, are decisiveness and penetration.

Ethical leaders considered most desirable for their followers at the upper secondary level business orientation, then energetic, than ambition and intelligence. The least important traits, in their opinion, are penetration, creativity and determination. From Table 1 it is clear that ethical leaders considered the most desirable for their mid-level followers to be intelligent, then ambitious, creative, and energetic. The least important traits, in their opinion, are determination and penetration.

UNDESIRABLE CHARACTERISTICS OF FOLLOWERS AND THEIR LEVEL IN THE OPINION OF ETHICAL LEADERS

In addition to the desirable characteristics of a follower in the opinion of ethical leaders, there are those that are undesirable to successfully perform the job of followers. What features are most unsuitable for ethical leaders shows Table 2.

Table 2: Ranking the importance of undesirable traits of followers

Undesirable characteristics	Level of follower					
	Highest		Higher medium		Medium	
	%	rank	%	rank	%	rank
Dishonesty	62	1/2	68	1/2	69	3
Superficiality	62	1/2	65	3	77	1
No professionalism	54	3	68	1/2	62	5
Indecision	49	4	61	4	74	2
No objectivity	38	5/6	49	5	64	4
Hastiness	38	5/6	39	7	41	7
The tendency to gossip	36	7	20	10	23	8
No dependence	18	8/9	46	6	54	6
Uncritical	18	8/9	25	8	13	9/10
Condescension	13	10	16	11	13	9/10
Permissiveness	10	11	22	9	10	11

As it can be seen from Table 2. Ethical leaders considered undesirable for followers to of highest rank dishonesty and superficiality, followed by unprofessionalism, indecision. The least undesirable traits, in their opinion are condescension and permissiveness.

Distribution of replies of ethical leaders, when it comes to features of undesired characteristics of followers is almost identical in terms of the dispersion to the answer of the eleven characteristics of followers, as well as ten desirable qualities of leaders. Ethical leaders differentiate much tougher when it comes to desirable, rather than undesirable traits followers.

FEATURES WHICH CHARACTERIZE ANALYZED FOLLOWERS

One of the questions, which were included in this study, was to ask ethical leaders to list, in order of importance, the five most important qualities that characterize followers not generally, but followers personally. The most important personal characteristic (65%) was given to the questions "a person that can be trusted". The next one was "ability to make decisions in different situations"(64%), followed by" full dedication to work"(59%), "perfect understanding of the work"(48%) and" giving freedom in associates deciding" (41%). Only 20% of the analyzed ethical leaders among the most important characteristics of a follower, said, "I always say what I think" and only 11% "personal charisma." The five most valued features were located between the 2nd and 3rd place, which means that they are equally important.

Table 3: Ranking the importance of personal characteristics of followers and their level

Personal characteristics	Level of follower					
	Highest		Higher medium		Medium	
	%	rank	%	rank	%	rank
The person to whom one can trust	53	1	65	2	76	1
The ability of decision-making in different situations	49	2	71	1	66	3
Ability to motivate associates	45	3/4	39	6/7	25	8
Complete dedication	45	3/4	60	3	71	2
Perfect understanding of the business	39	5/6	48	4	58	4
Giving freedom in associates deciding	39	5/6	47	5	30	7
The ability of finding the best associates	30	7	20	10	19	9
Responding to the challenges of environment	27	8	30	8	53	5/6
Understanding associates	20	9	39	6/7	53	5/6
I always say what they think	12	10	15	24	17	10
Personal charisma	10	11	14	11	10	11

Ethical leaders believe that the highest and medium level of followers should be "a person who can be trusted," while for followers of higher medium level the most important considered is " decision-making ability in different situations" Of the five most important qualities that characterize the followers of the opinion of ethical leaders, there are four at the upper secondary level. While the "ability to motivate associates," the highest level of parts 3rd 4th place with "Complete dedication to work".

CONCLUSION

This study contributes to the study of ethical leadership by giving an overview of how and why ethical leadership remains important in enhancing the performance of followers on the job. This research contributes to the development of the theory of ethical leadership and its development by identifying the effects of research examining the role of a follower. This study provides a complete and constructive picture of the ethical opinion of leaders and followers of their choice. We hope that our study will continue to encourage research on the role of ethical leaders to improve cooperation with the followers. From certain attitudes of ethical leaders, it can be concluded that the category of followers is extremely internally oriented towards companies. This can have negative consequences when one takes into account that this orientation is present in the choice of new followers and neglect in cooperation with the ethical leaders. The application of this research in these ethical leaders should be achieved not only through professional training followers, but also by changing their overall attitude toward active involvement in the current environment. Only then will these followers be able to realize their expressed desire to contribute to the overall growth and development of companies.

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EXAMINATION OF EMPLOYEE SATISFACTION WITH CERTAIN ASPECTS OF INTERNAL COMMUNICATION IN WORK ORGANIZATION

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ABSTRACT

The research problem is related to internal communication in work organization, as one of the sources of information that plays a significant role in the process of ensuring employee satisfaction and increasing their productivity, and thereby achieving business success of the organization itself. The subject of research involves the study of employee satisfaction with certain aspects of internal communication in their work organizations. The aim of the research is related to demonstrating the connection between the quality of internal communication and the amount of information received by employees in that manner, on the one hand, and the level of achieved employee satisfaction, which certainly affects the intensity of productivity in performing work activities. The research was conducted via the Internet, using the Google docs application for creating a questionnaire to be sent to a wide range of potential respondents via e-mail or Gmail account. The sample on which the research was conducted is representative by gender, age, level of education, duration of service, level of realized income and hierarchical position of the respondents. During the research of the defined subject a descriptive method was used in order to present the actual state of the impact of internal communication on employee satisfaction as well as the intensity of their productivity, relying on given empirical facts.

Key words: employee satisfaction, work organization, internal communication, productivity.

INTRODUCTION

In modern, turbulent business environment, high quality internal communication and adequate involvement of employees in a work organization provide a very significant contribution to the increase in their productivity and achieving business success. Internal communication is a process through which employees exchange information, establish connections and relationships, create organizational culture and value. It is a process dominated by people, messages, information, practical experience and appropriateness (Shockley-Zalabak, 1995) and represents the foundation of a modern organization (D'Aprix, 1996). The research problem refers to internal communication in work organization, which plays a significant role in the process of ensuring employee satisfaction and increasing their productivity, and thereby achieving business success of the organization itself. Using internal communication, employees receive important information on the content of work, characteristics of the organization, business environment and many others. This communication will help motivate employees and build mutual trust, provide a way for individuals to express their own emotions, enable the exchange of expectations and ambitions and create conditions both for celebrating current achievements and reminiscing previous successes. According to Berger (2008) internal communication is the key means by which individuals and groups can give meaning to their organizations. The subject of research involves the study of employee satisfaction with certain aspects

of internal communication in their work organizations. The general aim of the research is related to the determination of the most significant elements of internal communication that influence satisfaction, and also includes the determination of the degree of connection between the aforementioned elements. The specific aim of this research implies the establishment of intensity of the impact of each individual aspect of internal communication on employee satisfaction, through obtained results, in order to determine which factors exert the strongest and which the weakest impact on the said subject of research. Upon obtaining the overall results and derived conclusions, authors will indicate the new findings related to the researched subject, propose corrective actions in further researching of this problem and point out the various possibilities of application of obtained results in order to increase the quality of internal communication in work organizations, secure greater employee satisfaction and increase their productivity.

THEORY

By exploring literature, one may encounter a vast number of studies dealing with the problem of communication in work organization as well as those that analyse internal communication and its effect on employee satisfaction. According to a definition by Cutilp (1985), internal communication is such communication that identifies, creates and maintains mutually beneficial relationships between an organization and its employees and thus affects the achievement of organizational success or failure. On the other hand, Bevan & Bailey (1991) state that internal communication is a process within which an organization shares its information builds trust and manages changes. They point out that internal communication plays a very significant role in achieving the competitiveness of an organization since it represents one of the basic factors of motivation and action of employees. Most work activities of employees cannot take place without communication, so it is necessary for them to possess a range of communication skills such as writing e-mail and various documents, telephone and internet conversations, direct communication among employees at the same and different hierarchical levels and intercommunication within a team and during joint decision making (Roganović, Stankov & Marjanski-Lazić). Troy (1988) states that effective internal communication improves morale, supports positive relations between employees and managers, informs employees on internal changes, explains business benefits to employees and increases the level of understanding of organizational goals and culture. Armbrecht (1992) has defined five steps in creating an efficient model of internal communication, namely: communication, information, motivation, integration and identification. Internal communication must be based on the mission, philosophy and strategic objectives of the organization. Given that implementation of the system of internal communication is a very demanding investment in the organization, return of funds and efficiency are very important factors.

Hargie and Tourish (2002) stand out among researchers who have studied the connection between employee satisfaction and internal communication, and state that low quality of internal communication at the same levels within an organization creates a significant sense of dissatisfaction among employees which in turn results in a lower level of their involvement in decision-making processes. The aforementioned leads to the conclusion that insufficient information sharing with employees at the same level creates uncertainty and increases alienation. In addition, Hunt & Ebeling (1983) studied how the level of employee satisfaction can influence the implementation of structural programs of communication in an organization and whether the use of the said programs may cause an increase in productivity levels. Apart from the fact that employee satisfaction is conditioned by the quality of internal communication, the aforementioned authors point out that satisfaction will increase if employees sense that they are valued by the management. King, Lahiff & Hatifield (1998) came to the conclusion that there is a strong and positive relationship between the communication of employees with their managers in the form of reports on work, on the one hand, and employee satisfaction with both communication and work itself, on the other hand. In order to discover the factors that encourage effective internal communication, Asif & Sargeant (2000) identified six key variables: shared vision, job satisfaction, focus on kindness, empowerment, commitment and loyalty. The aforementioned authors presented the existence of new forms of association between internal communication and employee satisfaction, although they did not investigate the existence of a

relationship between the abovementioned variables and the level of employee engagement. Numerous researchers have argued over time that internal communication not only leads to an increase in employee satisfaction but also to the identification of employees with the organization itself (Smidts, Pruyn & Riel, 2002), to the development of trust, support and commitment to the achievement of organizational goals (DeRidder, 2004), as well as to an increase in reputation and credibility, reinvestment of profit and growth in value of shares of a certain company (Holtz, 2004).

METHODS

During the research of the defined subject a descriptive method that tends to describe the empirical facts as closely as possible, was used in order to present the actual state of the impact of internal communication on employee satisfaction as well as the intensity of their productivity, relying on given empirical facts. The method of questioning, i.e. a survey as one of the ways of its implementation, was used due to the fact that it is most commonly used in researches of social reality and also due to numerous advantages that characterize it. Surveys have shown numerous advantages over other methods of collecting experiential materials, among other things, it provides an opportunity to collect data on the motives, interests, attitudes, opinions of respondents as well as factors of action or omission. Surveying can, for a relatively brief period of time, collect a large number of experiential data on the subject of research that may related both to the current and the past state of the appearance but also the predictions of respondents about what will happen in the future. In addition to collecting the required data, applying this method studies the feelings and behavior of respondents in the sample by asking questions with offered answers.

The required data were collected via the Internet, using the Google docs application that provides the ability to easily create a questionnaire, sending the questionnaire to a wide range of potential respondents via e-mail or Gmail account, as well as the possibility of quick access to research results. The research timeframe covers the period from November 1st, 2014 to March 1st, 2015. The research included the application of group surveys and responses were obtained from a large number of respondents who filled out a questionnaire containing 18 questions methodically arranged within two groups of studied variables, in a simple manner, in a pleasant atmosphere, completely anonymously, using a personal computer. The survey was conducted individually, with each participant filling out his/her questionnaire alone, without a time limit. In the first group, there were 6 closed-type questions answered by the respondent by choosing one of several offered options, while the second group contained 12 questions whose answers were formulated in the form of Likert scale, so the respondents had the opportunity to give answers to all questions using a seven-level scale, thus expressing the degree of their own satisfaction with internal communication in work organization.

Using the descriptive method leads to proving a general hypothesis which states that employee satisfaction and their productivity depend on many factors, but primarily on two groups of variables: the first one covers general characteristics of employees and the second one certain aspects of internal communication in work organizations. The studied sample is representative by gender, age, level of education, duration of service, level of realized income and hierarchical position of the respondents. The research included 524 respondents obtained by random selection without repetition, from the basic set of 873 respondents.

FINDINGS AND DISCUSSION

General characteristics of employees

Among all respondents, 52% were women and 48% men belonging to different age categories. The largest percentage of respondents (16%) belonged to the 38-41 year age group, followed by the 26-29 years age group with a share of 14%, after which appeared respondents from the 34-37 years age group with a share of 13%, all of which accounted for 43% of all respondents. Most respondents had

higher education, as many as 70%, with 37% of respondents with completed academic level of studies, 33% with vocational level of studies, while 30% of respondents with completed secondary education.

The largest share of 29% was taken up by respondents reaching 6 to 10 years of service, followed by those who have up to 5 years of service (21%), then 16 to 20 years of service (20%) followed by respondents with 11 to 15 years of service (18%) and a smaller percentage of those who have more than 20 years of service (12%). About 40% of respondents generated income in the range between RSD 20,000 and RSD 30,000.
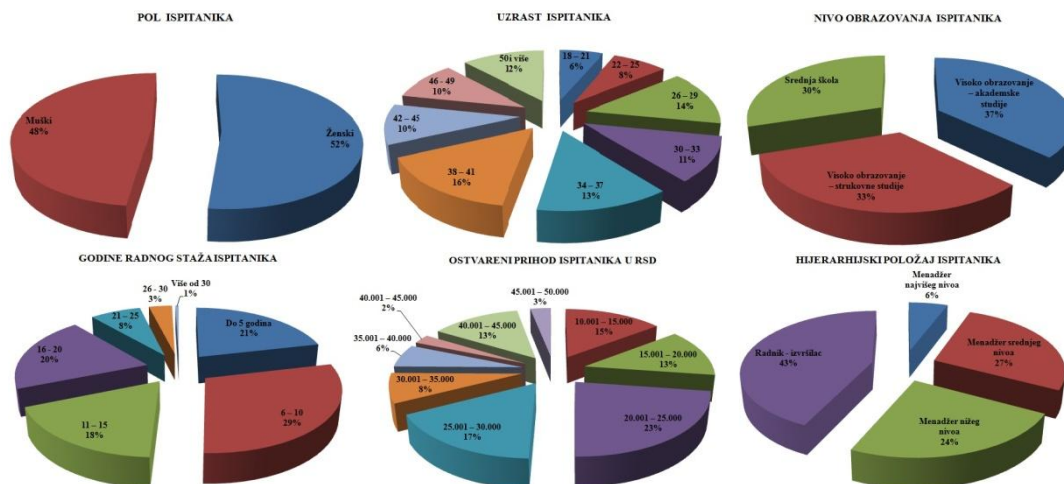
Figure 1: General characteristics of employees
Source: Research conducted by the authors

43% of respondents were employed at executive job positions in their work organizations. Other respondents were at managerial positions with 27% of them in mid-level management, 23% in low-level management and only 6% of respondents being managers of the highest level.

Employee satisfaction with certain aspects of internal communication in work organization

An extremely high percentage of respondents claimed that the managers of their work organizations listened and paid attention to them since as many as 32% of respondents agreed with this statement, 28% agreed partially and 13% agreed strongly. Since they were asked to comment on whether their manager constantly provided guidelines for solving problems at work, respondents expressed completely opposing views due to the fact that an equal percentage of those who demonstrated a certain degree of agreement, i.e. disagreement on this issue were recorded. Even 75% of respondents believed that meetings in their work organizations were very well organized (39% agreed, 23% agreed partially and 13% agreed strongly). Also, a high degree of agreement was recorded in relation to the claim that written directives and reports available to them were very clear and concise, since 29% or respondents expressed partial agreement, 27% agreed and 9% agreed strongly. On the other hand, the majority of respondents (70%) believe that they did not receive information necessary for the performance of their work on time. A high degree of disagreement was also recorded in relation to the issue of adequacy of communication flow in the organization in emergency situations, where 30% of respondents disagreed with that statement, 9% disagreed strongly, and 24% disagreed partially.

When it comes to communication that stimulates the enthusiasm for meeting objectives, the respondents' opinions differed greatly (43% of respondents opted for one of the levels of agreement and 46% of them opted for some type of disagreement with the aforementioned statement while 11% of them declared themselves as neutral). In the case of certain forms of internal communication in work organization, more than 60% of respondents expressed a certain form of agreement with the statement that horizontal communication with other members of their work organizations was free and precise, and more than 70% of respondents completely (48%) or partially (26%) supported the view that informal communication in their work organizations was active and precise. More than 50% of

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respondents agreed (37%) or agreed partially (22%) with the statement that communication in their work organizations was interesting and useful while 30% of them expressed disagreement (17%) or partial disagreement (13%) in the same case.

Figure 2: Employee satisfaction with certain aspects of internal communication
Source: Research conducted by the authors
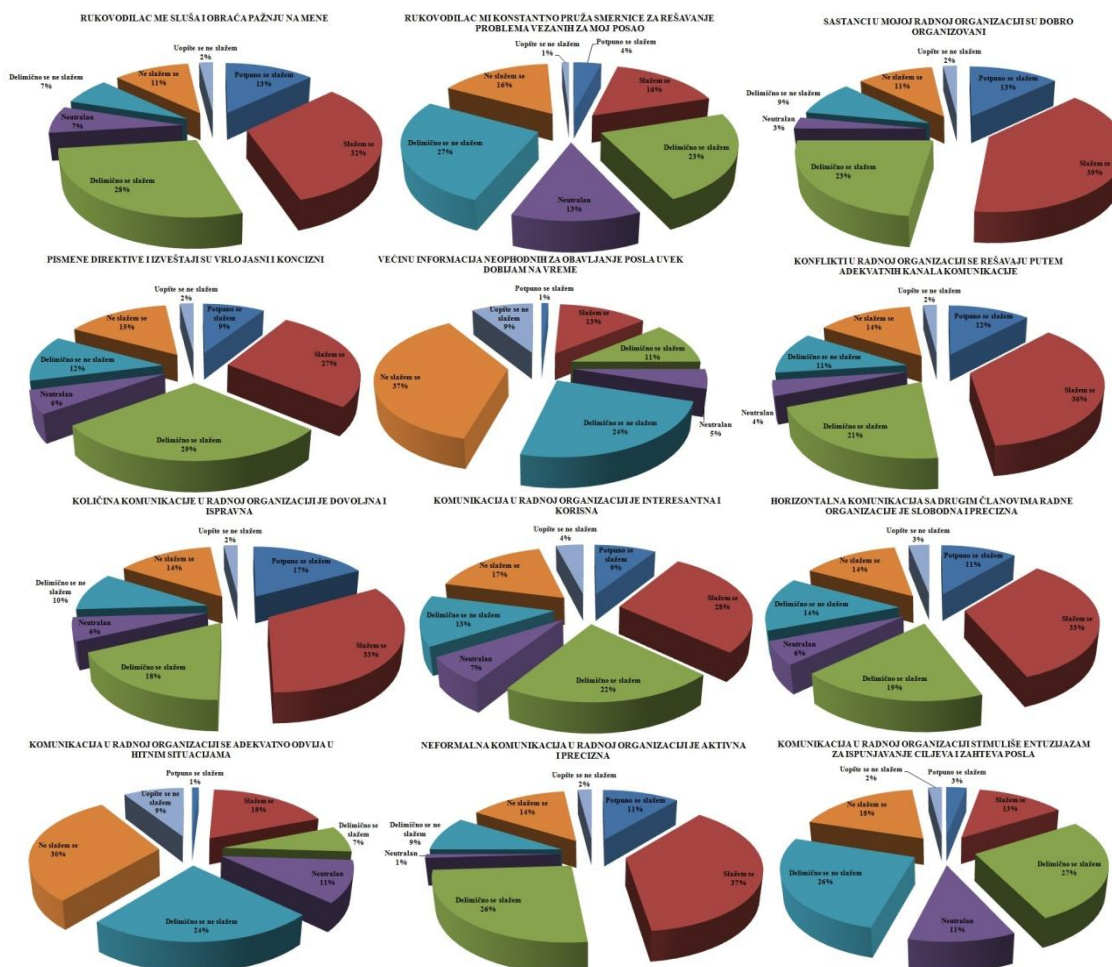
When asked about the amount of communication in work organization, 50% of respondents agreed and strongly agreed that communication is correct and sufficient, followed by 18% of respondents who agreed partially, while 26% of them expressed some form of disagreement with this statement. Nearly 70% of respondents thought that conflicts in their work organizations were addressed via adequate communication channels.

CONCLUSIONS

In recent years, internal communication has stood out as one of the most important tools in the management of an organization. Improving the internal communication system includes diagnosis of the current situation in the organization, identifying faults, points of deadlock and deformation in the process of communicating, with the analysis of major barriers. Improvement of internal communication can be achieved, above all, through changes in the plan of organizational structure, in the direction of combining the existing or establishing new communication channels. By exploring relevant literature, one may encounter a vast number of studies dealing with the relationship between internal communication and employee satisfaction, as well as the impact of quality of internal communication on increasing employee productivity. Researchers generally agree that employee satisfaction will reach a higher level if their relationship with direct managers is characterized by

openness and trust. In addition to the above, employee satisfaction is also determined by the quantity and quality of received information at different hierarchical levels in the organization. Employees will certainly be dissatisfied if they obtain insufficient information that are important to effective performance of work or if certain criteria regarding the quality of available information are not met. On the other hand, too much unnecessary information may lead to confusion among employees and reduction of their motivation for the performance of work and increase of work productivity. Not only does a satisfied employee work more and better, but good communication saves time that may be used for the performance of specific work activities, which all together leads to increases in productivity (Opitz, 2003). Authors concluded that there is a high degree of dependence among certain elements of internal communication in work organization and employee satisfaction, as well as that the aforementioned elements may cause an increase or decrease in the intensity of work productivity and affect the achievement of business success of a work organization. Good internal communication may improve organizational performance and management performance, improve decision-making, increase productivity and employee commitment, contribute to the establishment of trust among employees and affect their satisfaction.

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THE FORECAST AND ANALYSIS OF STUDENTS' SUCCESS ON THE COURSE "COMPUTER APPLICATION"

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ABSTRACT

As a part of its business policy Technical College of Applied Studies in Kragujevac carries out an analysis to assess the success of students at the end of each school year on all study programs. This paper is based on such an analysis for the course Computer Application. The curriculum of the course Computer Application covers practical application of what is taught at high schools in the field of informatics. The process of conducting the analysis was alleviated, since the documents about students' previous success in education were obtained at enrolment at the College. The success of students at the end of the first school year depends on the methods of accredited educational programs, as well as activities of students. The purpose of the research is to check the modernity of teaching methods. The analysis was conducted thanks to detailed supervision of students' activities, test results and practical exercises.

Key words: forecast, analysis, curriculums, modernity.

INTRODUCTION

One of definitions of statistics says that statistics is a collection of methods with the specific procedure for quantitative description, analysis and reasoning. It belongs to the general scientific methodology, it is a quantitative research method for mass phenomena, by its nature it is an inductive scientific method, it contributes to checking of theoretical stances, raises the exactness of research by applying mathematical methods, completes quantitative analysis and does not exclude deduction nor other logical and methodological procedures. The advantages of statistical method are: it is neutral toward reality, strict in forms and procedures, suitable for mass testing, diverse in forms and procedures, it provides accuracy of data when mathematical expressions are applied and it is precise in describing phenomena and their manifestations. Its disadvantages are: it is not independent since it relies on the scientific discipline to which it is applied, it cannot be applied to all areas and phenomena, its cognitive power is limited, obtained results do not speak of individuality of phenomena and it does not reveal nor explain all the complexity of how a phenomenon starts, changes and develops. Since it is difficult to conduct a statistical survey on an entire set, a sample is randomly chosen from the set and the research is then completed. The analysis of units selected from the set as the sample gives the parameters that are used for the assessment of unknown characteristics of the set. The process of statistical evaluation is the process of statistical inductive reasoning: the results of the analysis of the sample are attributed to the statistical set. Nowadays, the statistical evaluation of a set based on a

sample has become the dominant method of statistical analysis. Various methods of forming the sample are intended to make the sample representative of the set from which it is extracted, and for the sample to be representative it must faithfully reflect the characteristics of the set and be large enough. The sample size depends on the size of the set, the variability of characteristics and desired accuracy of results of statistical analysis.

BASIC NOTES AND DEFINITON OF REQUEST

Upon accreditation of study programs at the Technical College of Applied Studies in Kragujevac, it was agreed that the minimum aggregate number of points that students have to acquire for attending lectures, on preliminary tests, assigned papers or lab excersises cannot be less than 30. Also, there is an agreement that this number may be higher, depending on the plan and program for each subject. The curriculum for the course Computer Application specifies that the maximum aggregate number of points, which are prerequisite for the final examination and can be achieved before the exam, is 45 (for students who achieve the maximum number of points).

Various questions were raised regarding criteria, seriousness and appropriateness of plans and programs since the experience with previous accreditation periods showed that the number of points students gained before final exam was increasing from one school year to another, approaching the maximum of 45 points (which could be explained with higher level of knowledge), which was not reflected on the examination passing rates nor on average grade. The request for analysis was set in the following way – on the basis of the sample the analysis should examine whether the aggregate number of points on pre-exam responibilities for the academic year 2015/2016 is significantly different from the same size for the school year 2014/2015. The set refers the number of students at four study programs (80 + 80 + 40 + 40 = 240). The sample refers to the study program Informatics with 80 enrolled students. Students at all four study programs take the subject Computer Application. By fulfilling the assumption of statistical analysis that all the data are relatively homogenous, integrated, relatively differentiated and large enough, we consider the chosen sample to be representative (Šolak, 2001).

BASIC DATA, CALCULATIONS AND THE ANALYSIS OF THE OBTAINED DATA

Based on precise records, there are data on all forms of pre-exam requirements for the subject Computer Application, and on the aggregate number of points required for the final exam. Table 1 gives the data about the aggregate number of points on the pre-exam requirements for 69 active students (from 80 enrolled students) on study program Informatics in the school year 2015/2016, and Table 2 shows the number of intervals, their length, and necessary data for calculating average rates, measures of variation and measures of form distribution. Figure 1 shows a histogram of frequencies.

Table 1: Aggregate number of points on pre-exam requirements

40	37,6	36	33	31	31,1	35	37	30	31,5	34,3	35
35,4	37	37,3	42,9	37	30	35,3	43	35,1	41	34,6	37,4
31,2	39	34	41,8	38,8	33,6	44,6	33	32,4	32	37,3	33
41,1	42	33	44,8	31	32	40,3	37,4	44,8	35	36	36,2
32	38,4	38	32,2	33	32,6	38,6	31,1	33,9	42,1	41,5	38,9
40,9	31	35,9	35,2	37,8	37	40	35	35,8			

The values of calculated parameters for the 2015/2016 school year are:

    36,21 – arithmetic mean
    14,76 – variance
    3,84 – standard deviation
    0,12 – coefficient of asymmetry (skewness)
    2,13 – coefficient of convexness (kurtosis)

Due to the lack of measures of variation, which describe the variation in values, without showing the direction of variation regarding arithmetic mean, nor the degree of concentration of values around the arithmetic mean, that is, the form of distribution, there are two directions of form analysis – symmetry testing and testing of the amount of distribution. Since skewness is > 0, we have a positive asymmetric distribution, where the mean is greater than the median and mode. However, it is said that the distribution is moderately symmetrical if the value of skewness is in the range of -0.5 to +0.5, thus for the example (0.12) it can be said that it has a moderate symmetrical distribution.

Table 2: Multiple intervals and the data for calculating the parameters of the sample

k=7; i=2,1		f	X	kumf	Xf	X²f	X-μ	$(X-μ)^2f$	$(X-μ)^4f$
30	32	12	31	12	372	11532	-5,21	-1698,607	8852,453
32,1	34,1	11	33,1	23	364,1	12051,71	-3,11	-331,392	1031,156
34,2	36,2	15	35,2	38	528	18585,6	-1,01	-15,528	15,708
36,3	38,3	11	37,3	49	410,3	15304,19	1,09	14,183	15,437
38,4	40,4	8	39,4	57	315,2	12418,88	3,19	259,305	826,769
40,5	42,5	7	41,5	64	290,5	12055,75	5,29	1035,315	5475,164
42,6	44,8	5	43,7	69	218,5	9548,45	7,49	2099,608	15722,713
*	*	69	*	*	2498,6	91496,58	*	1362,883	31939,400
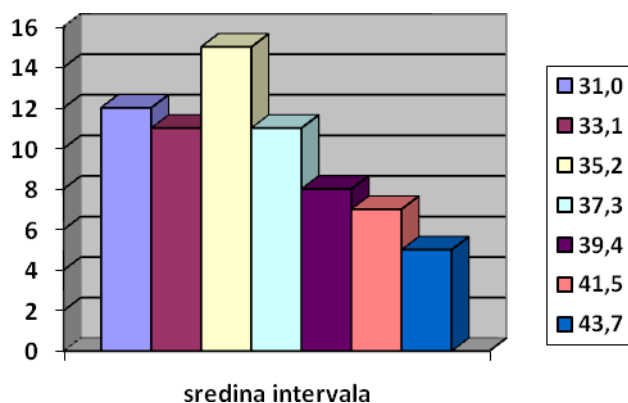
Picture: 1 Histogram of frequencies

Since homogeneity of data can be estimated by shape of the top of the distribution curve, flattened distribution (2.13) in the given case has a lower concentration of data around the arithmetic mean than a normal distribution. Further analysis refers to setting the zero and alternative hypotheses. The choice of a test depends on the objectives of the research, the research plan, the statistical model, the number and nature of variables, sample size etc. The testing begins with formulating the null hypothesis. Then, it continues through a series of successive stages of testing and ends with the acceptance or rejection of the null hypothesis. The decision is made with a risk to reject the correct hypothesis (the most common case) or to accept a false hypothesis (less common). Testing of hypotheses is an area of statistical analysis which is widely used because it allows decision-making on issues that contain ambiguity. It allows that conclusions can be drawn about the entire set (hypothesis is accepted or rejected) on the basis of calculated parameters of the sample

Setting the zero and alternative hypothesis relates to verifying the hypothesis that the number of points on the pre-exam requirements for the academic year 2015/2016 statistically significantly differs from the number of points on the pre-exam requirements for the academic year 2014/2015. Therefore, this claim is set as an alternative hypothesis, which aims to challenge the validity of the null hypothesis. Alternative hypotheses can be put in two other ways as a hypothesis that the number of points on the pre-exam requirements for the academic year 2015/2016 is significantly higher or as a hypothesis that the number of points on the pre-exam requirements for the academic year 2014/2015 is significantly lower.

The testing of hypotheses is done with a certain statistical expression, which is called the test statistics. Different test statistics are used depending on the statistical methodology and theory of distribution. The z-test was applied for reaching conclusions in this research, that is, conclusions were made on the basis of standardized normal distribution, because the sample was large and distribution normal. A two-way test was performed, based on the assumption that the data are arranged on both sides of the mean. The test gives the opportunity to conclude whether, e.g. the difference between two arithmetic means is important regardless of whether the difference is + or. The test provides an answer to the question what is the probability for this difference to occur randomly. The test has two critical values (lower and upper threshold of the test), the areas of rejecting the null hypothesis can be found on both left and right sides.

One-way test was applied on two other ways of setting up alternative hypothesis. It is called a direct test, with one critical value of the test. These types of test are carried out on request in mentioned researches and are not presented in this paper.

The testing of hypothesis is done with a certain probability. By comparing calculated and theoretical test statistics obtained on the basis of some theoretical distribution, a zero or alternative hypothesis is adopted. If the null hypothesis is adopted, then it can be argued with certain probability that the value of the parameter relating to the data for 2015/2016 will be found within certain limits of the theoretical value. The limit of theoretical value, determined on the basis of probability, is called the lower and upper threshold of significance of the test, also called critical value of the test or just test threshold. The probability of testing this hypothesis is the probability of adopting the null hypothesis. Opposing probability is called the probability of level of significance of the test or the risk of error.

The setting of hypotheses and statistical reasoning

Since the analysis is done by comparing the parameters for 2015/16 with the parameters for 2014/2015, zero and alternative hypotheses are set as follows:

$$\mu_0 = 33,11$$
$$H_0: \mu = \mu_0$$
$$H_1: \mu \neq \mu_0$$

Let us start with the known fact that every statistical hypotheses can be true and false; that in the verification of static hypothesis, the hypothesis can be adopted and discarded; that two correct decisions can be made, that the null hypothesis is correct and adopted and that the alternative hypothesis is true and adopted; that incorrect decisions are that the null hypothesis is true and rejected and the alternative hypothesis is true and accepted.

The decision to reject the null hypothesis is a type one error (α). Likelihood for this to happen is called the probability of significance of the test. It is chosen arbitrarily, but it is common to take the value of $\alpha = 0.05$ (then the risk to reject the hypothesis that is true is 5 in 100 cases) and $\alpha = 0.01$ (then the risk to reject the hypothesis that is true is 1 in 100 cases).

The decision to accept correct alternative hypothesis is a type two error (β). The decision to reject incorrect hypothesis is the strength (power) of the test. It is represented by the probability of rejecting the null hypothesis in the test when it is wrong. The power of the test increases with the size of the sample and the level of measurement. It is the difference between 1 and probability of error of other type.

The larger the power of the test, the better the test. The probability of rejecting the false hypothesis is γ. The relationship of likelyhood is:

$$\beta + \gamma = 1$$
$$\gamma = 1 - \beta$$

The probability of test's strength is larger if the probability of error of other kind is decreased. The probability of accepting the really true hypothesis is:

$$p(-Z\alpha/2 < Z < Z\alpha/2) = 2F(Z) - 1 = 1 - \alpha$$

When testing the significance of differences between assumed and actual values of the parameters, we start from two assumptions the difference is formed under the influence of random variations, it is permissible to some extent and is measured with a standard error of estimation (random variations are determined with probability, and it is also the likelihood of the adoption of the hypothesis); the difference arises because the null hypothesis is incorrect, the difference that exceeds a certain limit is called significant, ie. highly significant (Šošić, 2004).

Statistical reasoning is carried out as follows:
1. the arithmetical mean and variance of the sample are determined

    − the mean of the sample is: $\overline{X} = \dfrac{\sum Xf}{\sum f} = 36,21$

    − the variance of the sample is: $\delta^2 = \dfrac{\sum\limits_{i=1}^{n} Xf}{\sum f} - \overline{X}^2 = 14,76$

    Standard deviation is: $\delta = \sqrt{\delta^2} = 3,84$

2. The standard error of the mean is determined: $\sigma_{\overline{x}} = \dfrac{\sigma}{\sqrt{n-1}} = 0.47$

3. The confidence interval is determined:
    − the confidence interval=estimation ±(confidence factor) (standard error of estimation)
    − confidence factor is $Z_{\alpha/2}$

The most common values for the probability of the confidence interval, that is, reliability coefficient (or coefficient of trust) 1-α is 0.95, that is, 1-α = 0.95 or 95% (the value is in the range μ ± 2σ) and the level of significance of the test (or the risk of error, or risk ratio) α is 0.05, that is, α = 0.05, or 5% (value is outside the range μ ± 2σ).

$$2F(Z) - 1 = 0,95$$
$$F(Z) = 1,95/2 = 0,9750$$
$$Z\alpha/2 = 1,96$$

The probability of confidence interval is: $F(Z_2)-F(Z_1)$ and is given in advance. Determining the values of Z_1 and Z_2 is performed in the function α/2. Therefore, $Z_1=Z(\alpha/2)$ and $Z_2=Z(1-\alpha/2)$. Thus, the probability of confidence interval is:

$$P\left(\left|\overline{X} - \mu\right| \le Z \cdot \frac{\sigma}{\sqrt{n-1}}\right) = P\left(\overline{X} - Z(\alpha/2) \cdot \frac{\sigma}{\sqrt{n-1}} \le \mu \le \overline{X} + Z(1-\alpha/2) \cdot \frac{\sigma}{\sqrt{n-1}}\right) = 1 - \alpha,$$

where $Z_{\alpha/2} \cdot \dfrac{\sigma}{\sqrt{n-1}} = Z_{\alpha/2}\, \sigma_{\overline{X}}$ represents the accuracy of estimation.

Since Z(α/2) and Z(1-α/2) are symmetrical around zero, as the middle of their absolute values, they are equal, that is, $Z(\alpha/2)| = |Z(1-\alpha/2)| = Z_{\alpha/2}$. Since the value Z(α/2) is always negative, and Z(1-α/2) is always positive, the following equation is obtained: $Z(\alpha/2) = -Z_{\alpha/2}$ i $Z(1-\alpha/2) = Z_{\alpha/2}$

$$|Z| = \left|\frac{36,21 - 33,11}{3,84}\right| = 0,8$$

Since $|Z| \leq Z\alpha/2$, H_0 hypothesis is accepted, so there is no significant difference in the aggregate number of points on the pre-exam requirements for the school years 2014/2015 and 2015/2016. Finally, the confidence interval is both left and the right (above and below) from the middle of the sample:

$$(\overline{X} - Z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n-1}} < \mu < \overline{X} + Z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n-1}}) = 36,21 - 1,96 \cdot 0,47 < \mu < 36,21 + 1,96 \cdot 0,47 =$$

$$35,29 < \mu < 37,13$$

CONCLUSION

It is almost impossible to reach any conclusion in any research without statistics. Statistics is the science of collecting, analysis, interpretation or explanation, and presentation of data. It has wide application in the field of research, thus we can say that all the data for analysis and techniques used for the interpretation in researches are part of statistic. Therefore, the use of descriptive statistics is essential for drawing conclusions from each set of data. Statistics is used in a wide range within exploring, analysis, control and decision-making, and without it it is difficult to interpret the results of a research. If the methods of statistical analysis are not used in the right way, its methods will be useless and valuable time and resources will be lost. It will not be possible to detect an error in the analysis and the reason for its occurrence, it will not be possible to predict anything with certainty, and responsible persons will not approve the implementation of any analysis if statistics with all its methods and techniques has not proved justification and purpose. Statistics is essential in the evaluation, without it is impossible to make correct conclusions and it is very difficult to carry out control and comparison of planned with the achieved results.

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CONDITIONS FOR CAUSING CONFLICTS IN THE ORGANIZATION

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ABSTRACT

Conflicts are a widespread social phenomenon, which occurs at all levels and in all spheres of social life. For managers, it is important to know the nature, sources and consequences of conflict, and then ways to control them, channeled and resolved. This knowledge is indispensable for leading people in organizations, because the level of conflict is critical factor in organizational efficiency and therefore is an important task for managers to optimize the level of conflict in the organization. The paper presents the results of conflicts in the organization of production of JSC "Engineering" in Kula. The survey instrument was a questionnaire based on the Likert scale aim of the study is set at three levels: 1. Establish the conditions that create conflict situation in the organization, 2. How employees perceive a conflict situation, 3. Ways in which the conflict is resolved in the situation.

Key words: conflict, organization, organizational behavior, organizational culture.

INTRODUCTION

Conflicts are always take place on two levels at the level of action and psycho social level. It is important to know both these levels, in order to understand in what way and to what extent, influence each other, but at the same time are kept separate their performance. In many cases the psycho-social level determines the effect of the conflict. The more a conflict escalates, it has greater significance and importance of psycho-social level. Therefore, it is very important to understand and recognize the psycho-social level to the conflict to fully understand. Being aware of the psycho-social level of the conflict, and thus the hidden dynamics of the conflict means that make visible the real reason for the conflict, and to allow that the real reason for the conflict to overcome.

Conflicts are inevitable part of our everyday life, which is seen more as a nuisance and distortions in human relations but as an opportunity and a chance to refer to changes for the better. In organizations of various types, employees who "do not make waves" are often more popular among colleagues, easier to survive and retain its position. In addition to the lay experience conflict as a negative experience and scientific approach to this problem a long time reflected this negative aspect of describing it as something to be avoided at all costs, to be later directed towards emphasizing its creative potential as the basis of social and personal growth and development.

Psychologists talk about intra individual level at which cognitive conflicts lead to new insights and personal knowledge and interpersonal level where conflicts between individuals or lead to an improvement or a cooling in relations. Sociologists talk about the conflicts between different social groups and institutions as a prerequisite for social change and historical milestones that form the

antithesis to social stagnation. The most common type of conflict we face in the workplace is conflict between individuals. Since conflicts are present in every society and in all times define their nature and the way of dealing with them and overcoming can be culturally and historically conditioned. Author of numerous manuals for training experts in various fields, Mr. Fred Fisher pointed out that the conflict is rarely a good question and evil, but more often a question of recognizing and respecting differences. In other words, "the art of democracy is conflict in action." (Fisher, et al.). Access to this problem leads to numerous definitions of conflict situations demonstrate medley approach to this problem, but the key elements are common to all definitions:

−   "Conflict is the overall dynamics of the growth and development of living organisms and groups. He appears when confronting ideas, interests or behavior of two or more individuals or groups (Fisher, et al., 2000),

−   „The conflict is the state of antagonism with the conflicting needs and desires (included at least two parties that want to win) (Krkeljić, Slobig, 2001).

−   The conflict is a process that takes place between two or more individuals (or groups, organizations, state) when the differences that are important to come to the surface making it impossible to continue living in harmony. In doing so, the author states that differences are important ones that threaten the successful satisfaction of basic human needs and that are caused by our human nature, of different modes of reality perception, limited resources, different ideas and points of view, different goals, values or interests (Hammerich & Frydensberg, 2006:38)

The simplest definition that we found in the literature shows that conflicts are misunderstandings between human beings. This definition implies that conflicts are part of life and every change with the possibility of transformation into an energy source which gives the possibility to be managed in a constructive manner. It is this creative potential conflict is what we want to emphasize this approach as part of resolving the conflict (Mandić, 2003).

Finally, it is important to remember that there is no universal definition of such complex concepts. Much more important than a definition is the understanding of the nature of the conflict. As we have pointed out earlier, the nature of conflict is twofold. While on the one hand, they can lead to violence and other undesirable consequences, on the other hand, they can also be a chance to change the current situation for the better and the establishment of a new, more productive relationships in the community where you work, live or where the accident location.

RESEARCH RESULTS

Questions and answers

1. How do you assess the working atmosphere in your organization?

Based on the results, we can conclude that one-third of respondents believe that the atmosphere is very tense in the organization and work tasks are not clear, which for this group of respondents represents significant number. Conflicts can be very easily occur because of discontent and tension have a major impact on the dysfunctional conflict.

2. What are your relations with your colleagues?

The distribution of answers to this question indicates that the relations among colleagues are very bad because it is only 16.67% said that even after hours hanging out with colleagues. If we take into account the fact that the majority of respondents employed in this work organization a long period, 43.33% over 25 years, and 26.67% between 20 and 25 years, we can conclude that relations with colleagues are very bad, when after so many years together not befriended, 33.33% said that relationships are not as good as might indicate that they are ready to see a change, but 50% of those who stated that they are not interested in private colleagues therefore make it clear they do not care to change atmosphere. In this group of respondents are those who are very easily prepared to enter into

conflict with other colleagues. The management of the organization should gradually affects the employees, perhaps by giving employees divided into teams

3. What are your relations with the immediate supervisor?

From the results we can conclude that the superior generally willing to listen to ideas and to jointly discuss them, and that relations with colleagues very bad. Workers are largely satisfied with the leadership, as evidenced by the results. Only 20% of respondents said that they cooperate with superiors on the principle of command - a report, a satisfactory number because we need to take into account the fact that there are employees that this relationship much more convenient. We can conclude that employees are satisfied with the leadership, and to trust that these should use to improve relationships among colleagues.

4. How do you observe the conflict?

Most of the staff believes that the conflict is a necessary and constructive from which we can conclude that it will not hesitate to enter into conflict situation, so that managers should be informed of these results, and if there is a conflict to identify and to manage it so that be functional. Respondents declared that in their opinion, others have the same stance on the conflict as well as themselves.

5. At what levels it appears the conflict in the organization?

Based on the results we can conclude that 46.66% of conflicts in the organization occurs between employees and superiors. We can conclude that these conflicts that occur on this route largely constructive, so they should not be suppressed. Conflicts that arise among employees to be detected, determine the causes and the type of conflict on the basis of the results obtained should be to find the right methods for solving and managing them.

6. Which of the following behaviors suits your personal behavior in conflict situations?

From the data obtained, we can conclude that employees are reluctant to participate in conflict situations, which tells us that conflict is considered dysfunctional. A third of respondents declared themselves to actively participate in the discussion on the resolution of the conflict. These are employees who see the conflict as a functional and when you need just the right way to manage, because they are trying to get away from the conflict a positive effect. These are the most likely conflicts between employees and managers, because the results show that the frequent conflicts between them, but despite that employees are more satisfied than their colleagues leadership.

Employees who always try to avoid conflict do not see any profit from it, or the management of such people should influence because when to engage in discussion and shared their opinions can make a lot of constructive solutions than those who easily enter into discussions and conflicts.

7. Does in the reality resolve conflict in your organization?

In order to solve the problems in the organization exclusively related to productivity, 56.67% of them, which is not good because it carried such opinion they can not be satisfied with their position, and not the position of his colleagues. Based on this we can conclude that the communications in the organization is weak because it does not reach all information to employees. Productivity, and hence the revenue of the purpose for which organizations exist so that employees who do not insist on some questions and not talk openly about the problem, solve only those related to productivity because the administration has imposed them. The management of this organization would need more to get closer to employees to gain confidence, to see that they are important and necessary organization, and they will start to have a different attitude towards everything that the organization concerned.

8. For conflict resolution and the creation of a healthy work atmosphere you're ready:

The obtained data shows that the respondents are willing to work to resolve the problem. We conclude that the majority of respondents believe that the only organization to solve problems related to productivity, more than a third of them are willing to work to solve problems during working hours, and almost half is willing to set aside their free time in order to resolve conflicts and create a better working atmosphere.

If we consider the fact that 70% of respondents for more than 25 years employed in this organization, we can conclude that their willingness to help may very well be used to solve both conflicts, and other problems related to this organization, because so much time spent in she realized that her virtues and flaws and can share their experience and significantly contribute to a better situation in the organization. In this case, the management plays an important role because it needs to channel this potential and to properly manage it.

9.Order by relevance aspects of a normal working day

Based on these results we can conclude that the staff of this organization the most important work, followed by interpersonal relationships which agrees with previously obtained results that their relations with the relevant counterparts but only during business hours, followed by salaries and other cash fees that might be expected because the first employee must meet basic needs, and it can not do without financial support, in the fourth place they put the working conditions of a man who is not sure if the material does not have other sources of income may suffer worse working conditions, on the other hand, if these conditions are met it is very important that the working conditions are good otherwise can cause dysfunctional conflicts both between employees themselves, because the voltage is higher and between employees and management.

If all the previous conditions are met, it is clear that there is a need to succeed at work, as much as is essential for the success of the organization is so important for the employees because they are part of it especially in this case when employees are working here for many years and when they age year does not provide easy finding another job security to them means a lot and will want to give their contribution and success.

At seventh place is interesting work, indicating the willingness and dedication of people to work relatively tasks, all in order to achieve the objective. Eighth place belongs to actively participate in decision-making as well as for solving conflicts, we came to the fact that employees do not want to participate in things that are not direct links to their work, so that managers should find a way to involve them in decision-making and dispute how conflicts and disputes and other problems that the organization has. Not ninth they put their free time, a tenth control. Control is not friendly to any person, a lot of people worse perform their duties if they feel that they believed would work much better if you set up a system of self - control on what would this organization could sake.

10.Satisfaction ie. job dissatisfaction of conditions in organization

The obtained results show that 83.33% of the respondents said they are satisfied with the condition in organization, non-existent ones who are very or completely satisfied, a small number of those who profess to be unhappy, which tells us that organized government satisfaction factors prevailing in it and have an impact on employees. If you compare these results with those that we heard while we interrogators can conclude that the employees did not want to criticize the leadership, and considered that the midfield does not endanger anyone.

CONCLUSION

The results of this can be interpreted in accordance with the hypothesis from which we have started the study, which is that conflicts do not exist in the organization. The hypothesis that we set is confirmed. The obtained reziltats may conclude that the general opinion of respondents regarding the conflict in the organization is positive. Most respondents see the conflict as a functional and necessary. They are ready to solve conflicts that arise, although this will only work if they have to. These results meet if we take into account the fact that the subjects for many years employed in this organization that began to work in the system when the conflict was not discussed, and when there was a belief that the conflict can only be dysfunctional. They have a broader view and believe that it can be constructive. Still there may be concern entering the conflict or so managers should try to approach employees and draw from him only good things so they become accustomed to this attitude towards the conflict.

The proposal for solving this problem would be to implement the necessary training in the organization, not only in the our study, but also in other organizations on the subject of the conflict and its resolution. Workers and assumed should be familiar with the techniques of conflict resolution and in this way to get acquainted with the conflicts that they do not pose a threat to the organization, in contrast to the conflict as a phenomenon if proper approaches to solving it can be very productive and to help better work organizations as well as to help improve interpersonal relations in the organization.

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ORGANIZATIONAL COMMITMENT AND FINANCIAL PERFORMANCE

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ABSTRACT

The research presented in this paper examines the impact of organizational commitment dimensions on items and dimension of financial performance. Research was conducted through a survey and N = 400 responses were collected from middle level managers in 129 companies in Serbia. Research results have confirmed a statistically significant correlation between the dimensions of organizational commitment and items and dimension of financial performance, as well as statistically significant predictive effects among them. In the enterprises in Serbia, the most frequent dimension of organizational commitment is Organization involvement - OCM2, and the least frequent dimension is Organizational loyalty OCM3. The assessment of financial performance indicates the presence of all of the observed items on an equal level, with the exception of Employee salaries - FP7 that achieve the lowest value. Analysis of the correlation between the observed dimensions and items indicates the present state of enterprises in the economy of Serbia and the obstacles that management in these organizations is faced with.

Key words: organizational commitment, financial performance, Serbia.

INTRODUCTION

Organizational commitment is defined as relationship of the organization members towards the organization, which is manifested in the form of identification with the organization and its goals (Meyer & Herscovitch, 2011), and commitment itself is realized through the acceptance of the organizational values and goals and the willingness of individuals to invest some effort in order to achieve the organization success (Mayer & Schoorman, 1992). Basic dimensions of organizational commitment are: identification, loyalty and involvement (Cook and Wall, 1980). The success of the organization can be considered through different aspects. In this study, the success of an organization is observed by monitoring financial performance. Financial performance in the organization can be defined as a measure of changes in the organizational finances that occurs as a result of the operation of the management and employees of the organization (Hatane 2005).

According to the study given in references (Benkhoff, 1997), organizational commitment has a significant impact on the business performance of the company, and therefore on the financial aspects of success achieved, and commitment itself is associated with the internal (organizational and supervisory) and external (user, customer) objective measures of business performance (Siders et al 2001). According to (Balfour & Wechsler, 1991), a higher level of performance and productivity is the

result of commitment to the organization, and this commitment is realized through the pride of belonging to the organization, and faith in organizational goals and values. Committed employees feel a higher level of belonging to the organization and a greater desire to remain members of the organization, and therefore put organizational interests ahead of their own. The perception of working conditions affects the well-being of employees (Harter et al, 2010). However, employee loyalty, employee retention, revenue, sales and profits are essential for the success of the company. As it is known that these outcomes are correlated with attitude and perception of employee working conditions, it is possible to speak of a significant impact that employee perception of work has on the future organizational outcomes such as retention employee, costumer loyalty and financial performances (Harter et al, 2010).

The aim of the research presented in this paper is to define and determine the direction and intensity of the impact of organizational commitment on financial indicators in enterprises in Serbia. Practical significance of the research is able to provide recommendations and guidance to managers on how it is possible to influence the organizational commitment of the company to improve financial performance.

THEORY AND HYPOTHESES

According to (Mowday et al., 1979) organizational commitment is interpreted as an individual's willingness to - in a process of build a relationships with the organization, give up something in favor of the welfare of the organization. Organizational commitment can also be seen as the degree to which employees feel commitment to the organization and its members, with overall job satisfaction (Janićijević, 2008).

Organizational commitment is defined in various dimensions depending on the model through which it is interpreted. Literature provides several models that define the dimensions of organizational commitment (Cook, Wall, 1980; Allen, Meyer, 1990; Mowday et al., 1979). For the purposes of this research, organizational commitment is viewed according to the model given in the references Cook and Wall (1980).

This model predicts the following dimensions:
– Organizational identification (refers to the employee's sense of pride that comes from belonging to organization).
– Organizational involvement (it is reflected as an additional efforts that comes from in the desire and willingness of the employee to devote himself to the goals of the organization).
– Organizational loyalty (includes the obligation that employee sense when it comes to willingness to remain in the organization and even if the other organization offered him more finances).

The paper set two hypotheses:

H1: There are statistically significant correlations between the dimensions of organizational commitment and items and dimension of financial performance.
H2: There is a statistically significant predictive effect of organizational commitment dimensions on items and dimensions of financial performance.

METHOD

Survey instruments (measures)

Organizational commitment. Organizational commitment in this paper is measured by the instrument given in reference (Cook and Wall, 1980), which follows three dimensions of organizational

commitment throughout 9 items. Dimensions are as follows: Organizational Identification, Organizational involvement and Organizational loyalty. The respondents give their answers via a five-point Likert scale.

Financial Performance

Financial performances are selected on the based on references (Tan & Litschert, 1994; Wang, Tsui, Zhang, & Ma, 2003; Wang, Tsui, & Xin, 2011), including the following item: profitability, sales growth, asset growth, market share, and competitive status in the firm's industry. The list is complemented by the two additional items: productivity and salaries. In this way seven financial performance items are defined and followed in this study. All seven performances are evaluated based on five-point Likert scales. This was modeled on the references (Tan and Litschert, 1994; Wang et al., 2003; Wang et al., 2011). This paper presents financial performance as single dimension that consists of the seven listed items.

Participants and data collection

For respondents were selected middle-level managers in companies in Serbia. Respondents completed questionnaires, and the research was supported by an interview. A total of N = 400 middle level managers from 129 companies completed the questionnaire.

RESULTS

Table 1 gives an overview of the dimensions of organizational commitment, financial performance items and dimensions of financial performance, according to the following categories: names of dimensions and items, abbreviations for each dimension, mean, standard deviation and Cronbach's alpha for each dimension. Cronbach's alpha values vary in the range of $\alpha = \alpha = 0.739$ to 0.903.

Table 1: Descriptive statistics for all dimensions and items

Dimensions / Items	Short name	N	Min	Max	Mean	Std. Deviation	α
Organizational identification	OCM1	400	1,00	5,00	3,7425	,96619	,793
Organizational involvement	OCM2	400	1,00	5,00	4,0942	,83222	,784
Organizational loyalty	OCM3	400	1,00	5,00	3,1558	1,15393	,739
Productivity	FP1	400	1	5	3,48	,858	
Profitability	FP2	400	1	5	3,39	,906	
Market share	FP3	400	1	5	3,35	,995	
Sales growth	FP4	400	1	5	3,23	,981	
Competitive status	FP5	400	1	5	3,48	,944	
Asset growth	FP6	400	1	5	3,20	,942	
Employee salaries	FP7	400	1	5	2,95	,950	
Financial performance	FP	400	1,00	5,00	3,2982	,74824	,903

Coefficients of correlation between organizational commitment dimensions and financial performance items and dimension, are given in Table 2. Pearson correlation was used, with statistically significant correlations level identified: *p<0.05; **p<0.01.

Table 2: Pearson coefficients of correlation between organizational commitment dimensions and items and dimension of financial performance

	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP
OCM1	,288**	,247**	,201**	,254**	,280**	,350**	,420**	,365**
OCM2	,126*	,094	,052	,086	,133**	,165**	,285**	,168**
OCM3	,152**	,181**	,224**	,255**	,159**	,256**	,376**	,290**

Predictive effects of certain dimensions of organizational commitment (independent variable) on dimension and items of financial performance (the dependent variable) was examined using Multiple Regression analysis. In Table 3 shows the results of regression analysis.

Table 3: Regression analysis (Predictors: organizational commitment dimensions; Dependent Variable: items and dimension of financial performance)

Dependent	Independent			R^2	F	Sig
	OCM1	OCM2	OCM3			
	β					
FP1	,410	-,139	-,040	,094	13,728	,000
FP2	,321	-,154	,052	,074	10,549	,000
FP3	,218	-,182	,174	,073	10,416	,000
FP4	,277	-,187	,169	,098	14,285	,000
FP5	,376	-,117	-,022	,086	12,437	,000
FP6	,415	-,156	,068	,137	20,918	,000
FP7	,321	-,027	,186	,198	32,492	,000
FP	,417	-,173	,109	,155	24,131	,000

DISCUSSION

Table 1 presents the descriptive statistics of the research results. Results showed that the mean values for the dimensions of organizational commitment quite high, especially among the items Organizational involvement OCM2 which generate the highest value. As this result may give the impression that the high level of involvement is present in Serbian companies, the dilemma question is whether are employee actually willing to invest extra effort for your company, or the situation comes from imposed condition. The transition condition that is still present in the companies in Serbia, as well as high level of unemployment, puts employees in the position that they are easily replaceable in the company. When in this situation, employees tend to accept more responsibilities and obligations to fulfill the expectations of both the employer and the employees themselves. Dimensions of Organizational loyalty OCM3 has the lowest value. This is logical if one takes into account the low level of wages and poor living standard of people in Serbia. In such circumstances, it is difficult to expect a high employee loyalty towards their organization. If you provide them a better alternative, many people would make use of such a good opportunity. In terms of financial performance, based on the results shown in Table 1 it can be seen that the value of financial performance items are about average and that they are uniform for every item. The highest mean value is achieved by FP1 Productivity, FP5 Competitive status and FP2 Profitability. It is interesting to note that the lowest rated item is Employee salaries FP7. This result was expected for enterprises in Serbia as a result of the current state of the economy, and thereby confirms the previous assertion about the low living standards in Serbia.

Correlation with financial performance is (Table 2) highest for the Organizational identification OCM1 and lowest for the Organizational involvement - OCM2. Organizational involvement of employees do not contribute significantly to financial performance, which, in some way, shows that the high average value for the dimension Organizational involvement OCM2 si a result of compulsion and coercion of employees on involvement. However, for the most of the observed pairs there are significant correlations that confirm the hypothesis H1.

It is worth noting that out of the financial performance items, the most affected dimensions by the organizational commitment is item Employee salaries FP7. Here are two possible explanations. The first is that they are satisfied by the salary and therefore committed, and precisely because of that they do not really think much about money. Another explanation constitutes from observing situation from a different angle: low salary cause dissatisfaction and low employee loyalty. In such circumstances, all the dimensions of organizational commitment does depend on the salaries, in other words, employees

are committed to the level they are paid for. Unfortunately, second explanation seems closer to reality and truth.

Analysis of regression results (Table 3) shows that the results are consistent with the results of correlation analysis. The strongest predictive effect has Organizational identification - OCM 1, while Organizational involvement OCM2, in most cases, has a significantly negative effect. It is obvious that, in a joint action with the other dimensions of organizational commitment, organizational involvement (in this case can be called a pre compulsion and coercion) is fully manifested in its negative effects. In accordance with the results of correlation analysis, the maximum value of the correct determination index R^2 has the item Employee salaries FP7. Also, in all dependent variables (items of financial performance and dimension of financial performance) there is statistically significant value determination index R^2. Accordingly, it can be concluded that there is a statistically significant predictive effects of organizational commitment dimensions on items and dimension of financial performance. In this way hypothesis H2 is confirmed.

CONCLUSIONS

Analysis of the survey results confirmed both hypotheses, with the restriction on Organizational involvement - OCM2 which operates in specific conditions that comes from state in Serbian economy.

The recommendation is that managers invest in development of employees sense for organization belonging and loyalty, and to pay particular attention to the methodology of raising the level of organizational involvement. Also, managers must be aware of the following facts: 1. High commitment, it is often the result of salary satisfaction, and not of love and loyalty to the organization and its members. 2. High involvement is often the result of compulsion and coercion.

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Session C: MARKETING AND MARKETING MANAGEMENT

ANALYSIS OF CONSUMER BEHAVIOR AND MARKETING STRATEGY IMPROVEMENT

UDC: 005.5:685.8

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ABSTRACT

Understanding consumer behavior is one of the pillars for building a strong company. The ever-changing market puts a toll on organizations in a form of dynamic customer behavior. New products, new beliefs and overall society psychology require thorough examination of market segments and consumer demands. After analyzing customer behavior, organizations must realize a strong, flexible and effective marketing strategy which will ensure sales and profit. This is achieved with strategic planning and objectifying the targeted market segment.

Key words: Consumer behavior, Planning, Marketing strategy, Market segment, Behavioral patterns

INTRODUCTION

Consumer behavior can be determined as the study of individuals, groups and organizations. Also, it includes the processes used to select, secure, use and dispose products, services, experiences and to satisfy needs and the impacts on the consumer and society (Shimp, 2013). Knowledge of consumer behavior is very important for influencing decisions of the consumers in a variety of social fields. Companies have to collect information about specific consumers involved in making marketing decisions. More often than not conducting research it is necessary to get a wider picture of the consumer needs.

Questions have to be asked so the company can find out the (Subhash, 2010):
− Consumers' opinion about the products of companies and competitors
− Opinion about possible improvements of the products
− Reaction to new products
− Thoughts about the products in use
− Attitudes about the products
− Hopes and dreams of the consumers about new, present and past products they used

In today's dynamic business world, it is inevitable for success to understand consumer behavior as this is the key to planning and managing. Market segments are often prone to change. There are time windows which allow a product to reach its full potential, but after the window closes, a number of the sold products drop to almost non-profitable numbers. This is due to rapid trend fluctuations in general. Consumers tend to buy products because they are marked as trendy or cool. It is really hard to predict these fluctuations. Companies must arrange market researches in such a manner that will bring the

closest estimate of the next, ongoing or future trends on specific market segments. It is all about placing, selling products at the right moment, at the right time and at the right place.

MARKET ANALYSIS

Consumers

The company must understand consumer behavior if it wants to anticipate and react to customer needs and desires. Needs of customers are very complex and challenging to discover. Market research is a must. There are different methods that are used in consumer/customer research (Nikolić, 2007):
− Analysis of sales data of past and planned promotional techniques
− Testing in forums and focus groups
− Conversation with staff or product users
− Questionnaires of past and present customers
− Surveys
− Testing product concepts
− Personal interview with focus groups
− Testing emotional responses to product and brand name
− Development of customer feedback forums
− Monitoring customer behavior on social media.

Before conducting any research methods the organization has to identify its research goals. Market research alongside with consumer behavior research is very tiresome. Therefore, an adequate documentation, goal definition and specific market targeting are the base points from which every other research aspect is performed. Managers, teams and fieldworkers have to understand the whole concept of the company they are working for, the product, the consumers and the past, present and new customers. The first step is realizing what kind of product has to be sold. The next one is defining crucial market segments. After that a thorough documentation is desirable. When everything is at place, it is important to find a wide variety of potential customers so the research results are more accurate.

Company

The company, before starting any research, has to understand its own ability to meet customer needs. This requires evaluation of all segments of the company (Kotler, 2003). The evaluation starts from the main production lines, the technology, the information infrastructure, knowledge base and worker experience and expertise. Managers have to check if there is an established point from where the company can start selling product to potential customers. Evaluation is crucial, because it shows from the very start if the company is strong enough or prepared enough for a battle in the desired market. When everything is in place, some research can be conducted and therefore product placement and selling too. The company also must understand its own strengths and weaknesses (Kotler, 2015). Failing to do so may result in serious consequences. Product misplacement, missed market segments, zero sales and other threats are very likely to happen.

Competitors

When aiming a better position on the market, the competition and its strengths and capabilities appear to be very influential factors. Understanding these factors requires the same amount of knowledge as it does for the own company. Building an effective marketing strategy rolls around the consumer behavior, the company's strengths and weaknesses and competition capabilities.

Marketing strategy has to be based on the answers to the questions like (Kaser, 2013):
−   Which companies will be hurt if our company succeeds?
−   How will the competitors respond when our company spreads in their market?
−   What capabilities do the competitors have?
−   What strategy is going to be used as a preventive measure when the competitors strike?
−   What is Plan B?

The above mentioned questions are the most important ones. If the company doesn't have a good answer to all of them, it shouldn't consider stepping in a new market segment.

MARKETING STRATEGY BASED ON CONSUMER BEHAVIOUR

The key in marketing strategy is to provide more value to the targeted customers than is provided by its competitors. Customer value is the difference between all the benefits derived from total product and all the costs of acquiring those benefits. (Hawkins, 2011) The company has to consider value from the customer's viewpoint. Maybe a certain price is not a big deal for the company, but it is a deal breaker for the customer. Pricing is difficult, because companies have to optimize it for the best profits and also the more sales the better. A high price doesn't mean a bigger profit. A huge number of sales is somewhat better, but only if it keeps the company going and growing. Organizations have to anticipate the reactions and needs of consumers so it can deliver the best value for the best money, therefore achieving the most profits. The basis of marketing strategy formulation is indeed consumer behaviour. (see also Figure 1.)

Figure 1: Marketing strategy (Hawkins, 2011)

Marketing strategies have to be formulated. Strategies seek to provide the consumer more value than the competition. Marketing strategy involves the marketing mix: products, price, communications,

distribution and services. It has to be considered that an entire set of characteristics of a product is determined as the total product. This so called total product is served to customers. The total product engages with the market, giving value to maintain and boost the quality of life in general (*Online article - Customer research methods*).

The main influential factors represent the perception or sensation of the product and the company. Affects and beliefs of the consumer play a great role in the whole marketing strategy. Also, cognition and social influences have an impact on the consumer. These factors have a so called two-way impact. It means that the consumer determines these factors and at the same time these factors have an impact on the consumer. Consumers define the informational structure around a product, the choices they make and the preferences they have which are all parts of integral entity that is a consumer. Communication allows information flow about the company and the product. It all comes down to market research and developing the marketing strategy and delivering high value products for affordable prices. (see also Figure 2)
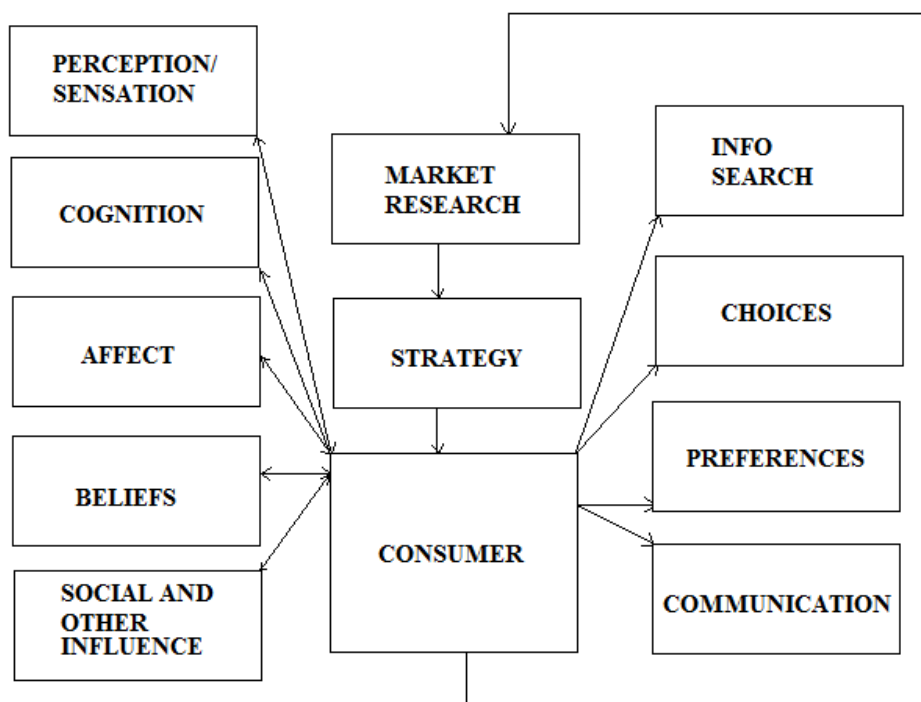
Figure 2: Impact factors on the consumer (Hartline, 2011)

As seen, the above figure clearly shows the integrity of the consumer, company, product and impact factors. They represent a unity which helps to define the marketing strategy. The company must take in consideration every aspect of the market and every influential factor. Only then the company can provide adequate products which will satisfy the needs and wishes of the consumer, automatically ensuring profit and a stable market position. Very often the consumer has a different perception of the product from the perception the company has to that product. This is due to misconception of the purpose, quality or price of the product. There are very high quality low priced products which don't sell as good as highly priced lower quality products. The price is the reason for the different perception. Other situation is when a company develops a new, expensive technological innovation, for example, a mobile device, and the company percepts this innovation as very valuable and asks a higher price for the mobile device. However, the consumer doesn't consider that particular feature innovative and doesn't want to pay extra for that innovation. The result is: the company loses money on developing and advertising the new innovation, and it loses market position due to lack of interest of the consumers. It is very important to have an objective view on any new product or innovation.

CONCLUSION

In the modern business world an organization has to develop high quality, optimized valued, medium priced products so it would ensure a solid market position. There are many impact factors which determine the success of a new product or innovation. Perception of the product, communication between consumers and overall market segment situation is crucial for understanding customer needs and wishes. An organization which wants to enter a new market segment, has to make sure that the competition is not fierce, and has a strategically developed plan to ensure a strong position on the new market. This is where market research is necessary. Market research allows companies to get to know its new, potential consumers. Optimizing and documenting every future step is very important. Without market research it is like shooting without a scope. The company could "shoot its own leg" if the market in which it wants to take a position, is not researched. Through various methods, the company can get to know its new customers, and therefore ensure that the products it offers fulfill the expectations of the customers.

We can conclude that even the strongest organizations, with the most money and the most innovative products can fail, in a new market, if there is no thorough research. Consumers won't buy a product, even if it has high quality and low price, if it doesn't fulfill their expectations and needs.

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FROM UNESCO HERITAGE TO TOURISM ATTRACTION: CASE STUDY OF BERAT CITY

UDC: 005.52:338.48(496.5)

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ABSTRACT

Currently change in cities is accelerating a lot because of technological advances, information overflow, and the rising standard of living. This development brings along "brandising" of cities. For increasing brand values of cities, it has become necessary to study the brand equity held by cities and to develop a strategy based on a new approach. In order for a city to be a good brand, it must possess defining and distinctive characteristics that could be identified. These are functional as well as non-functional qualities. These include city appearance, people's experience of the city, people's belief in the city, what the city stands for, and what kind of people inhabit the city. This work contributes towards a comprehensive brand strategy development and may serve as a guide for wider and more effective city brand management. The purpose of this study is to illustrate the city of BERAT, in all its disciplines, particularly from the cultural and historical perspective; to identify the main points that must be developed, how to improve its image, both for internal and external audiences. We should be able to come up with some important points in which needed to be developed in order to improve the image of a city and making it thus a favorable destination.

Keywords: City Branding, City Marketing, Destination Positioning, City Products, Berat City.

INTRODUCTION

The growing competition between cities has resulted in the increasing usage of marketing methods in their struggle to attract tourism, investment and residents. To some extent, City Marketing aims at turning the city into a brand with a certain value in the consumers' minds. It has been acknowledged that people are willing to pay more for trademarks and brands than for any other physical asset. City marketing and city branding are the subjects that examine tourism marketing. However, when it comes to destination marketing and city marketing, the number of studies is noticeably restrained. This type of marketing can be used to increase the activity of small regions or cities; especially they are the remnants of ancient civilizations. An effective strategic marketing for city branding can be implemented for Albanian cities as well. There are many cities with their original architectural settings, like Durrës, Apollonia, Gjirokastër, Krujë, and Shkodra. Along the cities' infrastructure are also natural beauties like 'National Park Theth', 'Syri Kaltër' or 'Osum Canyons'. Efficient city marketing can truly be positive for the city of Berat and Gjirokastër, which have always been interesting beacons for attracting tourists.

CITY MARKETING

City Marketing, to some extent, deals in *turning the city into a brand with values* to the customer's mind. When we speak of brands, a lot of companies come into our minds, and the countless products they offer (Balencourt & Zafra, 2012). 'Destination Branding' or 'Location Branding' is defined by Anholt (2004) as

'managing altogether with innovating the image of a particular city through strategic applications of commercial, social, and economical policies'. The effect of branding is so big that people are willing to visit them even though they know little about. Paris still is one of the most visited cities in the world even supposing that it is considered too expensive and not so welcoming (Raubo, 2010). The image of a city is different from another and clearly distinguishable. Not all cities are brands that can be built, and not all cities have the abilities to achieve it. So, this is the main concern, the image or the brand is neither easy nor quick to be built (Wharton & Fenwick, 2012). There are several terms used interchangeably to define the marketing of cities. The term 'urban marketing' is still used to cover the marketing activities of cities today, but it also refers as special marketing strategies of firms for the inner cities. Another popular term as far as tourism is concerned with is 'destination marketing'. There are other terms used for marketing of cities that are not as popular as place marketing and city marketing. Overall, the most popular terms are "place marketing" and "city marketing" (Pike, 2004). Philip Kotler is one of the first marketing scholars who have taken an interest in the marketing of places and he is the main author of the book *"Marketing Places"* (Kotler et al, 1993). Accordingly, place marketing is defined as designing a place to satisfy the needs of its target markets. Firstly 'the whole city as a product' does not relate to the needs of customers and it does not do justice to the complexity and diversity of cities: it is an oversimplification. Moreover it is also impractical as it is difficult to see how detailed marketing instruments can be useful for such a broadly defined product (Kavaratzis M. , 2005). Traditionally, a city is concerned with factors that influence the location decisions of firms such as labor supply, transportation costs, availability of inputs, and access to markets, etc. (Wharton & Fenwick, 2012). In the marketing mainstream, products are bundles of attributes (Kavaratzis & Ashworth, 2009). But we have to think also the customer needs. Just as in most marketing applications, we would look for groups of customers with similar needs, demands or perceptions: in our case aspired relevant environments (Kotler & Armstrong, 2005). Another fundamental problem is that we know such relevant environments combine locations, facilities, services, estimates and expectations of future potentials and other aspects that are important for the customers' spatial behavior. They are a mixture of tangible and intangible factors. These factors are linked in the perception and decision-making process of customers but are not necessarily seen as one integrated product by individual suppliers (Moilanen & Rainisto, 2009). Place marketing has been shaped and developed within the discipline of strategic marketing, and its application depends on the construction and maintenance of the city's image and the users' perceptions (Kavaratzis & Ashworth, 2009).

GENERAL DESCRIPTION OF THE CITY OF BERAT

Berat is an important and attractive destination for tourists, characterized by its unique values, stunning architecture, and rare documents of early Christianity, as well as religious coexistence and harmony. Its foundations are set in antiquity with a variety of values represented by the outstanding work of the masters over the centuries, and the rich cultural heritage, both material and spiritual, which today is all part of the prestigious "World Heritage of United Nations Educational, Scientific and Cultural Organization" group [UNESCO] (Çaro, 2011). Tourism is considered one of the main pillars for the development of the local economy in Berat. Given the importance of tourism for economic development, it creates new jobs and supports small businesses. This is seen as a big a priority target in the Strategic Plan for social and economical development. Berat is still in the early stages of forming a good quality destination. To this its historical and cultural values must be disclosed, reducing various risks like the illegal construction in historic areas (Xhafaj, 2013). The town was founded during 313-310 BC as a Dassaretae castle city named "Antipatrea", from the king Cassander in memory of the General Viceroy Alexander the Great. After the Roman occupation in the second century BC, it was called "Albanorum Oppidum" (Albanian's Fortress). Under the Byzantine Empire, it was reinforced and changed its name in "Pulheriopolis" (beautiful city). Conquered by the Bulgarians in the ninth century, it got the name "Belgrad" (White City), today's Berat (Cohen & Walbank, 1995). This fortified historical center is well preserved, and is particularly true for its buildings. They have been continuously inhabited from ancient times down to the present day. Situated in Southern Albania, Berat bears witness to the wealth and the diversity of the urban and architectural heritage of the region. The city has been adapted with same-leveled houses on the slopes, which are mainly horizontal in arrangement, and make plentiful use of the incoming daylight (Çaro, 2011). The city of Berat has been a UNESCO World Heritage site since 2008, and has finally started to draw tourists in. It has lately become a part of the international digital platforms in the field of tourism and promotion, thus being one of the three most preferred cities in Balkans (Ellis & Klusáková, 2007). During these last years, many products and achievements are dedicated to the status of

UNESCO. The town bears evidence of Balkan's traditional distinctive architectural housing construction. Such landmarks of the historical period can be seen in the "Castle of Berat", Byzantine era churches, like "St. Mary of Blaherna Church", built in the 13th century, the "National Ethnographic Museum", the "Bachelor's Mosque", the "Sultan's Mosque" which was built in the 15th century, sometimes between 1481 and 1512, the "Leaden Mosque" built in 1555, and the "Gorica Bridge" (Ćurčić, 1997). The 'Castle of Berat' was built on the right side 'Osum River', on a rocky hill, and is accessible only from the south (Berat Municipality Report, 2011). "St. Mary of Blachernae Church"; Church of "Shën Mehill" (St. Michael), both builded in 13th century ; "Xhamia e Beqareve" (Bachelors' Mosque), built in 1827; "Xhamia e Mbretit" (the King's Mosque) which is the town's oldest mosque, notable for its fine ceiling; The "Teqeja e Helvetive" (Halveti Tekke) built during 15th century are among the most historical sights of the city of Berat (Xhafaj, 2013). Berat has a favorable geographical position for the establishment of a modern and complete infrastructure. Its position, flora and fauna, as well as architecture and artifacts, makes the city attractive for tourists and suitable for the development of a good life quality for its citizens. The region has a typically Mediterranean climate, which makes the development of agriculture possible, in addition to the development of agribusiness (Rroji & Wilson, 2006). The city is home to museums and there are about 108 cultural monuments in the city. 'Mangalem Neighborhood' is home to a unique complex of museums of remarkable architecture (Plaku, 2012).

Table 1: Visitors for the cultural attractions of Berat between 2008-2013

Visitors	2008	2009	2010	2011	2012	2013
Local	94,142	253,002	291,542	265,103	1,301,479	245,703
Foreigner	65,347	81,991	93,716	107,836	131,254	109,771
Total	159,489	334,993	385,258	372,939	1,432,733	355,474

Source: Berat Tourism Strategy and Action Plan 2011 – 2021
Table 1 shows the number of visitors between 2008-2013.

In developing Berat as a tourism destination development it is important to have a thorough understanding of competitors in the market. A competitor analysis enables Berat to understand its standing as a destination in the global marketplace, to capture new opportunities that align with Berat destination's strengths, to differentiate itself from its competitors and to position Berat successfully.

CASE STUDY: TOURISM STRATEGY OF BERAT

Change in the image of the country, the radical improvement of the infrastructure, combining aggressive promotional spots in prestigious television networks in our region; have resulted with an increase of tourists in Albania (Xhafaj, 2013). It can be deduced that the number of foreigners in Berat has increased, as well as the locals, because of the marketing campaigns that the city has released. There is also the "word-to-mouth" communication, which makes the best marketing method known to everybody, especially abroad. Research has shown that interpersonal influence arising from opinion exchanges between consumers is an important factor influencing consumers' purchase decisions. "Word-of-mouth" or advice from friends and relatives often ranks as the most influential source of pre-purchase information (Braun, 2008). Development of tourism in Berat is based on the principles of sustainability, therefore takes full account of current and future impacts in economy, social and environmental field by addressing the needs of sustainable visitors. It is crucial to mention that sustainable tourism development requires continuous participation of all relevant stakeholders and political leaderships (Marku, 2014). Berat is a quality destination, known worldwide, with sustainable tourism which preserves and revitalizes its cultural and natural resources (Brokaj, 2015). Tourism, culture and nature provide excellent opportunities for senior officials to communicate positive messages; developing a promotional collection of international tourism to be distributed to the press and a bulletin board with printed materials, videos, articles and other materials that allow easy presentation of the country in other countries (Marku, 2014). Today Albania is using a number of topics to introduce itself, but the country needs professional assistance for the selection and designing of a theme that reflects national culture, and environment strategy and image portrayed in the world (Shkira, 2010).

Marketing Strategy: SWOT Analysis

Berat has a very good geographical position. Tourism sites are close to each other so both mountain area, and beaches can be seen in one day. Diversity of tourism gives the opportunity to tour operators to create a diversified tourism package. Given that the image is still elusive, if all stakeholders cooperate, they can build a detailed country segment or image based on Berat identity. There is not yet a mass tourism in Berat. The opportunity is to use this as strength, inviting in the segment of tourist that want to discover new cultures, and new sites. Centralization of decision making in governmental power structures often creates a barrier for the cooperation with the private sector. Lack of appropriate training on a quality service cannot establish a relation marketing meaning a tourism destination loyalty. The recent political change in Berat may also lead to a subsequent change of the strategies adopted. The threat is that again new strategies will be elaborated but without firstly achieving the objectives set out in the prior strategy (Qirici, Theodori, & Shkira, 2012). Attractions in the city recorded in the list of UNESCO constitute strong points of tourism development, including natural resources, religious coexistence, culinary products, historical and spiritual values. But these Opportunities are associated with the Threats of damage due to lack of funds for reconstruction of historical assets, damage to forests, poor access to points of interest from the natural and cultural perspective, the absence of tourism facilities especially in touristic villages (Xhafaj, 2013)

Marketing Strategy: Segmentation Targeting, and Positioning

By segmenting the market we will have a better understanding of target audience and thereby make marketing more effective (Gunter & Furnham, 1992). Market segments can be characterized in different ways. The demographic segmentation (age, gender, family size, income, occupation, education, religion, race, generation and etc.) (Kotler & Armstrong, 2005) often used in market segmentation for the reason that the variables are easy to identify and measure (Gunter & Furnham, 1992).. A company can target one or more areas and must be aware of the fact that data according to geographic segmentation may vary due to population shift (Pickton & Broderick, 2005). There are over 100 monumental building of the first category and over 380 second category ones. Also there are old dwellings; there are the Byzantine walls in the "Castle of Berat" and over 400 icons and early time monuments. Tourism growth in Berat focuses on developing products and services that meet the needs of the target markets (Larsen, 2010). For this purpose there are several types of markets planned. These market plans aim to attract tourists who would bring larger income (Xhafaj, 2013):

- *The culture enthusiasts*. Travelers that are interested in including cultural activities as part of a broader travel experience.
- *Culture moderators*. They visit Berat as part of Balkan's or Albania's culture.
- *Tourists in search of adventures*. They are independent who need specific destinations shown to them.
- *Albanians with foreign ethnicity who wish to discover their ethnic heritage.*
- *Groups of international tourist*. This target group includes the high school visitors coming from different cities of the country.

Not one strategy will suit all consumer groups, so being able to develop specific strategies for our target markets is very important (Dibb & Simkin, 1996). Multi-Segment Targeting is used if we need to focus on two or more well defined market segments and want to develop different strategies for them. It offers many benefits but can be rather costly as it involves greater input from management, increased market research and increased promotional strategies (Kotler & Keller, 2009). The third and final step deals with "positioning". Once the segments are identified and which segments to target, the final step is to decide which ones are chosen. Positioning is concerned with how the customers perceive the products and how they define it in order to maximize the potential benefit to the company. The result is a persuasive reason why the target market should buy products. Effective positioning involves a good understanding of competing products and the benefits that are sought by your target market. It also requires us to identify a differential advantage with which will deliver the required benefits to the market effectively (Kotler & Keller, 2009). The positioning for Berat derives from values and strengths of the city. It carries history, with unique architectural style and merges nature with these values. And of course cultural diversity is at the heart of the city.

Marketing Strategy: Marketing Mix

Product

Berat has many available human resources which position the city as an important source of economic development. The majority of the population working age is predominantly young adults. With a population of 64'000 inhabitants, 40% Christian orthodox and 60% Muslims, Berat is densely populated, with the density at 2,844 inhabitants per km^2. This indicates a readily large workforce available for the city. The general indicators related to level of education reached by the population are: 33% cent of the population had completed general and vocational high school; 44 % had completed middle school and 6 % had completed post-secondary education. In the municipality, there are three professional 'High Schools', three 'High Schools' and one University. There's an artistic 'High School' which prepares the students in painting, sculpture and music. However, there is no course in the University of Berat for arts, cultural heritage or architecture, except in Tirana or abroad (SUSTCULT, 2012).

Place

The Municipality of Berat is the center of the Berat Region. Its main sources of income are budgeted by central and local government. The local government has prioritized the application of its revenues for the direct benefit of its citizens. This is done through services offered directly to the community, in addition with the investments for the improvement of the city infrastructure. The city of is located in Central-South Albania, 120 km south of Tirana, stretches over the so-called 'Osum Valley', passes through by the 'Osum River'. The distances from Berat to the country's seaports, airports and other cities are not that significant and make communication easy. The region has characteristically Mediterranean climate, though given the topographic variation there are diverse microclimates as well, including alpine. The micro-climate around the city is favorable for farming, and as such the development of local agribusinesses seen for the city's economic development is very important (SUSTCULT, 2012).

Price

Local businesses producers want to develop and expand their products by using with great effectiveness and efficiency the region's geographical advantages and natural resources. Businesses based on tourism make use of the city's architectural and historical heritage. Artisan businesses, though small and based around the family, want to maintain traditions alive and even expand not only into the national level but possibly into international markets as well (SUSTCULT, 2012).

Promotion

Around the city, there is adequate space for industrial zones in order to make an important economic site. There is a slight increase of economic potential in the businesses that operate in tourism. This happens because of the promotion of the values of the city which now has a special status of the World Heritage. It has about 17 Hotels and 25 restaurants mainly tourism-oriented (Habian, et al., 2007). The focus will be on renovating or upgrading the heritage assets, that is, the existing infrastructure; strengthening the capacity of human resources; improving the quality of accommodation; better understanding the current and potential markets; raising awareness of tourism industry, etc. (SUSTCULT, 2012).

Main concerns and developing a strategic plan

There are some concerns, potential risks and threats that are still above the real values of Berat. There are over 100 monumental building of the first category and over 380 second category ones that have waited many years for funding, restorations, conservations and advertising. The low number of symbolic donations from the locals and the government make noticeable that such buildings risk degradation. Among such old dwellings, there are over 80 houses which seem to have been abandoned. They give the view of annihilation and forgetfulness, not only for the houses but also as the architectural assemblage of the Historic Centre. The Byzantine walls in the "Castle of Berat" seem to have been crumbling, falling and some frescoes of churches are losing their original traces. Transition has created many noticeable problems with illegal constructions and urban distortions not only near the historical centers but also the urban centers, with over 42 building that do

not meet the criteria under law and regulation (Çaro, 2011). Likewise, the risks of rocks falling from the slopes of the "Castle of Berat" and "Gorica Bridge", the lack of hydrants are continuous problems, while the solutions for financing projects in this area seem remote and hopeless (Plaku, 2012). The "World Heritage Committee" requested the implementation of an inventory of the illegal constructions, together with a plan for their removal in a medium-term perspective. Specific monitoring indicators should be defined, together with the intervals of their updating. A program for archaeological excavations should be proposed, in accordance with the international standards in force, the firefighting arrangements in the historic urban zone should be improved; tourism plans for Berat need to be implemented in order to extend sustainable tourism, etc. (Hoda & Matja, 2010). Care must be shown for cleanliness and environment protection. Environmental pollution is a great problem that needs to be fixed. To spread the planned vision and objectives, the TAC identified four main areas of action. These areas are interdependent and equally important: Product development and quality improvement, Infrastructure and its use, Marketing and promotion, Human resources and destination management.

CONCLUSIONS

Berat is an ancient historical city, part of the UNESCO group, but modern also, and so we think that the intermingling of architectural value along with the historical tourism function will be a priority. This boosts the economy as a whole. City marketing with the identification of international values, and building a new specialized construction for tourism near the municipality, coordinating the work with family businesses, will enable Berat to have tourism all year long. The process of efficient planning includes: formulating a mission of the touristic destination, determination of goals, identification of time period and a way in which these goals are to be achieved as well as the appointment of the persons responsible for the realization of the relevant marketing tasks. The marketing should ensure efficient allocation of destination's resources, to focus the activities of a touristic destination, and to serve as means to control the results and the resource management. The implementation of a marketing plan is an operative activity that includes human resources and corporate processes management aimed to fulfill planed marketing activities. A mission of the touristic destination is in fact the purpose of the touristic destination that is the goal which should be achieved by tourism development in the specific location. The mission of a touristic destination should be: realistic, specific, based on the particular abilities as well as motivating. When the touristic destination carries out the SWOT analysis, it can continue with development of the appropriate marketing targets/goals for the plan period. Effective marketing strategy implies doing the right things. A good marketing strategy should: identify specific goals that a touristic destination wants to reach, point to the resources, money, time, people, which will help achieving the goals of a touristic destination, include detailed assessment of marketing environment, harmonize environment conditions with the resources of the touristic destination and focus on delivering a superior value. Work needs to be done for the maintenance of the city museums and for the museum quarters. Berat is also a city with resources, not only natural, but also underground.

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RETAIL LOGISTICS SYSTEMS

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ABSTRACT

In order to survive on the market in the conditions of increasing competition, retailers find various ways of increasing the efficiency of their business operations. In addition to cost cutting, one of the areas enabling an increase in the level of customer service is logistics. Its essential task in retailing is reflected in supplying the right product at the right time at the right place. In relation to this, retailers can organise two most frequently implemented delivery systems direct and centralized. Whilst in the first case products are delivered to retail outlets directly by the suppliers, product flow in the second is realised through the retailer's distribution centre. In addition to the basic characteristics of logistics in retailing, this paper also presents both delivery systems, their activities, advantages and disadvantages.

Key words: retail, logistics, delivery system, distribution centre.

INTRODUCTION

Due to mutual impact and interconnectedness of transport, storage and handling activities, the essence of the logistic concept is reflected in the application of system-based and theoretical approach. Logistics can therefore be represented as a system of mutually connected, compatible, complex, stochastic and dynamic elements (subsystems). Unlike mega, global and macro logistics, which refer to the logistic phenomena of planetary, global and national dimensions, the micro-logistic system represents a set of logistic activities, knowledge and potentials focussed on effective and efficient accomplishment of the objectives of independent business entities.

A particular emphasis within micrologistics is placed on the logistic of business entities, whose scope of activities is defined by the enterprises' legal boundaries. Depending on the activities, they are further broken into the logistics of production, trade and service business entities (Kalinić et al., 2009, p. 12). The basic task of logistics in retailing is to place the final products at the future user's disposal (Bloomberg et al., 2006). Providing the "right" products, at the "right" time at the "right" place (Fernie and Sparks, 2009) is also the primary precondition for its placement, that is, for the realisation of the desired transaction with increasingly demanding consumers. In the conditions of highly concentrated market and low purchasing power, this *task* gains even more significance.

Constant struggle for a more competitive position motivates retailers and their suppliers to adapt their offer to customers and minimise their effort in the purchasing process through a more effective and efficient organization of logistic activities. Therefore, to provide the preferred level of product availability in retail outlets, a particular attention is paid to establishing an operationalizing the logistic system of their delivery.

LOGISTIC SYSTEMS

From the aspect of business logistics, the systemic approach is reflected in mutual dependence of the company's transport, storage, handling and other logistic activities. They all feature as parts of a unified logistic system, which is established with the purpose of as efficient linkage of the purchase market and sales market as possible. Depending on the company's nature of activity, Kalinić et al (2009) differentiate between the structures of production and service systems of business logistics.
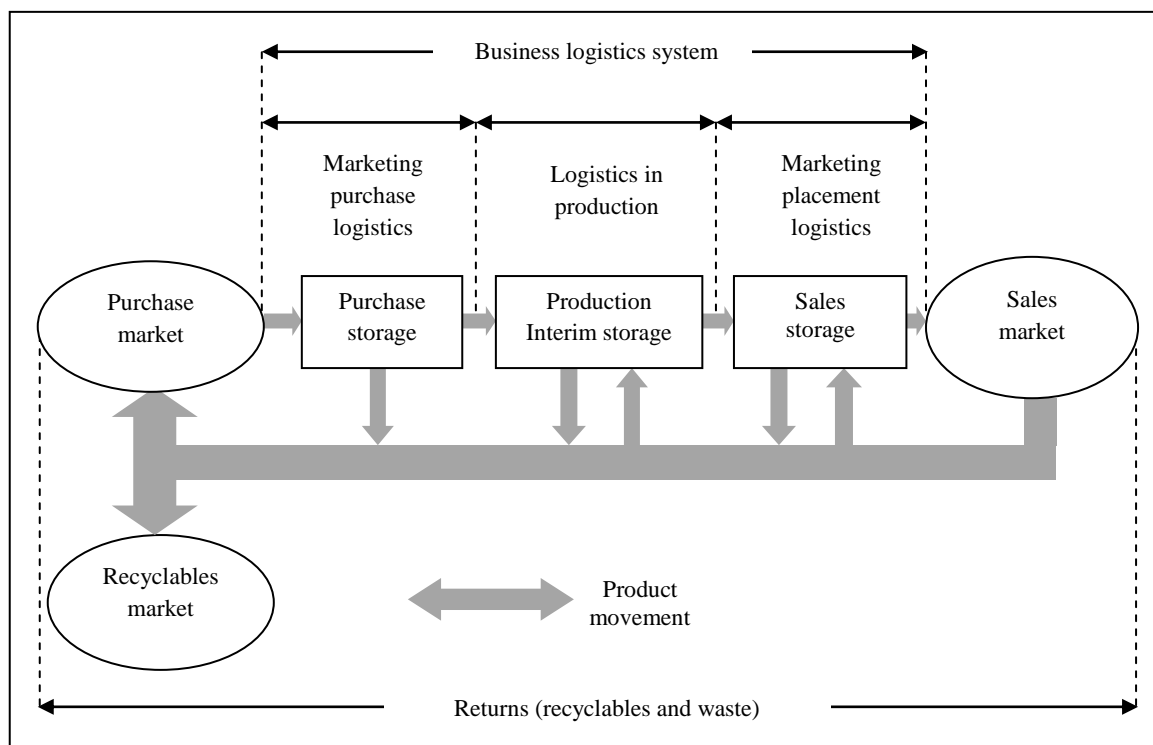
Figure 1: Business logistics system (adapted from Kalinić et al.,2009)

In production companies, the logistic system comprises the logistics of marketing purchase, logistics in production and marketing placement logistics. Four key phases of product flow are distinguishable in relation to this. The first stage begins from the purchase market and includes the movement of raw materials, semi-manufactured goods, spare parts, auxiliary and reproduction materials, from the supplier to the company's warehouse. In certain cases, there is a possibility of establishing a direct product flow from the purchase market to the production process. The second stage is oriented to the movement of goods from the purchase warehouse to the production process, where their properties and values are changed. Also, within the production process itself, there may be certain internal movements, if the company has several production and auxiliary facilities. In the third stage, final products, semi-manufactured goods and spare parts move along the flows. Product flow starts from the production site, through distribution centres and despatch warehouses, to consumers on the sales market. The final (fourth) phase encompasses product flow in opposite direction to standard logistic channels. It refers to flow of hazardous materials, product recycling and reuse, product recall, return of damaged and outdated products, and other reversed flows (Roca, 2004).

Unlike production companies, according to Kalinić et al. (2009, p. 15), the business logistic system in service companies consists of marketing purchase logistics and marketing sales logistics. Therefore, in the case of trade companies, logistics in production is not present, whereas product flow is most frequently based on the movement of goods from suppliers to the company and from the company (the purchase market) to the consumers (sales market).

LOGISTICS IN RETAIL

The past few decades have seen a growth in the market power of retailers, who have taken over the leading role in marketing channels from producers. The change of balance of powers in favour of retailing, according to Lovreta et al. (2006, p. 307), is manifested in three directions. In addition to a rapid growth in terms of turnover and total assets, retail companies are taking over from producers increasing control over individual functions (physical distribution, packaging, product design etc.) that they traditionally used to perform. Also, as the third direction, the above mentioned authors also mention the evident growth in the profitability of large retail companies, especially in the sale of agricultural and food products.

As retailing is the first stage to consumers in marketing channels, its development was also influenced by certain changes on the demand side. Consumers' accelerated lifestyles, growing urban middle class in developing countries, increase in the disposable income and increasing use of new technologies in the shopping process are only some of them (Lovreta, 2009). With the changes on the demand size, the policies and practice of purchase and sales operations are changing as well, which also results in the strengthening of the retailers' role (Lovreta et al., 206, p. 308):
- large retail companies have at their disposal a pronounced existing and potential purchasing power which is manifested in the in purchase and sale, capital utilization rate, using marketing services, etc;
- there is a powerful breakthrough of modern information technology in sales;
- internationalization of retailing and strengthening of its role on the international market;
- intense development of trademarks and sales marketing;
- acquiring a higher level of professionalization in the development of specific sales management;
- strengthening the influence of retailing on the key flows in the domain of logistics.

Similar to Lovreta et al. (2006), other authors also link the development of retailing to the area of logistics. According to Trautrims (2011), higher market concentration has enabled retailers to take over the control over product flows from suppliers, forcing them to adapt their deliveries to current demand, rather than their own production plans. Fernie and Sparks (2009) point to their evolutionary path, from passive producer servicers to active supply chain designer. In relation to this, there have also been changes in the logistics sector, which becomes a significant component of the strategic approach of large retail companies (Murphy and Wood, 2004). Building on the given transformation, Mc Kinnon (1996) identified six closely linked and mutually conditioned trends:
- channelling purchases through their own distribution centres, retailers have increased the control of "secondary distribution" (product flow from warehouses to retail outlets);
- with the development of composite supply and reduction in the inventory levels, retailers have increased the efficiency of their logistic systems;
- the application of the quick response (QR) strategy has contributed to shortened wait time, reduced inventory levels and realization of smaller, more frequent deliveries;
- partly as a result of the quick response strategy, and partly as a result of the increasingly intensive competition, retailers have also extended the control over primary distribution (product flow from suppliers to distribution centres);
- involving in the processes of recycling and product return, retailers have an increasing role in reverse logistic operations;
- having improved the efficiency of their own logistic operations, retail companies are increasingly involved in various forms of cooperation with their suppliers, so as to maximize efficiency at the supply chain level.

By means of tightened control over activities related to product flows, retailers strive to reduce logistic costs, which account for 10 to 30% of total retail costs (Kontzab and Bjerre, 2005). According to Baumgarten and Thoms (2002), logistic costs in retail account for 27% of total costs, which is 15% and 19% higher compared to food and automotive industry respectively. However, in addition to cost

reduction, logistics can also be used in retailing for differentiation, as a marketing tool (Angerer, 2005). Fernie and Sparks consider retailing and logistics in the context of product availability. Particularly, the stress is on providing the right product at the right time at the right place. In the case of fast moving consumer goods, availability is analyzed from the aspect of retail outlets (and/or retail shelves), as only 3.7% of the total sales of these products are achieved through e-commerce (Kantar Worldpanel, 2014). Their movement from suppliers to retail shelves can be achieved by using two most frequently used supply systems in practice: centralized and direct (Pramatari and Miliotis, 2008).

Centralized supply system

With the development of large retail formats and higher market concentration, retailers increasingly apply the centralized supply system. By building their own distribution centres, they attempt to reduce inventory levels and establish a more efficient control of product flows in the overall chain. According to Pramatari and Miliotis (2008), in large retail chains, the centralization level ranges from 50% to over 90%. Particularly, in the UK and Central European countries, 80-95% of consumer goods are supplied through distribution centres (Kaipia and Tanskanen, 2003).

Through the centralized system, retailers receive significantly larger quantities of products, which provides them with a higher level of logistic efficiency. On the other hand, by delivering larger orders, suppliers can also economize when organizing logistic operations, especially saving on transport and storage (Pramatari and Miliotis, 2008).

Products are supplied from the retailer's distribution centre to retail outlets. Depending on the characteristics of products, deliveries are performed on a weekly basis in most cases, where a single distribution centre can supply between several dozen and several hundred outlets.

Modern distribution centres are used by the world's leading retail companies. Walmart, the world's largest retailer, has over 40 distribution centres only in the USA (Walmart, 2014), with an average area larger than 90 thousand square metres each. Equipped with conveyor belts (whose total length exceeds 20 thousand metres), carousels and other automated handling systems, each of them serves 20 to 100 retail outlets, with 5.5 billion batches of product a year in circulation.

Like Walmart, the attention at Tesco, one of the largest British retail chains, is also devoted to the development of distribution centres (Fernie and Sparks, 2009). In addition to state-of-the-art equipment and automated systems, they have also installed special chilling chambers, enabling the storage of frozen and fresh products.

Only the UK and the Republic of Ireland have seen the construction of 28 composite distribution centres with the area of 20 to 60 thousand square metres each, through which 60 million batches are delivered to 3 thousand retail outlets (Tesco, 2014). Like Walmart, they are equipped with sophisticated data exchange systems, based on Point of Sale (POS) and Radio Frequency Identification (RFID) technologies, through which they are linked to retail outlets and suppliers.

Direct store delivery

Unlike centralized, in Direct Store Delivery (DSD) system, rather than interrupting product flow, products are delivered directly from suppliers to retail outlets. According to Grocery Manufacturers Association (2011), this system encompasses all the deliveries that bypass distributive centres and retailers' warehouses. Their application is particularly represented in the distribution of fast-moving consumer goods (Dalton and Mullaly, 2013).

Depending on whether they are delivered to retail outlets directly by producers (brand owners) or through distributors, we can distinguish between two-step and three-step direct systems.

Different functions are performed within the direct store delivery system, whose efficiency is conditioned by the level of cooperation between retailers and their suppliers. They include (Grocery manufacturers Association, 2011):

– ordering – efficient demand management with monitoring and exchange of POS data at each retail outlet;
– storage and delivery – providing adequate storage conditions for products and their delivery to retail outlets;
– merchandising – transfer of products from warehouses within retail outlets and displaying them on shelves and/or designated points of sale:
– coordination of activities of suppliers' sales representatives and retail outlet managers for more efficient implementation of merchandising strategy (especially when organizing promotions).

The implementation of direct store delivery enables retail companies to achieve certain benefits (Dalton and Mullaly, 2013). In addition to transport costs, retailers can also reduce costs related to displaying products in retail outlets, as a part of inventory management costs, which will be borne by suppliers instead of them. In addition to cost cutting, implementation of this system reduces stockout rates and facilitates the process of shelf refilling. On the other hand, benefits for suppliers are reflected in better quality control, more efficient product monitoring and getting to know the retailers' product mix (Dalton and Mullaly, 2013).

In a survey by Clarkson Consulting, which included 41 respondents (suppliers and retailers), and the research by AMR Research and Grocery Manufacturers Association, conducted among 37 retailers and 42 suppliers on the territory of North America, opportunities and potential improvements were analysed, to establish which of those are provided to retail companies (Grocery Manufacturers Association, AMR Research and Clarkston Consulting, 2008). These include:

– growth in the sale of products delivered directly to retail outlets – from 2003 to 2007 the sale of products delivered through DSD system achieved a growth rate of 14.9%, where they are the most represented in 7 out of 10 best sold categories of fast moving consumer goods in the USA;
– a significant share in margin coverage – the sale of DSD product acquires more than 52% of the total margin coverage, which is why they are rated among the most profitable products for the retailer
– higher capital turnover rate – delivery to retail outlets by suppliers is achieved within two days on the average, almost five times as fast as in the classical manner, thus making the retailer's required investment smaller;
– higher effectiveness of promotions – investment in promotional activities of DSD products are higher by 30-50% due to more pronounced engagement of suppliers, especially when introducing new products;
– increase in customer satisfaction – more efficient supply of products and layout of retail outlets make a positive impact on customer satisfaction in the shopping process, and thus on increased loyalty.

Bearing in mind that the direct store delivery system relies primarily on suppliers, its implementation may cause a loss of retailer's control over distribution channels. This is, according to Dujak (2012), its main disadvantage. Dalton and Mullaly (2013) include the following in the key problems of the application of this system: too much paperwork, manual product control, higher delivery costs (for suppliers), higher dependency of retailers in terms of delivery times, difference in the delivered and received quantity of product.

Comparing the direct system with centralized, Shriram (2011) also points to its certain disadvantages. According to this author, a higher inventory level, higher delivery costs and higher number of deliveries present problems faced primarily by retailers through the implementation of this system.

CONCLUSION

Development of logistics is also accompanied by evolution in the retail sector, which is taking over the leading role in marketing channels from producers. With the growth in turnover and profitability, large retail companies take over control over products flows, where, in addition to cost cutting, they aim to increase the level, i.e. quality of customer service. Bearing in mind that product availability represents a significant dimension of the retailer's service quality, one of the essential tasks of retail logistic systems is reflected in providing its adequate level on shelves. With its increase, a basis is formed for increasing customer value, and thus their satisfaction and loyalty.

A retail company can accomplish the given task by organising two systems of delivery, centralized and direct. Whereas the former prevails in the developed countries of Western and Central Europe, the latter, direct store delivery system, is most implemented in developing countries, including some Western Balkans countries. Both systems have their advantages and disadvantages. Construction of contemporary distribution centres enables retailers to order greater quantities of products, reduce uncertainty and raise the level of efficiency of conducting logistic activities. On the other hand, the application of the direct store delivery system may contribute to reduced costs of transport, inventory management, and product display costs. However, while errors and problems in product ordering may occur in the centralized system, transfer to the direct system may cause retailers to lose control over distribution channels.

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POSIBILITIES OF INTERNET MARKETING TOOLS FOR IMPROVEMENT OF MODERN BUSINESS

UDC: 005.21:004.738

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ABSTRACT

This paper presents Internet marketing as a new part of marketing mix (4P: Product, Price, Place and Promotion), then Internet and digitalization influence on marketing mix, as well as the importance of Internet site, SEO optimization, blog and Google analytics. By using these tools and by their correspondence with social networks: Facebook, Twitter, LinkedIn and Instagram, company's successfulness may become more significant and easy to measure. It was shown that Internet marketing must be an integral part of marketing department of the company in modern business. Real world examples were used in order to represent significance of social networks in modern business of companies'. It is well known that Internet and social networks enabled companies to communicate with customers by two-way communication and they were able to achieve significant advantage by satisfying market needs of customers. But, other strategies that guide customers to access to the company's web site are necessary too. This is stressed in this paper with the real world examples.

Key words: internet marketing, social networks, business communication, modern business.

INTRODUCTION

The subject of this paper is detailed explanation of the role and significance of Internet for development and improvement of companies in modern business. Internet and social networks contributed to development of communication between people. Different information, experiences, impressions of large number of people, becomes available all around the world. In contrast from one-way communication that was favored in successful companies in twentieth century, Internet and social networks enabled companies to communicate with customers by two-way communication (producer/customer, P/C). In that way they achieved significant advantage by satisfying market needs of customers. Internet appearance of company enables communication with customers and product promotion that led to the new part of marketing mix development, called Internet marketing. Companies use blogs to educate customers about their brand, strategy and culture. If company decides to create its Internet site, it is logical to include blog in it, in order to establish direct interaction by two-way communication with potential customer (P/C).

INTERNET MARKETING – NEW PART OF MARKETING MIX

As it was said before, Internet appearance of company enables communication with users and product promotion that influences on new part of marketing mix development, called internet marketing.

Certain indicator that nowadays Internet marketing represents the most payable manner of marketing is the fact that today it is possible to advance business and accomplish significant financial gain based on creation and placement of an Internet marketing plan to the specific target group. In fact, Internet advertisement and promotion are interactive direct marketing. This type of marketing contains creative, as well as technical aspect of Internet, including design, commercial development and conventional marketing.

Internet advertisement uses principles that offer direct marketing supported by telecommunication development and information technologies. Deep and precise market fragmentation enabled by Internet advertisement, which result is "one person – one segment", enables transfer from mass to micromarketing. (Miljković, Alčaković, 2013)

Integrated strategy of online appearance means combined usage of social networks, Google services and Newsletter tools in particular measure that corresponds with the target group, according to initial research study. After studying target group, recognition of product/service for the potential user is clearer, thanks to the one sight of indirect Internet marketing, which contains broader picture of the things that should be presented. Afterwards, the same users (target group) may see detailed information about product/service by direct Internet marketing.

Digital revolution and especially, fast development and acceptance of Internet in every aspect of communication and informing, have obvious influence on Internet marketing movement, as new part of marketing mix. Table 1 shows Internet and digitalization influence on marketing mix, through advertisement, sale promotion, personal sale, public relation (PR) events, sponsorships, customer service and direct marketing.

Table 1: Internet and digitalization influence on marketing mix (Ekhlassi, Maghsoodi, Mehrmanesh, 2012)

Marketing tool	Internet and digitalization influence
Advertisement	– Billboards with moving pictures, – LED display for outdoor advertisement, – Faster, more qualitative, better targeted and cheaper by using digital TV and radio, – Internet advertisements, banner and pop up commercials, social networks, viral marketing.
Sale promotion	– Creating consumers' database for more efficient placement of actions for sale promotion that is designed for interested customers.
Personal sale	– Possibility of online connection of sales representatives and buyers. – Possibility of presenting company's web page, as well as product catalog on personal computer at sale spot.
PR, events, sponsorships	– Faster and more effective news delivery by e-mail and other e-channels. – Viral effect of transferring information mouth-to-mouth.
Customer service	– Establishing customer services on Internet.
Direct marketing	– Easier identification of target customers through customer database creation. – Decrease of costs for potential customers processing, that are not really interested and do not want to become real customers.

INTERNET MARKETING TOOLS

Internet site

Main reasons for Internet site development are:
– Creating affirmative identity of the company on Internet,

– Detailed presentation of products/services to the customers,
– Direct communication with potential customers.

According to the Bureau of Statistics of Republic of Serbia in 2014, there are 63% households in Serbia that use computer; every domestic company uses computers and Internet in their business; 98% of companies' have broadband access; 74% companies have web site; 3.8% companies use cloud services; 62% citizens use Internet on regularly bases (2.8 million of them on daily bases); 22% citizens buy over Internet regularly, and only 13% use public administration services (e-government).

The main goal of the company in site development is to maintain two-way communication with customers. However, its influence will be minimal if there are no other strategies that guide customers to access to the company's web site. Promotional activities that connect buyers with web site should be designed in manner to attract Internet users.

SEO optimization

Search Engine Optimization – SEO is browser optimization that includes set of methods and techniques that ease finding, indexation, categorization and ranking of web contents. Advantages of using well done SEO for companies are:
– Occupation of top positions – certainly, this is the main benefit of site optimization. Anyone who types key words in Google search (or other one) reaches the site of specific company. This directly increases site visiting's, and in that way increases business scope;
– Long lasting results – results that SEO gives are long lasting, and after the first positioning, site remains at the top position at the end of the optimization;
– Increasing brand awareness – the main goal of the company is to occupy top position in Internet search.

Techniques for site positioning using SEO optimization:
– Defining *H* tags for every page and its adjustment with contents by title tags and analytics;
– Setting up different tags for every page;
– Setting up certain *ALT* tags on pictures;
– Check and test of uniqueness of every site page;
– Installing *Google analytics, sitemap.xml, webmasters tools, robots.txt*;
– Submitting site for browsers, tracking and accelerating indexing of new pages. (http://www.sajtova.rs/izrada-sajtova-kroz-prizmu-integrisanog-internet-nastupa/)

SEO optimization is more and more important, because nowadays 71% of people stay on the first page of Google search. More precisely, 67% choose one of five first results from the first page. More than 80% of Internet users seek information about products and services in browsers such as Google. (http://www.teshadesign.com/optimizacija-sajta-za-google.php). The example of well-done SEO optimization is shown in the figure 1.

The example in the Figure 1 shows organic search results for the Technical Faculty "Mihajlo Pupin" in Zrenjanin (University of Novi Sad), as well as positioning of this faculty at the top position in Google search, after well-done SEO optimization of its web site.

Blog

Companies use blogs to educate customers about their brand, strategy or culture. If company decides to create Internet site, it is logical that includes contents called blog. Term blog originates from combination of words web and log. In its structure there are texts that explain more detailed P/C to potential customers. Why is it important to write new blog posts all the time? Because the fact that all the stories are read in social networks, and in that way direct communication with potential users of

service is accomplished. Internet site gains visits increase, and possibility that buyer will choose particular product/service increases as well.
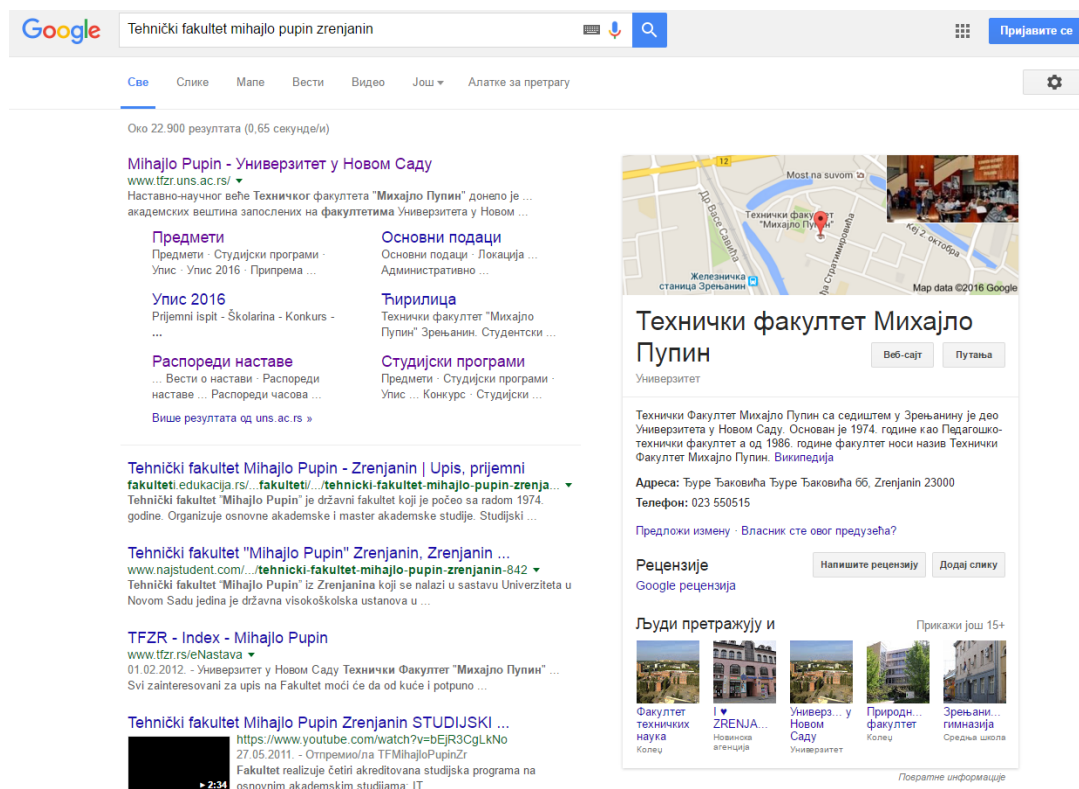
Figure 1: SEO optimization of the Technical Faculty "Mihajlo Pupin" site with Google search

Tracking activities and results of Internet marketing campaign by Google analytics

One of the most reliable ways of tracking site visiting is installing Google Analytics code into the site. Google Analytics is a free service of Google Company that enables detailed statistics about site visitors. It has possibility of tracking guests country, their browsers, operating systems and language, the reason of their visit (was it some browser action, site ad or paid marketing).

In the figure 2 there is an analytics for EduWebCast site (name of the Cross Border Cooperation project between Technical Faculty "Mihajlo Pupin" and University of Timisoara, Romania, MIS ETC 1379). This example shows detailed number of visits in the period from 26th of February to 25th of April in 2016, according to Google analytics tool for tracking activities in web site. Beside number of visitors, type of the browser and country of the user may be seen as well.

SIGNIFICANCE OF SOCIAL NETWORKS FOR INTERNET MARKETING DEVELOPMENT

Social networks changed the way of communication with people on Internet. American company "Nielsen" published research about this subject, and its results stress that 67% Internet users regularly visit social networks, and constant e-message corresponding have 65.1% of them. (Marković, 2016) According to these assumptions many companies nowadays find the way to place their own P/C to the potential buyers, which leads to company appearance on social networks.

In contrast of blog there is a Facebook, which, according to figure 3, about appearance of Serbian top 100 companies on social networks, means that the number of Facebook users in Serbia may be measured in millions. Companies realized this and used it to reach wider public, in this case through

their brand web pages or corporative Facebook pages. Even 58% companies used this social network as their communication channel, and placed advertisement of theirs products and services. Serbian study showed that only 32% companies have Twitter profile, 54% companies is on YouTube, and dominant contents on corporative channels are ads, the same ones presented at traditional media. In the most cases YouTube and Google+ have direct link. (https://www.pioniri.com/sr/top-100-sprskih-kompanija-na-drustvenim-mrezama/
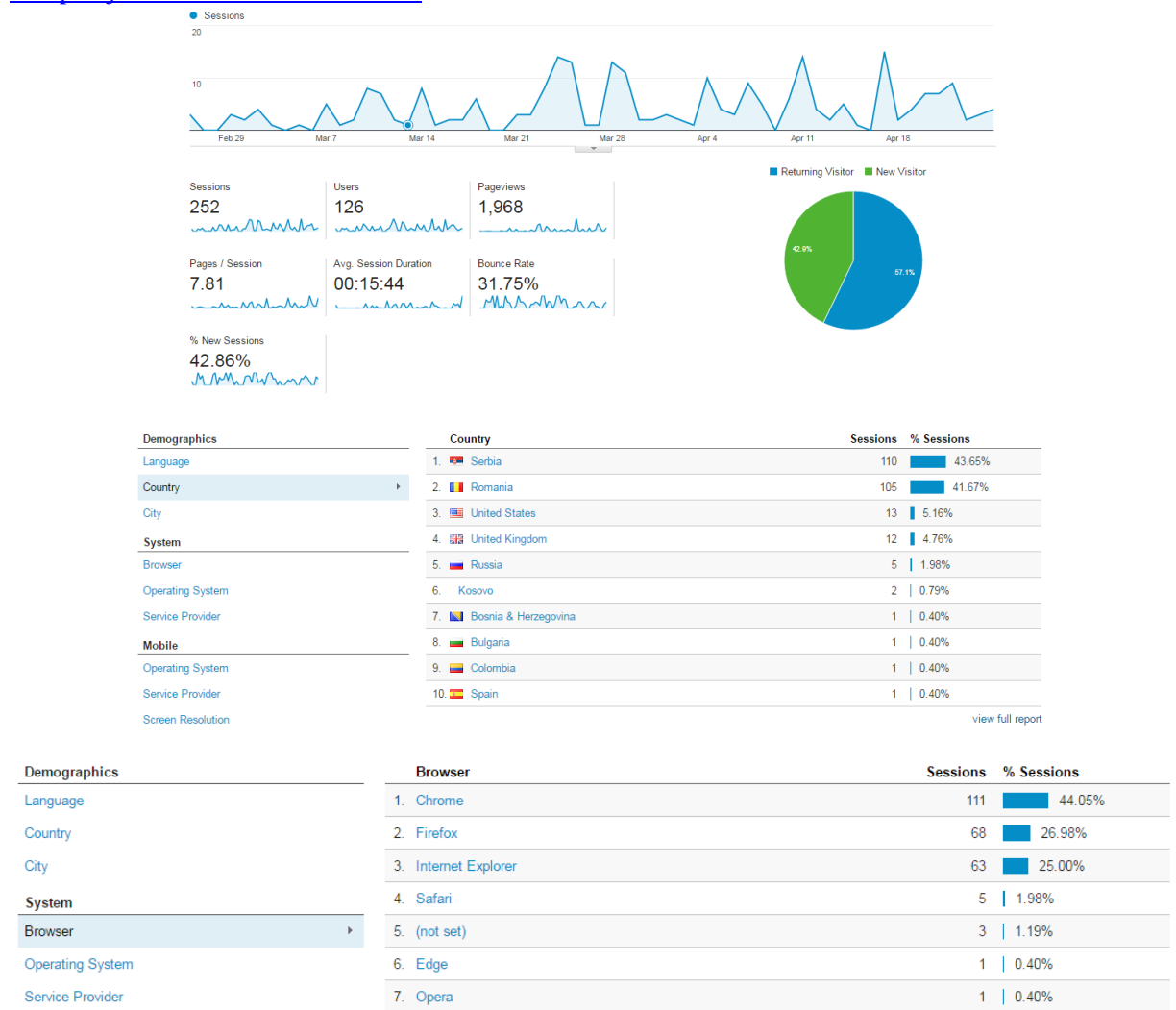
Figure 2: Google analytics for site visiting for EduWebCast project
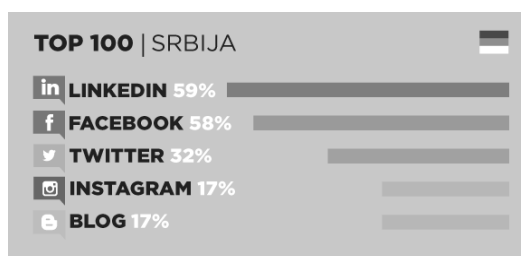
Figure 3: Appearance of Serbian companies on social networks

In the figure 3 there is a score of the top 100 Serbian companies whose have social networks recognition, and as it was shown the greatest appearance is on Facebook and LinkedIn networks, then Twitter and Instagram and blog in the web site of the company.

TWO-WAY COMMUNICATION DEVELOPMENT BY USING INTERNET MARKETING

While companies in previous century had one-way communication with their users, occurrence of Internet and social networks enabled companies nowadays communicate with their customers by two-way communication (producer/user). In that way they gained significant market advantage by satisfying market needs of customers. Company's appearance on Internet enabled creation of particular target group. Direct two-way communication resulted with creation of desired product or service for particular buyer, in the right time, on the right conditions, at the right place and with the right amount.

Internet enables personalized communication with users, but it demands serious technical and human resources. In general, practice showed that the biggest problem of introducing real personalization in online environment represents contents personalization in relation to concrete needs of particular user groups. In ours circumstances income increase from online environment in the future will influence on broader personalization development. Organizations whose have no control over communication in online environment, where users have possibility to answer to sent messages, have problem because this is usually done in the way that is unsuited for organizations.

CONCLUSION

Company, that move towards accomplishing leaders goals, as well as towards gaining success in modern business, needs to improve its business through marketing sector, by introducing internet marketing in product/service. Usage of Internet and social networks increases business productivity minimizes costs and improves control of business. Integrated strategy of online presentation means combination of using: social networks, Google services and Newsletter tools in particular way that corresponds with behavior of target group, according to the initial survey. Web site and social networks make base of internet marketing, and application of useful tools in web site, such as: SEO optimization, blog and Google analytics, represents basis for successful business of company at the market. By using these tools and by their correspondence with social networks: Facebook, Twitter, LinkedIn and Instagram, company's successfulness becomes more significant and easy to measure. It may be concluded that Internet marketing must be an integral part of marketing department of the company in modern business.

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THE IMPACT OF MARKETING ADVERTISING THROUGH THE PORTAL "I LOVE ZR" ON DEVELOPMENT OF AGENCY "*023 STATUS*"

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ABSTRACT

It is known that marketing has a crucial impact on any business in the modern world. For a long time, advertising has been one of the constitutive elements of our everyday life. Advertising is an extremely important means of promoting in the process of dissemination of information about products or services of an organization, in this case in advertising the newly established agency, with the aim to provoke attention in accordance with the intention of advertisers. The agency for matchmaking "023 STATUS" has reached the top of interestafter advertising on city portal "I love ZR"one month after its establishment. This paper will present us the original research data as well as detailed analysis and statistics from the establishment day of agency and after the published interview.

Key words: marketing, agency, web advertising, portal.

INTRODUCTION

Market communication is the key precondition for a successful operation of an organization. Communication is the central issue of our life, our existence is based on communications of various types, we all communicate and no one is different in that point of view, we differ only in the way we do it (Janković et al., 2009, 129). Organizations usually apply various methods of communication, creating and transferring a specific and perfectly clear message which is intended for the consumer. It is agreed that not all media are equally effective in attracting and keeping the interest of the consumers, in order to "persuade" them to purchase. Each type of media offers certain advantages and limitations in terms of creativity. Today it is not enough to advertise a message through a variety of media, it is necessary to focus marketing in the media on what is important to people.

The appropriate choice of media, meaningful set of information, timely established contact, adequate and appropriate style and the language in which communication takes place, interest to maintain and improve in this connection represents a very important prerequisite of quality communication process (Miljević, 2009, 313). One of many definitions of marketing is *that marketing is the art of finding and retaining customers*. Branding contributes to both ends, particularly to the retention of consumers, which is much more valuable and important. The relationship between the cost of keeping and the price of the product is much more favorable than the relationship between the cost of acquiring a new customer and the same price of the product. Increased customer retention ratesof 5% can increase profitability by 35% to 95% depending on activity (Reichheld, 1996, 13). Technology in the form of

computer equipment, Internet access, mobile devices and other "smart" devices that allow the flow of information around the world at an incredible rate is a decisive factor in shaping not only the material basis of a society but also the way of human thinking (Kotler, 2012, 14).

The agency "023 STATUS" was established and registered on 1ˢᵗ December 2015 in the APR for industry assistance in choosing a partner for life. The web site was officially opened on 13ᵗʰ January 2015. Since then it has been closely monitoring for any progress and attendance of users. Given the large initial financial investments, the association had to find a way to break into the public spotlight and, thus, draw the attention of future members to its work. It used all methods and types of free advertising. Since it is based in the town of Zrenjanin, it was necessary to begin in its hometown. Active participation and advertising in social networks contributed to the popularization of the agency at the best paid and most popular portal in the town of Zrenjanin. On the journalist' ssuggestion to do an interview for the portal and to publish the interview, a sudden interest among the citizens was awoken. In the modern world, technology is the most dynamic factor of development (Đorđević et al., 2007, 3), therefore it has a very significant impact on the operations of the agency.

WEB PORTALS AND ADVERTISING THROUGH THEM

Researches suggest that advertising based on consumers' emotions will be the most effective form of advertising in the future; this will stimulate the interest of consumers for certain products, with a clear difference compared to the competition, but also alasting emotional connection between consumers and the brand. Brands that could cause emotions with consumers would get a special role as an indicator of extra value when making a purchase decision (*tastes that awake longing, smells that seduce, forms that touch*) (Gobe, 2006, 70-100). In a modern society which is characterized by fierce competition and rapid changes in technology, it is inevitable to attach great attention to the study of commercials, as well as the ways in which they are presented. Because of the increased availability of information and the sharing of those information, the organization becomes more informed, more flexible and better organized (Sajfert et al., 2008, 241). The media are the most suitable for advertising/publicity, starting from the Internet, newspapers, radio and television. The modern mass media techniques such as advertising and propaganda are becoming something that we are faced with every day. Rapid changes are characteristic for all operations in global markets (Đorđević et al., 2007, 6). Wherever we look, we will see some form of advertising. A newer form of advertising that is growing is "online advertising" through social networks on the Internet. One of the most popular Internet services are web portals where it is possible to access to information from a number of sources. In a town where there are several portals, it is the best to advertise on the portal which has the most users.

Ilovezrenjanin.com is the first successful portal in Zrenjanin, designed according to the principle of the modern internet informant, which is updated daily with news, service information, cultural, sporting and entertainment events and a blog which has 300 000 visits per month. Data from the January 2015 show the numbers of visits to popular social networks:
- Facebook likes: 39 500
- Instagram followers: 3 200
- Twitter followers: 2 500.

Figure 1: Popular social networks

The advantages of portals are:
- they allow access to content, applications, and various information

- improved communications
- unified access to various information
- provided data security
- personalized interaction of users
- identification of potential licensed users
- quick and easy modification and maintenance of the page content.

Today portals are created by individuals, organizations, schools, universities, ministries, states, cultural-historical, entertainment and sports organizations and others. The primary objective of expanding services on web portals was to provide users' database as well as to extend the implementation time of users on a particular portal. A large number of portals in the world which were one of the first created, no longer exist today, and those who went up with the times and the changes have become more successful, more comprehensive and more useful.

The types of web portals:
- Regional web portals
- State web portals
- Corporative web portals.

The development of international portals such as Google, Yahoo!, YouTube, has contributed to the development of regional versions of Web portals. The regional portals may contain local information and a city map and local business information, current news, weather, etc. Many countries have decided to create their own portals for their citizens by which they provide direct access to applications, detailed information about life, business and the level of competence in a given state. Corporative Web portals were developed in the nineties of the last century, which was the era of innovation in the field of Web portal. Companies have begun to offer their help for Informatics, all in order to facilitate working with data, information and applications. A new way of doing business gives the ability to access a variety of information related to the job and companies. Today's portals are rapidly developing new methods, skills and opportunities for solutions such as workflow, increased cooperation between working groups, etc. As the popularity of Web portal has grown, companies have started to offer themselves as the service bearer on aportal and publication of information about their business. Portals can be both educational character, Web TV portals, portals of sports clubs, portals for on-line purchases.

METHODS

As the best indicator in the given situation, the analytics is used; a special place is given to the analysis of the environment functioning as the determining quality factor of business operations or pulse generator of the behavior changes of the entire business system (Seifert, 2006, 277). Management development and training must be based on a needs analysis carried out by comparing the actual execution and behavior with the required execution and behavior (Seifert, 2009); therefore the behavior of stakeholders is constantly monitored, as well as which types of advertising bring the most visitors to a website.

FINDINGS

Website of the agency 023 STATUS, www.023status.com, was registered on the 13th December 2015.The advertisement on the portal I Love Zrenjanin was published on 16th January 2016. Job analysis has an important role in the further process operations. Also, it is essential to determine the criteria for the estimated efficacy and evaluation of the selection process, without which the selection of people is just "a coincidence" (Seifert, 2006, 118).

The indicators are from the date of registration of the website to the date of publication of the advertisement on the portal.
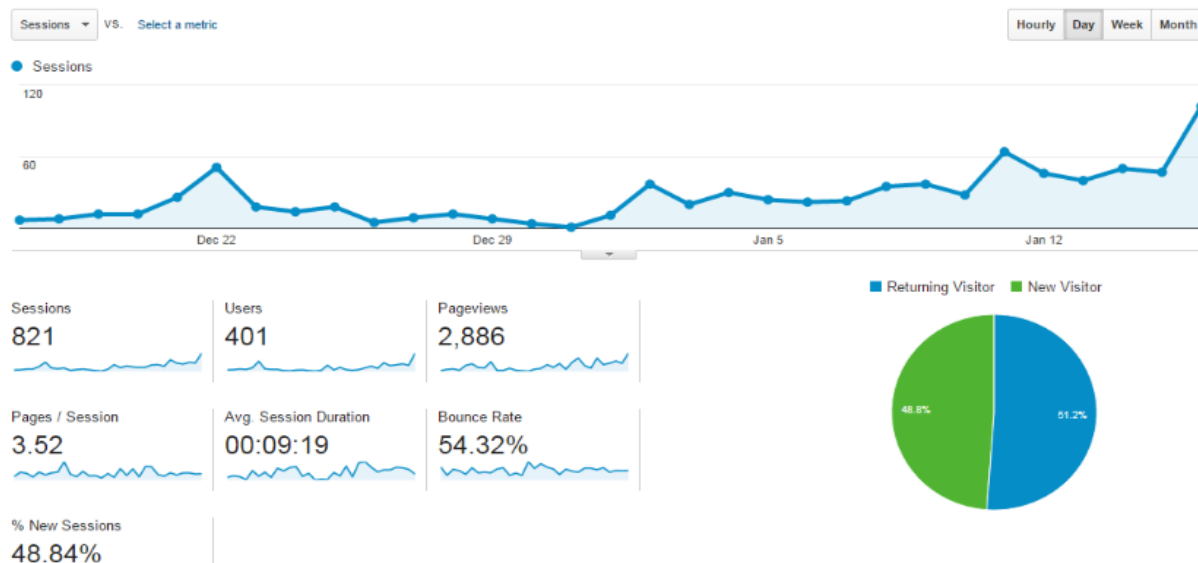
Figure 2: The indicators are from the date of registration of the website to the date of publication of the advertisement on the portal

Figure 2. shows that the attendance to the web site was the largest on the date of publication of the advertisements on the portal. It also shows that there were 48.8% new visitors, while the percentage of visitors who return to the homepage is 51.2%. The number of users in that short period was 401, and the average time spent at the web page was 9:19 minutes. On 16th January 2016. the number of visits by cities was the largest in Zrenjanin.

	City	Sessions	% Sessions
1.	Zrenjanin	152	18.51%
2.	Belgrade	99	12.06%
3.	(not set)	73	8.89%
4.	Novi Sad	71	8.65%
5.	Kraljevo	65	7.92%
6.	Kula	26	3.17%
7.	Saint Petersburg	22	2.68%
8.	Lynchburg	22	2.68%
9.	Nis	20	2.44%
10.	Moscow	12	1.46%

Figure 3: Visits by cities (16th January 2016.)

Figure 3. shows that in addition to Zrenjanin, whose attendance is 18.51%, Belgrade takes the second place with 12.06%, while the third place is marked with "not set", which means that it is referred to smaller cities in Serbia or suburban areas which are not detected. Disclosure of information as a new component of an organization has introduced a new quality in the research of organization management degree (Zeremski et al.,2007, 78). When looking at the analysis of visitsat a state level, in addition to Serbia, the largest number of visitors comes from Russia, and from the United States. The access to information at any time is the basis of a good management and making quality business decisions (Nikolić, 2007, 172).

Country	Sessions	% Sessions	
1. Serbia	482		58.71%
2. Russia	146		17.78%
3. United States	50		6.09%
4. (not set)	39		4.75%
5. Spain	11		1.34%
6. Montenegro	10		1.22%
7. Germany	8		0.97%
8. Austria	7		0.85%
9. Bosnia & Herzegovina	7		0.85%
10. Israel	5		0.61%

Figure 4: Visits to the web page at global level (16th January 2016)

The assessment of behavior, performance and attitudes is necessary to examine the costs and benefits of any structural, personal and technological change (Seifert, 2008, 246).
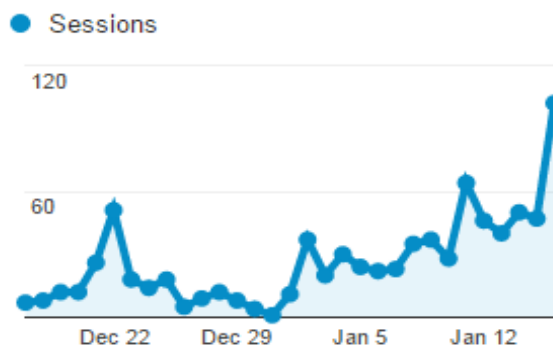
Figure 5: The review of sessions(16th January 2016.)

CONCLUSIONS

The results have showed a large number of visitors to the website after the advertisement, as well as the increased number of new visitors. It is known that the most significant changes in the organization happen in response to changes in the environment and, therefore, it is very important for the company's strategy to monitor the reactions of the environment. The evaluation is a simplified significance calculation and feasibility of the idea of a new enterprise (Seifert et al., 2009-2010). Every time has its own rules, so that business activities in business and in life could be effective, it is necessary to adapt and accept the rules. In this case we should accept the rules of the digital age. Marketing has constantly evolved throughout history so today it could represent a part of everyday people's life. Observing the visible or invisible components of marketing, marketing is all around us. It is extremely important at all times to bear in mind the wishes of consumers and to know their views. It is important to note that consumer research has no guarantyfor success, but it increases the chances for a successful and quality business. In the end, this work is a form of marketing, isn't it?

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HABITS OF CUSTOMERS' IN THE RETAIL MARKET OF CONSUMER GOODS IN SERBIA

UDC: 339.13.017(497.11)

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ABSTRACT:

The paper presents the results of market analysis research and consumer behavior in the retail segment of consumer goods in Serbia. First, it can be seen that the structure of the household budget has not significantly changed over the past 10 years and that the average Serbian family for purchasing food and non-alcohol drinks spends about 40% of their household budget per month.It is shown that the TOP 10 retail chains occupy just over 30% of market share, and as the most important factor for such a result may be taken the fact that the average Serbian customer buys at the store closest to him, and that is the main factor when choosing a store. It was also shown that the largest shopping are done on Saturdays (16.8), that the share of commercial brands in purchases is at a very low level (5%).

Key words: habits, customers, private label, retail, marketing, Serbia.

INTRODUCTION

Successful management of companies and good positioning in the market, regardless of their size or industry in which they work, is reflected in the ability to acquire new customers and retain the existing ones. The success of marketing activities certainly usually depends on the level of knowledge of consumers and that is why this discipline is one of the most important in the entire marketing area. A consumer is an individual, a member of the community, a social and cultural being which tends to meet its needs / desires by purchasing and by using a particular product / service. Without information about the needs and motives of consumers, their behavior in different situations in buying and factors affecting the decision-making process about the purchase, you cannot imagine the success of companies in the market (Maričić, 2011). As consumers make the market in the essence and are distinguished by their desires, needs, abilities, experience, etc., each of these characteristics can serve as the basis for segmentation, especially at a time when companies are increasingly embracing the concept of target marketing, which allows producers to get to know the real market opportunities (Župljanin, 2012). Market segmentation is the process of dividing customers into groups, or segments, within which customers with similar characteristics have similar needs. On this basis, a specific marketing mix can be the focused to reach each of them individually (Mekdonald & Danbar, 2003). In market segmentation of consumer goods and services as the key segmentation criteria are used: geographic, demographic, economic, sociological, and psychological and preference criteria (set of benefits for the customer). Looking at the listed criteria it is easy to see that segmentation precedes a

great job of collecting vast amounts of data about consumers and the market, which are a prerequisite for a successful segmentation in relation to a particular product or group of products. It is necessary to correctly answer the questions about what and why consumers want, and then who, where, how and when stands behind prominent consumer preferences (Vasiljev, 2005). In order for a segmentation to be successful, each market segment has to meet the following requirements (Perrault & McCarthy, 2005):

− market segment should be homogeneous within;
− market segment has to be sufficiently different from other market segments;
− market segment has to be big enough in order to be profitable;
− market segment has to be operational in order to be able to carry out customer identification and the implementation of marketing mix.

Similar properties of market segments are described by Kotler. According to him, in order to be successful, market segments must have the following characteristics (Kotler, 1996):

− measurability - to be able to measure the size and buying power of the market segment;
− availability - to be able to establish and to serve the market segment;
− validity - a market segment must be large enough and profitable so that marketing campaign would be profitable;
− operational - market segment must be possible to observe and to withdraw out of it.

THE ANALYSIS OF CUSTOMERS' BEHAVIOUR IN RETAIL MARKET OF CONSUMER GOODS

Customer segmentation according to sexual and age categories

One of certainly simplest divisions of customers into categories in order to identify their needs is the division by gender and age structure, as shown in Figure 1. In the Serbian market, the biggest target group is aged between 40-59 years, followed by groups aged 60+, and then the group aged between 30-39 years.

Population, by large age groups and sex	2014					
	Population			Structure %		
	Sum	Male	Female	Sum	Male	Female
Sum	7,131,787	3,472,746	3,659,041	100.00	100.00	100.00
0-19 age	1,399,950	720,609	679,341	19.63	20.75	18.57
20-39 age	1,880,823	958,477	922,346	26.37	27.60	25.21
40-59 age	1,986,860	975,905	1,010,955	27.86	28.10	27.63
60 and more age	1,864,154	817,755	1,046,399	26.14	23.55	28.60

Figure 1: Customer segmentation according to gender and age
Source: Statistical Office of the Republic of Serbia

Teenagers represent the "smallest" target group under this distribution, and a clear trend of decline in the period between the two censuses can be seen. Although according to the above-mentioned structure we can see eight different target groups taking account of gender and age, for the retail market of consumer goods certainly the most important are only 2 groups. According to numerous surveys conducted in the area of retail sales of consumer goods it was estimated that women in the middle age are the key target group for marketing communication precisely because studies show that they are the ones who make decision about purchases. In today's modern society women have become economically independent, have access to more funds than in the past, are strongly involved in the consumption, companies can no longer afford to lose profits because they do not know how women consumers respond to advertising messages and whether they make buying decisions based on those

messages.According to marketing literature, women are marked as big "spenders" (Maričić, 2011) (Armstrong & Kotler, 2005), and there are also indications that they are more prone to impulsive, even compulsive shopping (Youn & Faber, 2000). However, apart from this group which is certainly the most important, the target group of pensioners is also recognized as a very important one in Serbia, ie. persons of 60+ years. Serbia is one of the few countries where the retail market of consumer goods has developed special promotional activities and communication to win the loyalty of this target group, and so today there are almost no retail chains which do not have the famous 10% discount on purchases that is valid for all pensioners among their marketing tools. This is exactly what happened because, according to the Republic Fund for Pension and Disability Insurance in Serbia their number exceeds 1,700,000 and as such this group represents one of the largest target groups in Serbia.

The structure of the household budget indicates that a larger sum of money is separated for food

Personal household consumption helps us to see how customers in a market behave and how they allocate their household budget. From this parameter can be concluded to what extent the customers in a market are able to pay for their purchases. The higher the share of food and beverages in the structure of personal household consumption, the greater the likelihood that customers of the market are less capable of payment. If we look at the table of the relative amounts of personal consumption, which is shown in figure 2 (Figure 2), at the first sight we can assume that buyers in Serbia from year to year live at almost the same level; but it is very important to note that in 2014 they lived slightly better compared to 2012, 2011 and 2003 because the share of food and beverages in 2014 was 5% lower than in the aforementioned three years.
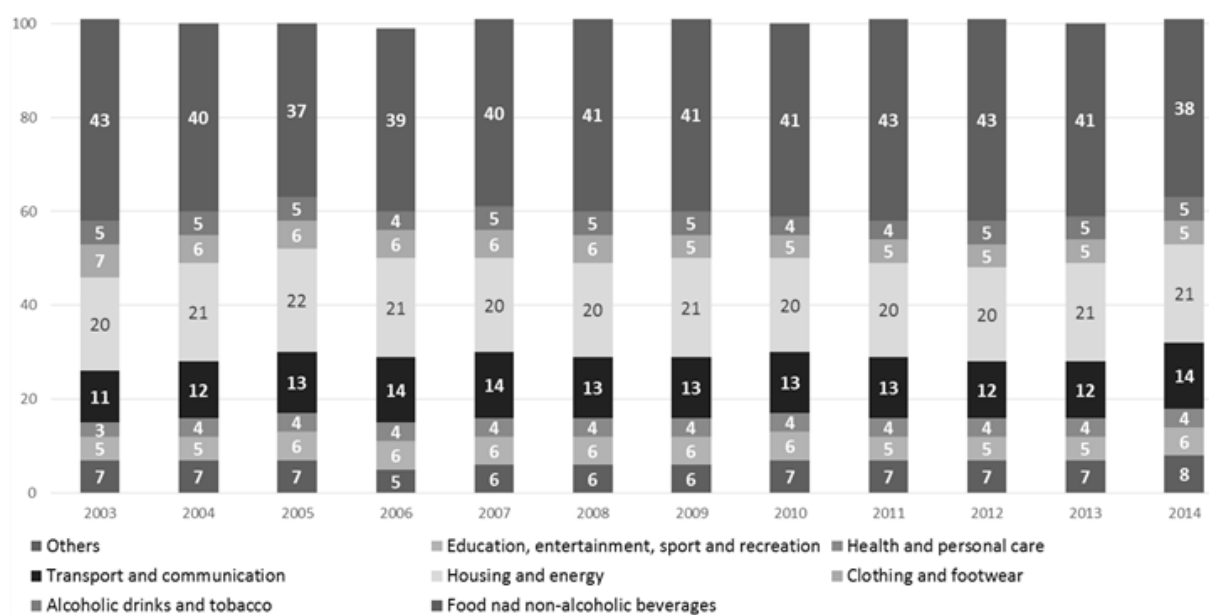
Figure 2: The structure of personal consumption by current prices
Source: Statistical Office of the Republic of Serbia

Nearness as the main factor affecting the selection of store

According to the research of the agency GFK, using the methodology panel of trade led to the result that the total share of TOP 10 retail chains in Serbia is at the level of about 31% and that the traditional trade still holds primacy in this market, what can be seen in figure 3 (Figure 3). From this might perhaps be concluded that the average Serbian consumer purchases in traditional stores because they suit their needs best, however, it is not like that.
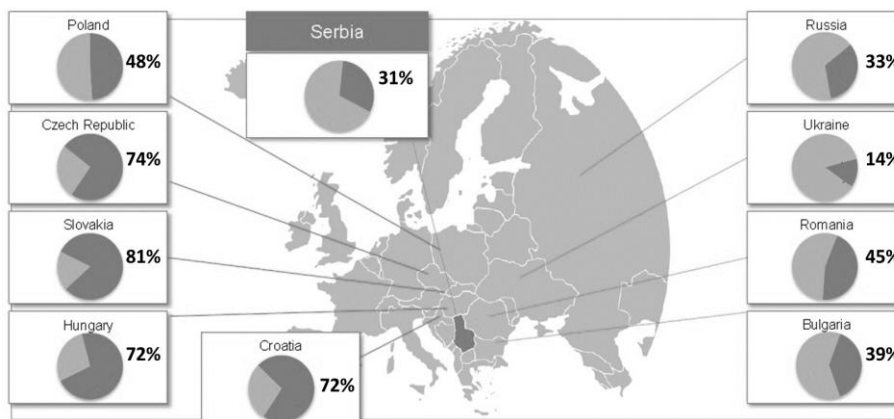
Figure 3: Concentration of Top 10 Accounts accros CEE in 2014
Source: GFK Serbian Retail monitor / March 2015

According to the research agency, this can be seen in figure 4 (Figure 4), the answer of GFK customers to the question which is the main factor that affects their selection of store in which they will do the shopping say in a close one. So, if a store is near the apartment in which they live or near the organization in which they are employed, then that precise store will be the place for their purchase. Particularly interesting is the fact that only 4 out of 13 factors are allocated by the fact that a number of respondents has qualified them as "the major reason". From this we can conclude that out of all, there are only 4 reasons on which the buyer chooses the shop where he/she will do the purchase.
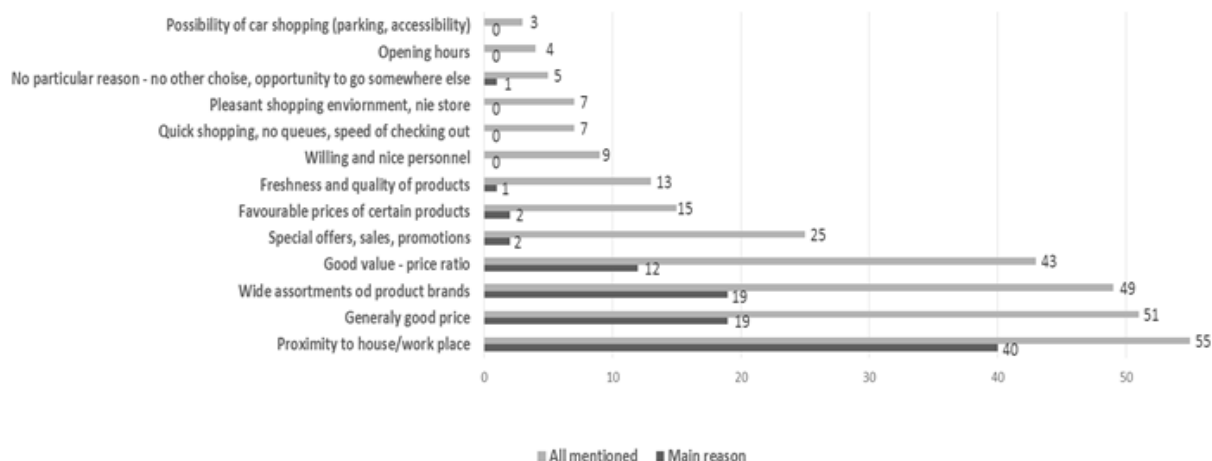
Figure 4: Reasons for choosing main retailers
Source: GFK Serbian Shopping monitor 2014/2015

Most customers buy mainly in the same store

Although in the aforementioned table shown in figure 4 (Figure 4) we could see that the strongest factor is the nearness of store, it is useful to know the fact whether the customers are loyal to stores in which they buy. Shopping Monitor study conducted by GFK agency, which can be seen in figure 5 (Figure 5), showed that 57% of customers say that their purchase is usually done at the same store, which actually supports the fact that they buy in a store nearest to them.

Most of the money is spent on Saturdays

According to the research conducted by the agency GFK, in order to determine the days on which consumers are willing to do a major purchase, the result is that Saturday is the day when the largest purchases are done, as shown in figure 6 (Figure 6).
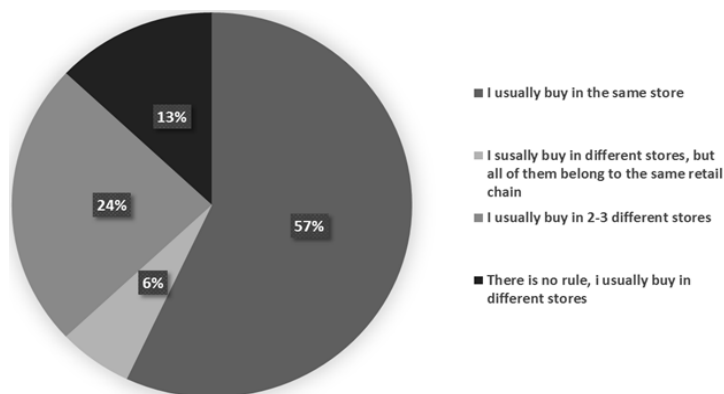
Figure 5: Loyalty when large shopping
Source: GFK Serbian Retail Monitor 2014/2015
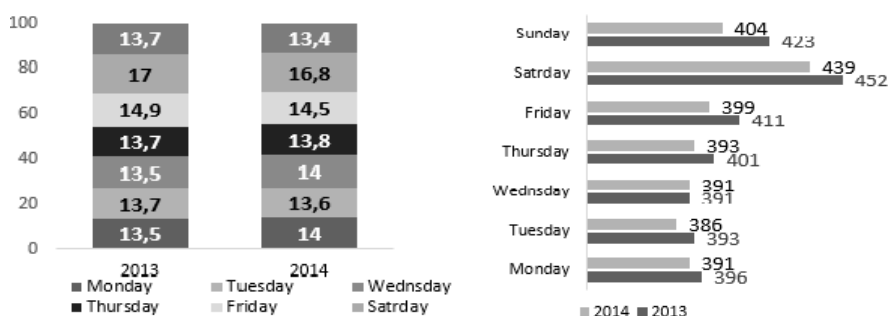
Figure 6: Turnover distribution and spend per trip by days of week
Source: GFK Serbian Retail Monitor 2014/2015

DEVELOPING OF MARKET TRADEMARKS

Although we are witnessing increasingly strong development of commercial brands, campaigns promoting their price and quality, buying these products, at least when it comes to Serbia, is still at a low level. Trade brand commonly represents a brand with a large number of items in various categories that can be purchased only in a commercial chain that guarantees its quality. This means that the retail chains hire producers which, on their behalf, produce the product for which they are specialized. Products of private brands (Private label or PL) by their quality do not differ from other products on the market, and their competitive advantage is the lower price. It is achieved by minimizing the costs of marketing, because the PL is recognized by the dealer, and so it creates one of the strongest factors of loyalty among customers who recognized the level of quality that suits them in these products and the lower price that guarantees savings in purchasing.
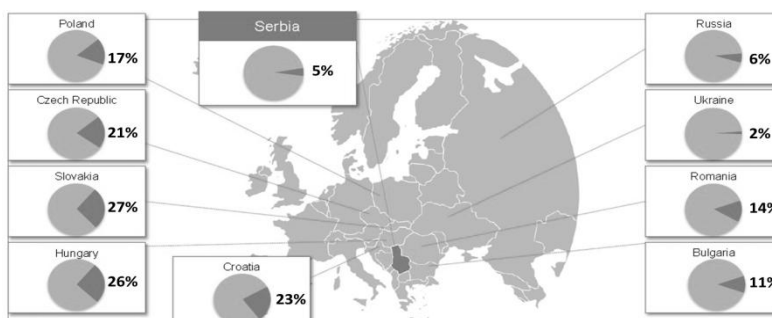
Figure 7: Share of private labels across CEE in 2014
Source: GFK Serbian Retail Monitor 2014/2015

From the research carried out by the GFK agency, which can be seen in figure 7 (Figure 7), it is clearly indicated that the Serbian market, in terms of products share of trading brands in the total turnover, is still not developed as some markets of Central and Eastern Europe. We see from the chart that it can be concluded that some of closest European Union countries have a share of PL products that exceeds 20%.

The structure of PL products is dominated by purchases of food

If we look at the research conducted by agency GFK, from the results we can conclude that the structure of PL products in Serbia is such that almost 90% of total turnover of these products consists of food and beverages, while products from the category of personal hygiene products and products for cleaning the apartment together have the share of just over 10%. This attitude may point to the fact that the range of categories of commercial brands is underdeveloped, although it can be said that increasing private label assortment share thus appears to constitute the key supply-side factor in augmenting sales share on the grocery retailing market.
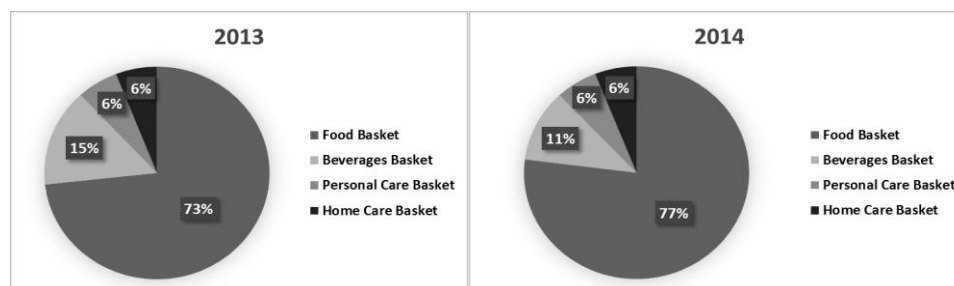
Figure 8: Structure of private labels of different baskets
Source: GFK Serbian Retail Monitor 2014/2015

CONCLUSION

The results have showed that the average Serbian customer does not primarily buy in stores of the largest retail chains, their household budgets is distributed in much the same way for years, purchasing in a store that is nearest to him, and there are only 5% of the retail brands in his shopping basket. Precisely these consumer habits have proved to be one of the obstacles for the development of organized trade in Serbia and based on them, we can conclude that the significant growth of organized trade will be reached just by increasing the availability of shops of 10 largest retailers. The entry of new retail brands on the market or increasing the retail network of those who are already doing business in our market a share growth of TOP 10 retail chains will be achieved, but also the increase of products share of commercial brands in their everyday purchases.

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THE IMPACT OF INTERNAL COMMUNICATION ON SUCCESS OF CSR CAMPAIGN MERCATOR-S CASE STUDY

UDC: 005.57

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ABSTRACT

This paper focuses on the importance of internal communication as an important part of PR, which influences corporate social responsibility campain (onwards CSR) success. This statement will be presented in the case study of Mercator-S company, which has managed to engage a large number of its employees and attract media attention to one of its performed activities and all through good internal communication. The result of this well-organized CSR campaign, called 'IDEA Caravan' (December 2015) reflects in engaging 2.000 employees, great social media buzz, 95 different press releases in print and e-media, which commercial value amounts over 55.000€, and PR value almost 200.000€.

Key words: Internal communication, Public Relations, Corporate Social Responsability

INTRODUCTION

Corporate social responsibility has been gaining popularity for a long time world-wide and recently in Serbia. Customers and the general public consider companies largely responsible for activities of wide social importance and increasingly think if the brand they trust is responsible to the community where it belongs. In order to benefit from numerous advantages of nurturing socially responsible behaviour, companies strive to affirm their ideas and sense of care for other people's needs, promoting all activities towards the solution (Veljković & Petrović, 2011). Increasingly, corporations are indeed being held accountable not only for profitability but also for their actions related to social issues and problems. Much of this new "corporate consciousness" has come in post-Watergate years as public opinion seemed to become more powerful. Increasingly, corporations are indeed being held accountable not only for profitability but also for their actions related to social issues and problems. Much of this new "corporate consciousness" has come in post-Watergate years as public opinion seemed to become more powerful (Toth & Trujilio, 1988). The concept of socially responsible business is used with the aim to build the key points of differentiation from competition in that segment.In this way, the company strengthens its corporate and market brend and sends the message to its customers, employees, business partners and media, that it is a part of local community, alongside with them. After a large number of scientific papers, books and media messages about the world as a 'global village', companies have got used to sending their messages and doing activities globally. However, the world financial crisis from 2008 has made the majority of world leaders urge their people to buy domestic products, as a means of fighting the crisis. From that moment on, the message 'We are a part of the local community' has become even more important for the company development.

The influence of socially responsible activities on the results of the company's business

An experiment has identified the significant influence of socially responsible activities on company's reputation and creating a positive public perception (Pfau,Haigh, Sims &Wigley, 2008). Based on the current experience from multinational companies, key benefits from investing into socially responsible business (Kotler & Lee, 2007, Corporate social responsibility, do the most for your company and for selected social goal: the best practices of leading company):

– **Sales and market share increase** customers are inclined to buy brands which support social aims. According to a number of researches into corporate social responsibility in Europe (2002), up to 70% European customers considers company's socially responsible policy an important element when buying goods or consuming services;

– **Strengthening the brand position** customers increasingly mind the emotional, psychological and sociological aspects of the brand image, overcoming the questions of functionality and rational benefits gained from the product. Strategically planned social initiatives can lead to the differentiation of the brand in comparison to the competition. Moreover, if the customers consider a company to be ethical and socially responsible, there is a higher probability that they will be loyal to the company's brand;

– Strengthening of corporate image and influence companies which, next to respecting the law, deliberately adjust their business with one of the standards for social responsiblity not only comply to the prescribed requirements, but also gain trust and sympathy from state and local authorities and therefore are less frequently controlled;

– **Strengthening of possibilities for attracting, motivating and keeping the employees** – the employees are increasingly assessing companies not only by the salaries, job descriptions and possibilities of promotion, but also by the company's corporate culture, dominant values and readiness for engaging in socially useful initiatives;

– **Minimizing business costs** companies adopting ecological initiatives, with the aim to minimize waste, reuse materials, recycle, spare water and electricity, minimize their OPEX and increase profit from grants and discounts which they get as the ecologically responsible businesses.

– **Increasing the attractiveness for investors and financial analysts** a positive social image can increase the company's stock value, since the market prefers the companies with lower social, ecological and ethical risks (Dow Jones Group Sustainability Index, FTSE4Good Index Series...). Environmental and social responsibility when investing (Socially Responsible Investment) is publically moniored and published. A growing number of joint funds integrate their corporate social responsibility criteria into their selection process and deny loans to companies which do not comply to certain environmental and sociological standards. Big investors like pension funds have to invest into companies which are considered socially responsible.

Internal Communication Is The First Step In A Huge CSR Campaign and good PR results

Internal communication is an important segment in creating large CSR and PR campaigns, since corporate storytelling significantly influences the employees' engagement, increases their loyalty and ultimately creates a better external image. In this way, companies strengthen their CSR public credibility, and sends the image of a champion to their employees. (Gill, 2015). Based on a research dne in Danish companies, the employees are presented as a key component to building reliability, since good CSR communication is developed 'inside out' (Morsing, Schultz & Nielsen, 2008). Set up like this, a CSR campaign which succeeded to build a basis for the entire action, is 'ready' to give a result 'outside' as well. An often misunderstood part of the marketing mix, public relations is much more than sending out news releases and pitching stories to the industry or consumer press. The PR umbrella covers a multitude ot activities, all of which involve communicating specific messages to various target audiences both intemal and extemal. Too often, companies and organizations forget that some of their largest, most important and most influential constituents arc on the inside their employees, board members or association members, Public relations programs create awareness and support among a company's or organization's target audiences for its products, services, mission, philosophy and approach to doing business. It helps build credibility that advertising cannot (Vass, 2007).

Here are some tried and true steps in establishing an essential internal public relations program that will enhance your extemal PR (Vass, 2007):
– Survey The Landscape
– Develop A Core Communications Document
– Get Senior Management On Board
– Engage Middle Management
– Have A Dialogue With Employees, Not A Monologue
– Determine The Right Communications Channels
– Measure And Report Results
– Stay The Course

CORPORATE SOCIAL RESPONSIBILITY MERCATOR-S CASE STUDY

With the wish to enhance the image of retail brand IDEA even more, company Mercator-S made the decision to, in cooperation with some state authorities, Ministry of work, employing and social policy, organized a socially responsible project through which the company's employees would visit all the institutions for children without parental care, give a show and New Year presents. The company wanted to point to the children without parental care, who firstly need care and then presents as well. The campaign was implemented as folows:

1. **Target group** by initiating a New Year's marketing campaign named 'Volimo praznike jer volimo jedni druge' (We love holidays because we love each other) IDEA wanted to, in addition to all the marketing tools, include a CSR action to send the campaign message in the best possible way. The mere fact that New Year and Christmas are the period when children are given gifts was enough to mark the children without parental care as the target group, regarding that this is a socially responsible action.

2. **Project partner** in order for the project to have big chance for success, it was necessary to find a partner whose reputation could contribute to better communication, cooperation and finally success of the action. The Ministry for work, employing and social policy is the empowered state authority which organized the communication with orphanages and foster families, which largely contributed to the realization of the CSR action.

3. **Strong internal campaign** given that the slogan 'We love holidays because we love each other' stands not only for giving presents, but also for care, the company decided to create a strong campaign which will make a large number of employees join the action and personally visit the orphanages and give the children presents, all within the campaign. In relation to this, a special issue of corporate bulletin has been released in 9.000 copies and given to each employee. Also, a special issue of corporate newsletter has been issued, promoting everything related to this CSR action. A string of other activities on the topic 'We love holidays because we love each other' has been initiated in order to create the desired emotion before the actual visiting of the children without parental care.

4. **Word of mouth** by creating a campaign which would include a large number of people, regarding te aspect of word-by-mouth message was logical. All te internal information channels communicating this information included all the important messages which were intended to go public and which were presented to the employees with the aim for them to spread the messages in their own way. In this way, an 'image' on the accomplishments has already been created even before the action, so the buzz in general public could be expected.

5. **PR campaign** as the last in the row, a PR campaign was done by inviting media to share the information on this action to the gneral public and in this way stimulate other companies to do similar projects, responsible to the community where they operate as well.

Big socially responsible actions are interesting to both media and publicity

After a successfully prepared internal campaign, about 2.000 employees have visited 65 places in Serbia on 13th December 2015, including orphanages, big children's hospitals and foster families, and handed in over 4.000 gifts to the children without parental care. The involvement of such a large

number of well-informed employees was ready to create a strong word-of-mouth on the very same day and to let the general public learn about everyting related to the action 'from the first hand' through the non-marketing content. After this, it was significantly easier to include media and create a campaign with the record number of posts in 2015. There is the opinion that PR is more of an art than a science and its effects are extremely difficult to measure. The main problem is in te fact that it is very difficult to separate the effects of PR from the effects of other units and external circumstances (Black, 2003). For instance, if the sales of a product increase, how big is the credit of PR there, how big the marketing's, or it is the result of a change in the environment like weakening of the competition, increased customer needs etc. (Nikolić, 2012*)*. However, it is very important to evaluate the PR activities of this campaign, so the Real Time Press Clipping agency's methodology has been accept. The CSR campaign 'We love holidays, because we love each other' has recorded 95 printed and e-media press releases in just a few days after it was done. Their commercial value amounted over 55.000€, and PR value almost 200.000€. In order to better understand the methodology behind these figures, we should know that the commercial value of posts is calculated in accordance with the positive price list of commercial space, whereas the PR post value is calculated using the qualitative factor as well, so the negative publicity is calculated as -4 x commercial value, mainly negative as -2 x, neutral 1x, mainly positive as 2x commercial value and very positive as 4 x commercial value. The results achieved in the field of public relations point to the fact that the CSR campaign 'IDEA caravan' was a complete success.

We can see the ratio of media space occupied by Mercator-S in December 2015 (IDEA, Roda, Mercator centar, and Mercator-S corporate brand), and the space occupied by CSR action IDEA Caravan. In only one day, this well-planned action has gained:
−   23% of total number of posts about all the actions and campaigns by Mercator-S in December 2015;
−   19% of total commercial value from all the company's posts in that month;
−   29% of total PR value achieved by all Mercator-S brands in the given period.
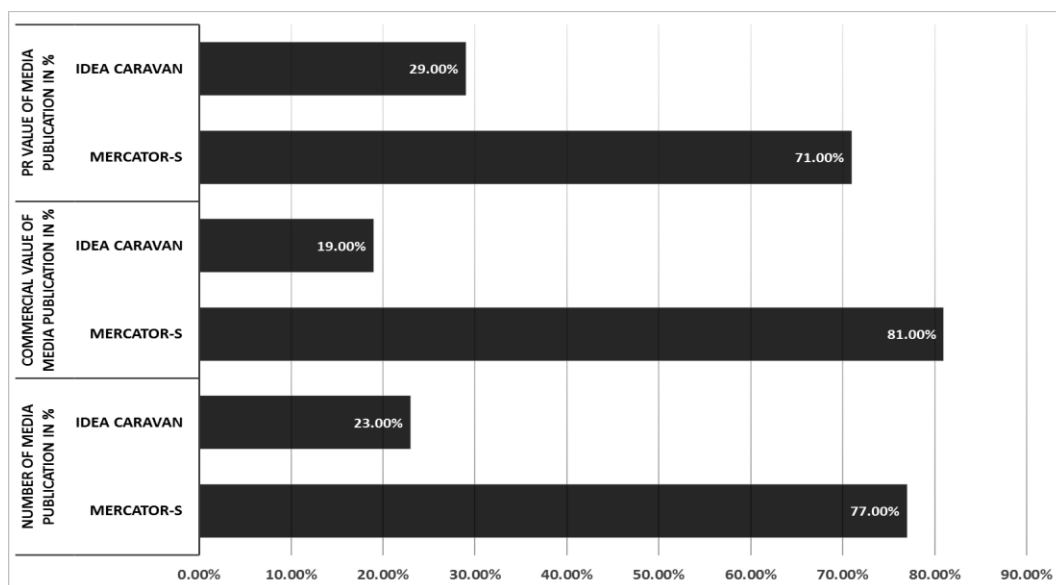
Figure 1: PR campaign in media – Mercator-S vs IDEA caravan
Source: Mercator-S

The 95 press releases is undoubtedly the indicator of the fact that engaging 2.000 employees and the program of CSR action are more than just marketing and were sufficient to start the media reports. However, the quality an tone of reporting cannot be monitored here. As it can be seen in the methodology mentioned above, the commercial value indicates the media space in which the posts are planned and PR value of the posts takes the way of communicating the message into account. The company Mercator-S managed to create the result of 412 e-media posts, which PR value amounts to

673.676,08€. IDEA caravan achieved 95 posts within only a few days after the campaign, which value amounted 198.066,44€. If we wanted to see the 'way' in which the messages are sent, then we could do it by dividing the total PR value with the number of posts, so we get the average value of one Mercator-S PR release of 1.635€ and the average value of a CSR post from the IDEA Caravan action of 2.085€.

This result undoubtedly points to the interest, quality of reporting and readiness of media for promotion of big socially responsible actions, related to all the other activities. However, apart from the good results in the field of PR, according to (Veljković & Petrović, 2011) the adequate promotion of corporate social responsibility inside a company has the following benefits:

− Increase of work morale
− Greater pride of employees related to the job they do
− Easier maintaining of quality and talented people in the company
− Employees' greater loyalty
− A more intensive work engagement and increased productivity
− Greater business efficiency
− Better cooperation by employees, as well as with top management

CONCLUSION

There is no doubt that the internal communication before the socially responsible campaign significantly contributes to the engagement of a large number of employees in these actions, and makes multiple contribution to the campaign results. It can be concluded that engaging a large number of employees in a socially responsible action was interesting for media promotion, together with the company itself. The result of a well-planned CSR campaign was engaging 2.000 employees, great social media buzz, 95 press releases in print and e-media, which commercial value exceeded 55.000€, and PR value was almost 200.000€. This data, especially the ratio of average PR value per one release, clearly signal the readiness of media to recognize significant socially responsible campaigns engaging a large number of employees, but also the readiness to give a significant media space and better reporting to these actions. The paper also shows that investing in good socially responsible campaigns and engaging a large number of employees, due to the way of reporting, mainly contribute to significant company image improvement in public. Moreover, it provides free media space for companies and brands to build even stronger relationships with customers, business partners and state institutions.

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CONSUMERS' PREFERENCES FOR STREET FOOD: EMPIRICAL STUDY

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ABSTRACT

The world's population can be studied by discovering its culture, traditions, language, or the gastronomy. Exploring street food is the easiest way to get to know the gastronomy of a country. Street food is a gastro-social area where exchange, liaisons and communication are being established between the known and the unknown. This form of gastronomy unites people different by gender, profession, status and education and is an important indicator of how people live and what values are important for the community. Street food can take people, more than any other gastro trend, through the world, revealing the true jewels of cooking and the lesser known places. Gastronomy of street food has created one of the most beautiful ever made mosaic embroidered with habits, traditions, recipes and ingredients of vivid colors. Time, history and creativity maximally participate in this process, bringing the consumer behavior interesting for research. The aim of this study is to explore the attitudes of consumers towards street food in Serbia as well as key factors that influence their choice during consumption.

Key words: Street food, preferences, gastronomy, Serbia.

INTRODUCTION

Inclination to cooked meals, which demand great time investment and attention, is related to tradition and very often to the understanding of traditional woman's role in a family. However, nowadays, considering the changes in relations between the sexes, as well as the desire to save time and work during food preparation, fast food and street food, which is also called ready-to-eat food, consumption is becoming more and more frequent nutritional trend among different socio-economic categories of consumers. Consumer appeal for a ready-to-eat product is forecasted to grow rapidly over the next 5 years as consumers demand convenient snacks with exciting sensory and textual properties (Brennam et al., 2013).

Street food is defined as "ready-to-eat" meals, snacks, and beverages sold by vendors or hawkers in streets and other public places (FAO, 2011). Street food is usually sold in busy public areas such as pavements, school premises, beaches, rail and bus stations (CI, 2011). Many researchers consider that street food has a long tradition due to a lot of factors: unemployment among women, little time to prepare food before leaving for work, whether women in the house are working or not, sheer urbanites lifestyle and hours spent away from home among others (Maxwell et al., 2000; Cohen, 1985; Draper, 1996). The expansion of street food trade has also been due to the substantial demand for food services not met by the formal sector of restaurants; canteens and other eating places (Delisle, 1990; Maxwell et al., 2000).

Approximately 2.5 billion people consume street foods on a daily basis, and the majority of them live in developing countries. Most of them rely primarily on street food for their daily intake of micronutrients and protein (FAO, 2011). A study by Ayo et al., (2012) indicate that those who are highly educated are less likely to consume street food because they understand the importance of healthy living and are more likely to obtain, process, interpret, and apply knowledge that shapes nutritional or dieting practices.

As for the relation between food consumption and age, dieting pattern changes due to factors such as food availability, new information, new cumulative experiences, and physiological changes as one grows (Wendt & Kinsey, 2007). Based on a study conducted by Blisard, (2001) it is noted that the youth spends less on food at home than the older generations. Most of them depend on street food as that is the lifestyle of many urbanites but these declines as they grow. This research is in accordance with an earlier research which showed that the quantity of food a person consumes outside home decreases with age, which therefore relates to lower consumption of street food (Ayo et al., 2012).

IMPORTANCE OF STREET FOOD AND HER GASTO SOCIAL ASPECTS

Street foods are generally sold from stands/stalls (usually not permanent structures) on the pavement of busy streets in both urban and rural areas, usually at a lower cost than fast foods. Hence they provide an accessible source of food to poorer people. Generally only a few food items and beverages are for sale and many vendors sell the same items (Steyn et al., 2011). Street foods are most commonly sold in low- and middle-income countries and the types of food sold vary according to socio-economic status of buyers and the food culture of the local people (Freese et al., 1998).

The importance of street food is manifold. Street food expresses the wealth as well the strength of a country, eating habits and social rules. It filters many events through religious, sacral, business, protest, and many other manifestations and events. Street food is doubtless an expression of cultural identity, both in the place of permanent residence and outside it, which makes it a multifunctional gastronomic product through which it is possible to get to know the variety of cultures.

Street food significantly influences the decrease in general cost of nutrition, and we can say with certainty that it represents a form of global transformation of attitude to the world. This "modest" taste often has to sacrifice momentary appetites and enjoyment for other aims of primary survival. Because street food is generally inexpensive, readily available, meets the need of immediate hunger, and provides vendors with a source of income it needs to be recognized that street foods contribute to individual and to household food security (Steyn & Labadarios, 2011).

Many street food consumers are richer in cultural than in economic capital, and therefore they are led to an ascetic consumption of necessity in all domains. Their conscious resourcefulness and lucidity confronts the search for original exotic food at the lowest economic price (Chinese, Indian, Thai, Italian cuisine) or populism.

One of the advantages of the street food culture is that it stimulates the use and demand of traditional foods and agricultural produce which may otherwise be overtaken by Westernization of diet. Secondly, it may add value to tourism as has been the case in Singapore's popular markets (CI, 2011). Because street food is generally inexpensive, readily available, meets the need of immediate hunger, and provides vendors with a source of income it needs to be recognized that street foods contribute to individual and to household food security.

It is very little known about street food in Serbia, although this sector is very developed in terms of employment provided and sales of food. There is also a paucity of data on street foods as well as in fast food, sold in Serbia, particularly with regard to types, frequency of use and preferences.

EMPIRICAR STUDY

The research was conducted in Serbia, in March 2016, on a random sample of 586 respondents. The research results refer to attitudes and preferences of consumers to fast and street food. The questionnaire contained demographic questions (Table 1) as well as questions related to attitudes and preferences of consumers together with the evaluation of the most important characteristics considering the choice of fast food. The average age of respondents was 23.72 years old (SD=6.389), the youngest respondent was 17, and the oldest was 62. Even 80% of respondents were up to 25 years old.

Table 1. Demographic data

Variable	Description	Count	Percentage (%)
Gender	Male	155	26.5
	Female	431	73.5
Education	Elementary school	12	2.0
	High school	393	62.1
	Higher education, College	56	9.6
	University (graduate, undergraduate)	98	16.7
	Masters degree, magister	21	3.6
	PhD degree	6	1.0
Status	Employed	110	18.8
	Unemployed	43	7.3
	Retired	2	0.3
	Student	418	71.3
	Pupil	13	2.2
Monthly income (per household member)	Up to 21000 RSD	191	32.5
	21000-50000 RSD	298	50.9
	Over 50000 RSD	97	16.6

The analysis of the frequency of fast food consumption has shown that most respondents (38.4%) rarely consume fast food, and slightly smaller number (36.7%) consumes this kind of food once or twice a week. 18.3% of respondents consume fast food three to four times a week, and only 4.3% of respondents consume it five to six times a week. The number of those who consume fast food every day is the lowest (2.4%).

When asked about how much they expect to spend on a fast food meal (see Figure 1) for majority of respondents said they are willing to spend between 200 and 300 dinars (48%), whereas the number of those who are willing to spend up to 200 dinars is somewhat smaller (40.3%). Only 9% of respondents would spend between 300 and 400 dinars, while the lowest percentage is of those who would spend more than 400 dinars for this kind of meal (2%).

Considering the high percentage of those who would spend a small amount of money on fast food, one may conclude that those are the consumers who would rather opt for street food, having in mind its financial affordability. These results are consistent with the research conducted by Infosan (2010), which concluded that street food plays a vital role in providing low cost meals for urban dwellers, particularly those in the middle income, who constituted the majority of respondents in this research, which can be seen in Table 1.
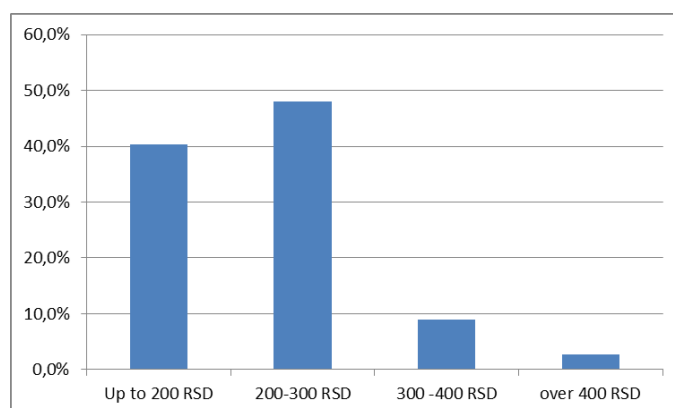
Figure 1: The ampount of money spent on a fast food meal

The analysis of places where fast food products are most often consumed has not shown a dramatic difference in the percentage of those who consume it in the street (34.1%), those who order take-away food (35.35%) and those who eat it in a restaurant (30.5%). The high percentage of respondents who consume fast food in the street (see Figure 2) presents a great market potential for street food vendors, as a main source of food for many people in Serbia, especially those with lower incomes. High income groups would rely more heavily than the poor upon the formal restaurant sector for the food eaten outside home but this is not to say exclusively that street food is for low income groups (Delisle, 1990).
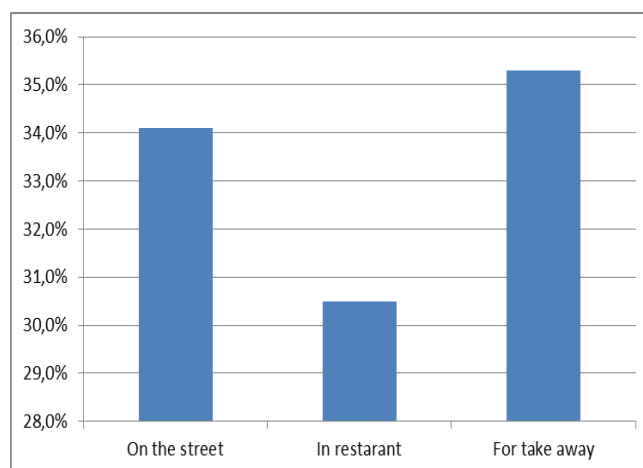
Figure 2: Way of fast food consuption

When asked about the time of day when they most often consume fast food, a great majority (49.3%) answered that they do it during the day, which is the expected result considering the lack of time for preparing food at home, so many modern families as well as individuals tend to prefer convenient, quick meals to rather traditional long meals. In the evening, fast food is consumed by 34% of respondents, in the morning (until 12 pm), it is consumed by 11.1%, and the lowest number of respondents (5.6%) consume fast food at night.

In this research, the respondents were also asked why they eat fast food, and they were given a possibility to state several reasons, so the total of 1180 answers were received (see Figure 3). The obtained results show a variety of reasons for the consumption of this kind of food. The most stated reasons from the total number of given reasons are speed, which 34.49% opted for, as well as the proximity of a fast food restaurant (25.85%). The smallest number of votes was given to quality (1.27%), discounts (1.95%) and socializing (3.14%).

When asked what they usually eat, 26.58% of total 1411 responses, was given to pizza, 26.51% was given to grill and 25.73% to bakery products. Half of them voted for pancakes (12.97%), while salads

got the least number of votes (2.69%). 599 votes obtained from the total number of respondents (349) consuming international fast food show that the most consumed food is Chinese (34.72%), and then Italian (28.55%), whereas twice less present were the Greek (16.86%) and Mexican (10.02%). The least number of respondents opted for Israeli (7.18%) and Japanese fast food (2.67%).
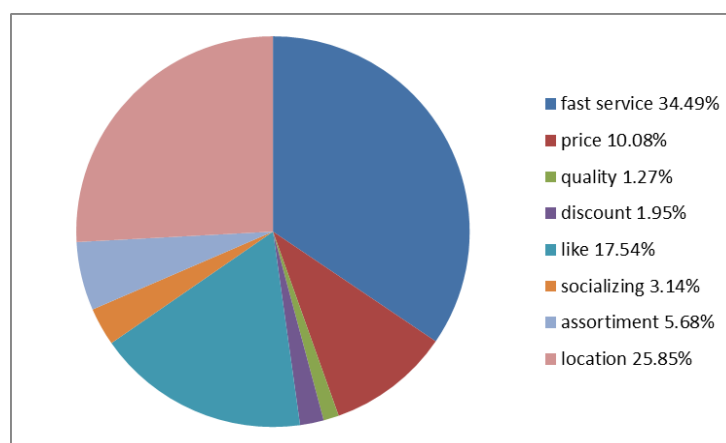
Figure 3: Reasons for consumption of fast food

Furthermore, the respondents evaluated the satisfaction of assortment of food in Belgrade on a scale from 1 to 5, with score 5 suggesting that they are very satisfied and score 1 suggesting that they are dissatisfied. Despite the presence of all scores, with the average score 3.66 (SD=0.928), we could say that the respondents are mostly satisfied with the existing assortment. The smallest was the number of those who rated with the score 1 (2.4%) and the largest number of respondents rated with the score 4 (38.2%).
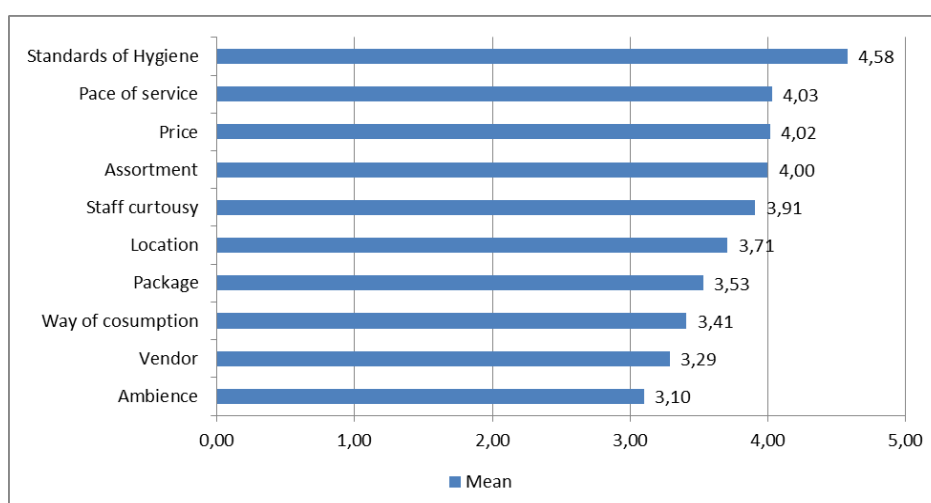
Figure 4: Importance of fast food characteristic

Beside attitudes and habits in consumption of fast food, this paper analysed the extent to which certain characteristics are relevant when buying (see Figure 4). The respondents evaluated a total of ten characteristics on the scale from 1 to 5, where 1 meant "it is irrelevant to me", and score 5 meant "it is essential for me". The results show that hygiene standards, speed of service and price are the most important when buying, while the least important are ambience, sellers and the way of consuming. What is interesting is that each score appeared at least once in all ten criteria, which points to their diverse distribution. However, regardless of the diversity of scores, an approximate average value of most characteristics cannot give a detailed picture of consumer preferences, which could be otherwise achieved by applying more sophisticated methods such as Conjoint analysis.

CONCLUSION

Street food is mostly sold in countries with low average income, including Serbia. The variety of assortment depends on the socio-economic status of the consumers and their eating habits. The results of the study show that three most wanted categories of fast food are pizza, grill and bakery products indicating that these products can easily undergo the category of street food since their price usually doesn't exceed 200 dinars, the amount that most respondents were ready to pay for a meal. In this way it is possible to stimulate demand for traditional Serbian gastronomic products by linking them with ever more powerful street food culture.

Despite the fact that the satisfaction with fast food assortment in Belgrade was rated 3.66, expanding the range of street food, which is usually cheaper than fast food, would make it more available to those in low-income strata, who had a significant share in the sample (Table 1). In addition to traditional street food products already being sold in our country, street food supplies should be enriched with international street food products, since 349 claimed that they consume this kind of fast food. In this way street food sellers would attract some new consumers on the market segment as well.

Street food in Serbia is a necessity, search for a cheaper meal, and at the same time it is a flexibility and ability to discover new tastes and places that an individual is barely aquainted with. It contributes to the authentic gastronomic experience, offering a link between food, place and tourism.

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OPTIMIZATION OF THE PURCHASING PROCESS IN SLOVENIAN COMPANIES

UDC: 005.936.41(497.4)

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ABSTRACT

Purchasing is responsible for uninterrupted supply of materials and services, inventory management, supplier relationships, company ethics and social responsibility. It is closely related to logistics and its strategies. And it has a significant impact on the cost of raw materials, competitive advantages and consequently on company`s profit. Optimization of purchasing process brings many advantages for a company: improves the efficiency of the purchasing function and has the impact on the performance of supply management. We have focused on the optimization of purchasing process in Slovenian companies. With the questionnaire which was sent to medium sized and large companies we have presented the importance of optimizing purchasing process, its impact on purchasing management performance and on the company`s profit. The findings showed that Slovenian companies have made the shift in mind set and understanding of purchasing function. Activities for optimization of purchasing process are becoming increasingly integrated into their business. Based on the research results we have developed the basic steps of the purchasing process optimization model which could help companies in developing their own models.

Key words: Purchasing optimization, inventory management, supplier relationships, supply chain optimization model

INTRODUCTION

Optimization is a technique that is used to assist in achieving savings or cost avoidance. At the same time improving productivity and increasing the credibility of the purchasers of its purchase decision, since only this accurately identifies costs of individual alternatives (Branch, 2006). Today we have available a number of commercial applications, which are a combination of mathematical models and software and computer hardware equipment. They allow us to analyze a number of different offers and scenarios and to identify the optimal purchase decision.

Optimizing gave benefits in three major purchasing areas: productivity, cost (price) and transparency of decisions. Productivity means that the purchasing manager can in a shorter time to analyze the offer, at the same time improves the quality, because the resulting data are of a higher quality. The biggest benefit that it brings optimization is definitely a cost saving. The task of optimization is that in the given conditions, find the most suitable solution. Very important is also the third area; transparency of decisions. Purchasing manager must be able to react in the event of unforeseen circumstances and to make the right decision regarding the selection of the supplier (or remain in the existing supplier and pay more or find a new supplier (Giunipero et al. 2012).

OPTIMIZING THE SUPPLY CHAIN

A comprehensive approach to optimize the supply chain must contain all the factors that determine the quality, time and cost effective purchasing. The objectives of such an approach are: optimization of

purchasing costs, improve prices and conditions, the introduction of best logistics warehousing concepts, efficient processes, effective control processes and further partnership after the procedure (Carter et al. 2007; Linton, et al. 2007).

The project to optimize of the supply chain consists of three phases.

1. **Analysis of of unused potential**
   At this stage we analysis of the purchasing function. In doing so, we look at the structure of groups of materials and suppliers, the basic principles of procurement, operations and organizational structure, already used to purchasing markets and concepts of warehouse operations. The results show the potential savings in percentage and value.

2. **The implementation phase**
   Management of suppliers: The objective is to reduce purchasing costs through the entire chain. The starting point of the systematization and analysis of the existing groups of materials and structure of suppliers and creating transparency by analyzing the quantity and value of procurement. The need for a structured collection and processing of information on existing and potential suppliers (Duffy, 2007). Purchasing logistics and inventory management: (Lambert et al. 1998; Jonsson, 2008). The aim is to achieve one hundred percent security at a maximum speed of stock rotation and the lowest possible capital weave. After a thorough analysis of the development of inventories of materials and the strategies used to reduce stocks are identified cost concepts for each group of materials. Organization of purchasing and management of breakpoints: The objective is to achieve optimum use of funds through clearly defined internal and external procurement processes. After analyzing the existing structures to produce a set of proposals for organizational changes. The aim of supporting management of breaks points early integration of the purchasing department for purchase the important decisions taken by other departments. Controlling the purchasing and indicators: Controlling purchasing serves as a control tool for those who make decisions. Purchasing staff for indicators comprehensively monitors the cost situation and actively influence the development on the basis of faults points (Ming et al. 2014). Support global supply: With the participation of all key employees in the purchasing process to first determine the overall demand for materials and identify materials which could be more favorably purchased on international markets.

3. **Checking the effect on profit or loss (gain / loss)**
   The aim is to explore the extent to which forecasts real impact on business around. This analysis can identify the readjustment of the purchasing function.

EMPIRICAL FINDINGS

The target group was Slovenian companies with more than 50 employees, i.e. medium-sized and large companies. The sample consists from 107 companies throughout Slovenia. Survey questionnaires were sent by e-mail in advance at selected companies from various industries. We used ad-hoc probability sample, as we surveyed companies randomly selected from the group of medium-sized and large companies. The companies included in the sample are distributed according to industries as follows. 56% of respondents belong to production oriented companies, 25% of respondents belong to trade oriented companies and 19% were services oriented companies.

Most (66%) of participating companies is medium-sized businesses, which means that they have 50 to 250 employees. Their annual income in 2014 ranged between EUR 760,000.00 and 800,000.000,00. Questionnaires were filled persons working in the purchasing department. In 79% of the questionnaires filled in by managers. The geographical location of their procurement markets are mostly Central, Western and Southern Europe. Respondents evaluated the importance of 12 criteria for the success of supply chain management. The results are shown in table 1. For the most companies the

cost of production for products and services is the most important activity in order to achieve optimization of the purchasing process.

Table 1: Success of supply chain management

Success Factors	Average Importance Score (1 = low, 5 = high)
Application of the standardized Information system	4,57
Analysis of costs for goods and services	*4,78*
Cooperation with suppliers and customers in reducing costs	4,52
Integrate suppliers into the new product/service development process	4,24
Training of employees	4,48
The measurement of purchasing management performance	4,57
Development and implementation of long-term supply strategy	4,57
Internal cost reduction	4,73
Create synergies between business functions	4,23
Purchasing Cooperation in the development of innovation	4,15
Contracting with key suppliers	4,68
Adopt ISO certification	4.57

In this study, we wanted to to identify which external factors have the most influence on the success of supply chain management. Of the 15 factors, respondents gave the greatest importance lack of strategic raw materials on the market. (Table 2)

Table 2: Factors of the external environment

Key Factors	Average Importance Score (1 = low, 5 = high)
The liberalization of trade	3,14
The entry of new competitors on the market	3,90
Change in customer needs	3,72
Migration of population	2,73
Complex environmental legislation	3,85
An increase in interest rates	4,15
Increasing oil prices	4,06
Lack of strategic raw materials on the market	*4,71*
Instability in the global market due to terrorism	3,77
High fluctuations in value of the euro	4,08
Change in legislation	3,70
Changes in the management company	4.57
The expansion of new markets	3,17
Outsourcing	2,95
Increasing pressure from existing competitors	4,03

DEVELOPING A MODEL TO OPTIMIZE THE PURCHASING PROCESS

Preparing to Optimize

Good preparation is the key to success in every activity, including optimization. For successful implementation of the optimization we can use the following approach:

Step 1: Develop a project team

The project team should consist of representatives of the purchasing department, production, sales and finance. All members must confirm that they understand the goals of the company and that their work will respect and follow them.

Step 2: Overview of the activities and the collection of basic data

The project team have to verify existing purchasing activities and in accordance with the purchasing plan to determine the best long-term acquisition strategy. For greater success it is necessary to make done a comparative analysis of competitive companies.

Step 3: Roundtable

The project team should organize all-day round table on which to invite the top management and owners. It is crucial to understanding the company's vision, growth parameters and requirements to satisfy customers. The first step is to document the objectives of the company and the activities necessary for their implementation. Then define the qualitative factors which we will evaluate proposed solutions in accordance with the financial capabilities.

Step 4: Creation of short-term solutions

Team should analyze the obtained basic data and proposed short-term improvements. Determination of short-term solution, follow these steps:

− Analysis of activities in the purchasing process of the company,
− Analysis of activities in the supply chain,
− Proposals for better and closer cooperation with suppliers.

Step 5: Creating a strategic solution

Team to develop initiatives will require capital investment, long period of time for realization and greater involvement of the entire company. It will be long-term strategic solutions.

Step 6: Preparation of cost / benefit analysis

For all the suggested solutions, both short and long term, we need to prepare a cost-benefit analysis. Based on the results we will be able to choose the correct solution and obtain the information needed to justify the decision.

The project team carries out the following activities:

− determine the costs and benefits related to the costs of implementation, expected benefits and time frame for implementation of individual activities;
− prepare a prioritized list of solutions that have the greatest potential for rapid payback;
− determine the dates for implementation.

Step 7: Preparation of Strategic Plan

Based on activity in the previous step team prepare the strategic plan for the optimization of purchasing operations. For the company's management prepare a final report and presentation of all activities, including the implied potential for improvement plan.

Teams carry out the following activities:

− Future improvements in the purchasing process can be change into initiative;
− define steps to implement the initiatives necessary human and financial resources and time to implement;
− determine the best strategy for their implementation (Cubitt 2004).
− With the proposed approach, companies can optimize their purchasing process and in that way use benefit from a given competitive advantage.

DEVELOPING A SYSTEM FOR EVALUATING AND MEASURING THE PERFORMANCE OF THE PURCHASING PROCESS

Implementation of optimization requires the creation of a system for evaluating and measuring the performance of the purchasing process. For this they need leadership and support of top management, which should provide the necessary financial resources (Seuring & Muller, 2008).

Selected categories must refer to objectives of supply chain management and company as a whole. Some of them are:
a) The effect of the price: The price notes how effectively we spend the money. Most often it works a comparison between the actual and planned the purchase price and the actual purchase price and market index, which measures the supply of certain goods and changing market needs.
b) Cost-effectiveness: In this category we tend to lower purchasing costs. We can compare the cost of certain goods or services over a longer period of time. Any increase or decrease in costs resulting from changes in the purchasing strategy or practice of an individual or group of people. We can also use a method of avoiding the cost, which represents the difference between the price paid and the potentially higher price, which could occur if the purchase would strive to obtain lower prices.
c) The burden of purchasing department: The criterion is an effective indicator of joint work. Its primary objective is to assist in determine the level of workload, providing information to staff scheduling and work assignments. But it also helps to justify the increase or decrease in the number of employees.
d) d) Position of the material and control: This criterion will identify outstanding orders and their maturity date, overdue orders, materials that can be ordered immediately and how suppliers meet required delivery times.
e) The performance of the supplier: Buyers usually accompanied the quality of material, costs and supplier delivery time. This gain insight into the entire operating costs with a particular supplier. Based on the information obtained they can compare the particular suppliers.
f) The performance of the supply chain: We measure how operating various aspects of the supply chain. It can be measured the cost of inventories, procurement, transportation, supply chain management, supplier development (Felix & Qi, 2003). It is very important for purchasing managers to make correct link criteria with the objectives of purchasing strategy and to ensure that the right criteria used to track the performance of each strategy.

CONCLUSIONS

The survey, which was conducted in Slovenian companies, showed that only implement these optimization activities, but it will be necessary to put a lot of effort in order to achieve optimal results. It is essential to choose the correct purchasing strategy, which will be strongly linked to the performance of supply chain management. The survey results confirm that the design and implementation of procurement strategies are very important activities in the company. It is necessary to establish a system for evaluation of employees in the purchasing department to measure the satisfaction of internal customers within the company and pay more attention to the development of supplier partners. We can expect that in Slovenian companies need to optimize continue to grow. It also knowledge and experience related to optimization.

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OBSTACLES TO MEASUREMENT AND EVALUATION IN PR COMMUNICATION

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ABSTRACT

The research presented in this paper is based on analysis of theoretical knowledge on obstacles in the evaluation of business communication. The paper also presents analysis of the attitudes and behavior of PR practitioners when it comes to the evaluation of communication. Special emphasis is placed on the obstacles that may prevent or discourage the PR practitioners to access and evaluate results of conducted communication activities. Knowledge of these obstacles is the first step in the process of solving the same, which can furthermore contribute to development of evaluation as a phase of PR communication, and later on to development of professionalism in PR practices and improvement of business in organization.

Keywords: PR, measurement and evaluation, obstacles, communication.

INTRODUCTION

Every model of communication should provide feedback information throughout process of evaluation. Public relations must be credible, and results of communication measurable so that it could be possible to see if the objectives are achieved. As with every other management activity, public relations also depend on action framework setup, allocation and resource management, and progress monitoring. Evaluation is the process of communication quality and efficiency assessment. It represents the key element of communication strategy campaign. Assessment of achieved results is the basis for gaining new knowledge from experience as a knowledge that could be incorporated in future planning process, so that it could provide continuous improvement of every process (COI, 2009).

The academic approach to PR evaluation could be followed through the last four decades. So far, development of evaluation theory resulted with a numerous successes on the field, mostly in the form of model development, as well as key development and application barrier detecting, which are going to be discussed further in this paper. Researches confirmed that the application of evaluation is restricted with a certain number of influencing factors. Understanding these limitations is the first step in towards their management in practice. This paper reflects on theoretical and practical aspects of PR measurement and evaluation barriers. Paper also gives basic definitions of PR communication and evaluation as a public relation activity.

THEORY RESEARCH

PR measurement and evaluation definition

Public relations could be defined as a strategic process of communication with objective to create, sustain and improve mutually beneficial cooperation between organization and its environment (PRSA, 2012). Evaluation is a process of quality and effectiveness assessment. Every activity within PR communication campaign must be assessed so that the result could be measured. Importance of evaluation is in the knowledge that is provides, and that could be used for improvement of every future communication activity.

According to (Wilcox, Cameron, 2009), PR evaluation could be defined within three frames. Primarily, evaluation is a systematic assessment of PR program and its results. For the PR practitioners it represents responsibility towards client, but also towards him/herself. Second frame defines PR program as planned activities directed towards making meaningful influence, change or maintenance of public opinion. According to this frame, after communication it is necessary to apply cretin research methods, so that program effect could be measured and documented. Lastly, term evaluation is refers to a methodical and properly assessment of progress in achieving the specific objectives of PR program. Based on evaluation, it is possible to learn what has been done properly, and what hasn't, what level of progress is achieved, and the most importantly, how to apply gained knowledge on future activities.

Significant deferens between PR practitioners' opinion and their actual behavior is noted, so this phenomenon needs to be analyzed further. The majority of practitioners stated lack of financial and time resources, as major reasons for avoidance of research, however, the analysis of PR practice and PR programs indicated that barriers for objective evaluation do not stop there (Macnamara, 1999). Literature recognizes six traditional barriers for development and effective use of evaluative research (Macnamara, 1999): understanding of research, goal setting, understanding of communication theory, multidisciplinary nature of public relations, several instances of the communication process and lastly finances. Traditional berries have been complemented with three more challenges on this field (Macnamara, 2014, June): preoccupation with scientific approach to research and quantitative data, lack of knowledge on differences between measurement and evaluation as activities, and finally lack of connection between important business and organizational strategies.

Theoretical approach to PR evaluation barriers

Understanding of the research process is critical to for the success in PR and its influence extends to the whole organization. Problem related to the research lies in the lack of knowledge among PR practitioner regarding (Macnamara, 1999): Environmental monitoring (scanning), audit of public relations, communications audits, and social audit. Many practitioners use research terms incorrectly, have too little knowledge about designing surveys and questionnaires, sampling and statistics, which further limits their ability to plan and manage research activities. Besides investing in the improvement of knowledge in the field of research, the PR practitioners need to change their attitudes about the research as a one-off activity to understanding of research as an integral continuous process within each PR program. On a practical level, both PR academics and PR practitioners need to increase efforts for an acceptance of research. Evaluative study of public relations is far more than simply monitoring and press clipping.

Setting clear and measurable objectives is of great importance for the success of a PR evaluation program. While this may seem logical, most PR plans containing inaccurate and non-measurable objectives (Macnamara, 1999). When goals are defined only as "create a greater awareness of the program" or "improve relationships among employees," it is clear that the set objectives enable a high level of subjective interpretation. For many questions that may occur there is no answer: what level of awareness exists in the given of a time, what are the current employee relations, what is the relationship to be achieved, etc.

Therefore, it is necessary to precisely define objectives such as "increase awareness from 10% to 30%" with the specific time limits such as "in the coming 12 months" (Macnamara, 1999).

According to (Gruning, 1983), PR objectives are often so bad and vaguely defined so that in they do not perform the function of directing communications, while on the other hand, related disciplines, such as marketing, have managed to overcome this kind of obstacle (Pavlik, 1987). Clearly defines objectives are, therefore, the basis for monitoring achieved effects, and failure to fulfill this requirement cannot be compensated by an additional investment of time and money.

Modern theories on public relations and the business communications are based on several decades old publications (Macnamara, 1999). In order to set realistic, achievable goals, the PR practitioners must have, at least, basic understanding of the communication theory. The assumption about "what can be achieved through communication" leads to incorrect and over-optimistic expectations of the PR plans, which further makes evaluation risky and problematic (Macnamara, 1999). Certain forms of communication in modern business could require the improvement of the basic theory in use, in order to adapt to demands that public puts before an organization (one of the current issues is how to communicate through social networks). Knowledge, one of the basic elements of communication theory, certainly makes it easier to understand the structure of PR program and its evaluation.

PR communicates through a wide range of tools and channels of communication, including publicity, publications, audio-visual and video programs, events, Web, sponsorships, etc. The question is whether it is possible to apply every model of evaluation and any evaluation tool or technique to each of the observed elements of PR communications. The search for a unique method of evaluation for each communication tool can be a big challenge and a big investment of time and financial resources. On the other hand, measurement and evaluation with the wrong techniques and methods can provide unrealistic results. Literature provides a number of techniques which could be applied on different elements of PR communication, and PR practitioner should be able to assess what, when and how to apply.

As a major breakthrough in moving towards practical methods for evaluation and measurement of public relations, was declared recognition of the practice of communication as a three-phase process - the preparation, implementation, and impact (Cutlip, Center, Broom, 1985). This three-phased process communication was featured for the first time in the "Macro model of evaluation" (Macnamara, 1992). Further development of the evaluation model has provided practitioners with the fourth level through the "United model of evaluation" (Noble, Watson, 1999). It is important to note that every level of communication depth provides better development of the connection between organization and its publics, therefore, the PR practitioner must understand following: the reach of individual activities, the applicable evaluation techniques and possibilities in the application of collected information.

The cost of measurement and evaluation are perhaps the most commonly mentioned obstacle for these activities. However according to (Macnamara, 1999), the cost in terms of money and time, can be an obstacle in the evaluation, but not as much as the most of PR practitioners believe. In the literature and practice it is possible to find a wide range of techniques and methods for the measurement and evaluation, which are ranked from so-called "low-cost" or "no-cost" techniques to the extremely financial and time-consuming techniques and models. The PR practitioner has an opportunity to find and choose the most effective and efficient way to carry out the measurement and evaluation of communication.

Summit in Amsterdam, in 2014, met PR practitioners with the idea of new challenges in the evaluation of public relations. The first of these concerns the scientific approach to research and quantification of contemporary data. Explanation of this statement is: The development of science requires the collection of data and evidence, and their rational and logical analysis - quantitative research describing the language of science. Modern society is burdened by "people counting, things, time, money" and different classifications and quantifications (Coleman, 2013). Social sciences also follow this trend, resulting with a reduction of "humanistic" perspective in science and research.

Necessity to recognize public relations as a science, as well as an important business function, weighed heavily on the PR practitioners constant quest for quantification, in order to prove their value and practice. It is not enough to say "perception is reality" - we must not forget that reality is constructed through the "perceptions, attitudes, beliefs, emotions and feelings, as well as stone, wood, minerals and metals to be converted into" (Macnamara, June 2014). The reality to which public relations impact describes precisely these elements: consciousness, perception, attitudes, thinking, commitment, trust, loyalty, attitude, behavior and the like (Macnamara, June 2014). Consequently, the question is how to objectively quantify subjective attitudes, beliefs, emotions and feelings that arise from the relationship of the organization and its public. The expected result of this criticism refers to the step change of attitude among PR professionals, their clients and managers that qualitative research is nothing worse or weaker than quantitative. What's more qualitative research can provide a deeper and more accurate understanding of the many issues related to the PR communication.

Another challenge relates to the lack of understanding of the relationship between the measurement and evaluation. Although in theory and in practice these two terms are usually found attached, it is necessary to understand that they relate to separate completely different phenomena. Measurement includes data collection and analysis, and the evaluation relates to the identification and subjective evaluation of the value of the information collected. The third barrier refers to the fact that evaluation usually assesses the past, which does not offer anything more than an analysis of what has been done.

EMPIRICAL RESEARCH

Several studies deal with the obstacles of evaluation of communication in public relations in the world. According to these studies (Watson, Simmons, 2004) respondents have pointed out the budget limitations, lack of necessary knowledge and lack of time as an obstacle to the implementation of the evaluation. Some of the respondents expressed even "desperate" desire for the existence of the accepted system of measurement and re-emphasized evaluation as a condition for building credibility in practice. According to (Macamara, 2005) there are three major obstacles in the evaluation of PR activities: lack of money, lack of time, and lack of "need" for evaluation. The PR practitioners also pointed out the obstacles to the introduction of evaluation in the standard practice of public relations where the main limitations is lack of human resources 68%, lack of adequate tools for evaluation - 46% lack of adequate recognition by management 42%, and financial constraints - 39 % (Foster, 2012). "CIPR 2015" research in the field of research, planning, measurement and evaluation (RPME) follows the basic obstacle to the building of professionalism through these four dimensions. The research confirmed that the lack of budget is currently the biggest obstacle in RPME. Other obstacles are ranked in the following order: the lack of time, clients' attitudes, organizational culture of the organization itself and the attitudes of management. The most of respondents invest only 1-5% of the budget in RPME field operations, and believe that, in the near future, there will be no changes in investments (CIPR, 2015, April).

Reference (Nikolić, et.al. 2014) provides an insight into the state of PR evaluation in enterprises in Serbia. Results of this study indicated that the evaluation is present in companies in Serbia. The analysis of the depth of communication that evaluation in the companies in Serbia shows that evaluation is applied in a simple, quantitative terms of monitoring communication, which is a feature of the lowest levels of PR practice. When observing the importance that PR practitioner, in the enterprises in Serbia, attach to the results of their own operations, it is notable that they take credit for significant influence that organization have on its publics. This attitude speaks about their knowledge on how much and in what way PR practice can contribute to the organization's success.

Analysis of the results further indicate that the PR practitioners have awareness and knowledge of the potential application of the measurement and evaluation results in communication, but the implementation is lagging behind in practice. Since the existence of a gap in the expected occurrence of the practice of public relations, it is necessary to establish the potential causes of this phenomenon, and the obstacles that stand in the way of active measurement and evaluation of PR communications. The greatest obstacles to an

active measurement and evaluation of communication in Serbia are time and financial resources of a company.

Frequency of evaluation performance in Serbia correlates to the credit that PR practitioners attach to certain PR activities and their influence on the number of posts about an organization in public, on impact on the audience awareness, and on the changes in public opinions and attitudes. The greater merit the PR practitioner attaches for the results of communication activities the greater the frequency of measurement and evaluation will be, i.e. the higher the frequency higher influence the PR practitioner considered to have. If in this equation take into account correlation on knowledge, it's notable that knowledge is not an obstacle in Serbia, the PR practitioner recognize the impact that can be achieved through communication and that a way to prove this impact is through evaluation.

Frequency of evaluation performance is related to the application of the evaluation results on to the current and future PR communication, as well as the impact that communication has on the overall effectiveness of PR functions. The PR practitioners who believe that they are responsible for a number of statements about the company, the impact on awareness, attitudes and behavior of the audience are more likely to perform more frequent evaluation, and to apply these results in the current and future communication. These PR practitioners are more likely to recognize the importance of the application of evaluation at different levels of communication. Awareness about the importance of the evaluation results showed no correlation with the frequency of evaluation, importance that PR practitioners attach to the taken actions, the application of concrete results in practice, even with obstacles in the evaluation. The exception is the positive connection that is established between the awareness of the importance of the use of evaluation in future communications with the credit that the PR practitioners feel that they have for the level of evaluation on the input/output level of communication.

The correlation analysis from the perspective of evaluation obstacles showed that of the mentioned influencing factors (weather, finance, knowledge, and awareness) shows that the highest number of correlations is in the lack of time. The increase in the lack of time and knowledge achieves a negative association with the implementation of evaluation at different levels of communication. It is assumed that lack of time prevented the PR practitioners to take the time needed for evaluation of communication at the higher levels, which leads to the evaluation largely focuses on measuring the lowest level of communication (input / output). On the other hand, the lack of knowledge can be interpreted as obstacles to the implementation of the measurement and evaluation at different levels, as well as for the PR practitioners to review the need for evaluation aspects. Lack of time and money for the evaluation is associated with negative character that PR practitioners attach to the PR activities for the communication results (number of posts, the impact on consciousness, behavior and thinking of the audience). As the lack of time and money are the most prominent evaluation obstacles, it can be assumed that the increase in these barriers limits PR practitioner's ability to carry out the activate evaluation, which further continues to affect their ability to assess and demonstrate the results achieved. The lack of time and knowledge identify negative correlation with the implementation of the results of the current and future communication evaluation and implementation of the overall performance results. The less time resources PR practitioner possesses, the more likely it is that the analysis of the potential use of evaluation results will be ignored. Also, the lack of knowledge may limit the PR practitioners in terms of the ability to recognize and apply the evaluation results the right way and at the right time during the current campaign maintenance and for the planning of future communication campaigns.

CONCLUSION

Numerous obstacles stood, and still stand in the way of active implementation of measurement and evaluation in the practice of public relations, and consequently preventing achievement of professionalism in PR profession. Practitioners throughout history point out that the major obstacles to measurement and evaluation are following: budget constraints, lack of time, attitudes the organization's management and attitudes of clients who receive PR services. Academics and researchers in the field of public relations believe that these attitudes PR practitioners to some extent

justified. However, they also believe that above mentioned attitudes of the PR practitioners caused and maintained these problems. The academic and research view puts the lack of knowledge and skills of the practitioners on the first place, and in the second place is the topic of planning and implementation of measurement and evaluation in practical terms. Results of research conducted on the territory of Serbia show that the evaluation of PR activities is carried out in Serbian companies, and the most commonly used methods for measuring are quantitative research. The main problems in the evaluation of PR activities in Serbia are lack of time and money. Awareness of the importance of evaluation of the PR activities and certain forms of knowledge are present.

Development of measurement and evaluation in public relations mainly depends on investment in the development of knowledge and skills, and then experiences in the field of communication, psychology, research, statistical and organizational sciences among practitioners. Information collected before, during and after the implementation of PR programs are look at past and the present, but their significance is remarkable for the future, thus the PR practice must not make room for hesitation in presenting the actual business results or for fear of their interpretation. Globalization and networking in business do not allow "luxury for the lack of interest". Present and future of every business depends on the ability of an organization, its leaders and other staff to build and maintain a successful internal and external communication with all audiences, which can improve (or limit) the performance of business. Practical and theoretical knowledge presented in this paper is significant in order to understand some of the aspects in the problematiqe of measurement and evaluation in communication and public relations.

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Session D: ECONOMY AND FINANCIAL MANAGEMENT

COMPETITIVENESS AS THE PRESUMPTION OF ECONOMIC GROWTH AND DEVELOPMENT

UDC: 005.7:339.137.2

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ABSTRACT

Prosperity and economic development of economy is conditioned by the competitiveness of its business entities. The competitiveness of companies is largely dependent of the business environment which is country is ready to provide them. The paper analyzes the competitiveness of the Serbian economy, comparing its position with the countries in the region, as well as guidelines for her improvement. In addition to the role of the state in attracting direct foreign investment, encouraging exports and improving business conditions, the paper focuses on the role of knowledge and quality as key factors in improving competitiveness of modern business. A key role in strengthening the competitiveness of the Serbian economy has improved productivity of business. To improve their competitiveness, Serbia should opt for a knowledge-based economy and the development of human capital.

Keywords: competitiveness of the economy, the competitive position of Serbia, knowledge, quality.

INTRODUCTION

Achieving competitive ability in conditions of the global market is a very complex process that requires coordination of all business functions in the company and exceptional financial investments and marketing efforts. Competitive ability is difficult to gain and easy to lose in conditions of the offensive of global competition. The primary goal of achieving and improving competitiveness in modern conditions is a lasting and sustainable economic growth. Economic growth is a prerequisite for higher living standards.

A key factor and driving force of competitiveness is the improving productivity, which takes place through an intermediate that enable this process. Key indicators but also the instigators of productivity in a competitive environment are: domestic investments that are essential for raising productivity of company and infrastructure development, exports to overcome the barriers posed by the volume of domestic demand, imports, which provides access to resources that can not be produced competitively in the country (allows to import new technologies and increasing rivalry in the domestic market), the inflow of foreign direct investments (FDI) to provide additional capital, modern technology and management skills and increases competitive pressure, the outflow of FDI, which promotes the international growth of local companies, which also requires an increase in productivity and local innovation that directly increases productivity. To improve productivity across these elements is

necessary to create a healthy competitive environment with an attractive value proposition, and the products must have high quality and high production efficiency.

MEASURES TO IMPROVE THE COMPETITIVENESS OF THE SERBIAN ECONOMY

The economy of our country must be included in the global trends, should be export-oriented and trained for rapid adoption of new technological solutions and creating their own technological innovations. Development orientation of Serbia should be the inclusion in the processes of globalization, integration and implementation of reforms in the economy and society.

Changing the structure of the domestic economy will enable a serious economic recovery and raising the level of competitiveness. Special treatment in development policy should be to have a successful export industry. Changing the export structure of our economy towards an increase in the share of products more stages of finalization and sustain strong growth of total exports, will depend on the level of foreign direct investment, as well as the sectors in which they will be achieved. Openness Serbia should be a framework strategy for the development of its economy.

Given the fact that Serbia is economically small country, the only way of economic growth is that its companies internationalize their business activities and start to do more to operate in the international market. As one of the explanations of the weak results of foreign trade of our country, and especially in exports, considers the lack of competitiveness of domestic producers on foreign market. Domestic companies have not been able to in the international market to be more successful than other companies in the same field of business. The environment for foreign direct investment in Serbia is still not favorable in order to attract as many foreign investors. Foreign direct investments have a significant impact on the Serbian economy, and to increase the competitive pressure on the domestic market, connecting with local producers, improving human capital, the influence on the balance of payments and trade deficit of the country and another. According to preliminary data of the National Bank of Serbia, the net inflow of foreign direct investments in Serbia in 2014 reached 1.2 billion euros, which is 3.7% of GDP, while input foreign direct investments reached 1.5 billion euros.

One of the main components of competitiveness of the economy are of its institutions. They were one one of the limiting factor in the development of our economy. Institutional transformation of our country is slow, and therefore increases the distance compared to most countries in the transition. A key role in strengthening the competitiveness of the Serbian economy has improved productivity of business. Factors contributing to the increase of productivity are technological progress, the rate of utilization of production capacity, scope and competence of employees, management capability, organization of production, as well as the manner of disposal of resources, raw materials and energy sources. In order to improve their competitiveness, Serbia should be defined for the economy based on knowledge and human capital development.

When the domestic economy is provided conditions for efficient functioning of the market, a firm and uncompromising legal protection of businesses innovative management, modern technological solutions and the process of continuous improvement of knowledge, will be able to carry out transformation economy and ensure its continued competitiveness and in that entirely based economic growth and development (Veselinović, 2010).

COMPETITIVE POSITION OF SERBIAN AND COUNTRIES OF THE REGION

The competitiveness of a nation depends on the ability of its economy to innovate and improve. Thanks to pressure and challenge, companies realize the advantage over the world's best competitors, and gain benefit from the existence of strong domestic competition, aggressive domestic suppliers, and demanding local customers (Porter, 2008). The Serbian economy was faced during previous years to the numerical difficulties. It entered the transition process with delay, so the execution of reforms was

evident only after 2000. year. All that caused many problems in foreign trade operations and economy of Serbia, and those consequences are present as well nowadays. The obsolete machines and technological proceses, knowledge absence and inadequate use of modern methods and techniques of management, resulted with low quality of business operations. It endangered companies' competitiveness at the international market. The problems of business operations of the companies, together with long - standing sanctions, war events and political fluxes and refluxes caused the low competitiveness of the Serbian economy (Veselinović, 2010).

According to the World Economic Forum's Global Competitiveness Report 2014-2015. year (Schwab & Sala-i-Martín, 2014), Serbia occupies the 94th place out of 144 countries that have entered this year in the analysis. This result represents an increase of 7 positions compared to the previous year in which Serbia is ranked 101st place, while the Global Competitiveness Index, moving in the range of 1 to 7, increased slightly from 3.8, which was the previous year, on 3.9.

Unlike last year, where we were able to note significant decrease GCI value of 0.1, this year there was a noticeable increase, as the realized value of GCI at the level of 2008 (Schwab and Porter, 2008), before the negative effects the global financial crisis. Serbia is according to the latest result of repeated historically the highest value as a result of the current perception of the business world about the country's ability to provide long-term stable economic growth. However, the assessment of Serbia indexes of knowledge is very low. As a country that is in the process of transition and European integration is not sufficiently analyzed in terms of the competitiveness of knowledge, because the existing indexes do not give enough information about the discovery of the so-called bottlenecks development (Katić et al, 2012).

The highest value of 3.90 GCI Serbia has made on the eve of the first wave of the crisis in 2008, and already the next, 2009. (Schwab & Sala-i-Martín, 2009) the value of GCI noticeably dropped to 3.77. After this period, followed by a gradual recovery to the 2013 (Schwab & Sala-i-Martín, 2013) the value of GCI back down to the level from 2009 until 2014, returned to the level of the historic high of 2008. Movements in the value of IGK Serbia, as well as other countries in the region is shown in the following chart.
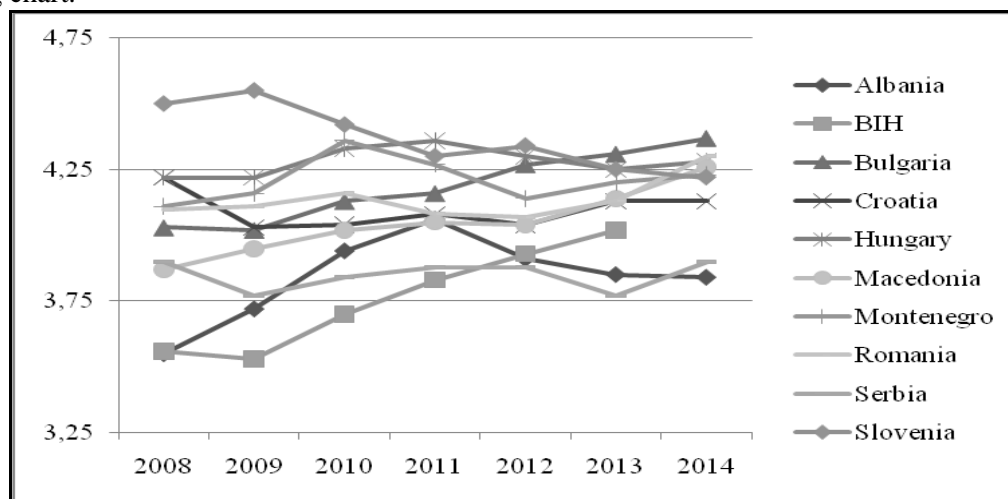
Figure 1. Value GCI for Serbia and neighboring countries
Source: Schwab & Porter, 2008, Schwab & Sala & Martín, 2009, Schwab et al., 2010, Schwab & Sala & Martín, 2011, Schwab & Sala & Martín, 2012, Schwab & Sala & Martín, 2013, Schwab & Sala & Martín, 2014.

According to the overall competitiveness, measured by the index of global competitiveness, in 2014 Serbia is better placed in the region only Albania, whose position on the list is constantly getting worse for the third year in a row. Other countries from the region have in most cases improved its position in relation to the previous year, with the most notable improvement in Romania, with the rank of up to 17 seats, while Macedonia also recorded a significant jump of 10 places in the rankings.

KNOWLEDGE AND QUALITY AS A FACTOR IN IMPROVING BUSINESS AND COMPETITIVENESS

The operations of domestic companies must be based on the application of management techniques that support competitiveness, innovation and flexibility, as well as the intervention of advancing knowledge their employees, especially executives. Economic progress and development of our country requires the need to develop competitive economy based on knowledge, new technologies and innovation. Domestic companies have to accept foreign experience in the field of business, especially those that come from global leaders, but more to take into account the experience of companies from newly industrialized countries (Đorđević et al., 2011).

The key factors for the competitiveness achieving are knowledge and quality. Knowledge management is a core competency for firms in the era of knowledge-based economies (Chong, Chong. 2009; Grant, Baden-Fuller, 2004; Johannessen, Olsen, 2003). Knowledge-based economy is the general solution to constant organizational change (Lazar, Bunda, 2012). Advancing its knowledge, a company creates favorable environment for carrying out also successful managing of the quality system, which is certainly the precondition for competitiveness development in the global environment. In order to make knowledge the resource of competitive advantage, the companies have to coordinate the strategy of knowledge improvement with business strategy (Choo et al, 2007b). The economic growth in the developed countries, presented as scientific and technical knowledge was used for rising labour productivity and other productive inputs. The systematic use of knowledge, and science to produce goods and services, increased very much the value of education and training of the employees (International Labour Organization, 2008). A higher the stock of the human capital implied a stronger the research and development ability (Chen, 2008). According to the research (Van Hemer, Nijkamp, 2011) as the key factors in the developed countries separated themselves high tehnologies, innovations and development, high quality of human capital and knowledge advancing. According to (Jha, Joshi, 2007), the business environment entered the knowledge era, where knowledge became power, and quick learning and competence become strong tendency for success. The aim of successful knowledge advancing is the business operations improvement (Jennex et al, 2009). Zack et al. (2009) established a positive direct relationship between knowledge management practices and organizational performance. The effective knowledge management that covers the whole organization, causes the enhancement of the competitive advantages, innovations and organizational learnings. The company improves its flexibility and adaptability to the demands of the changeable business environment. Schein (2002) noted the difficulty in establishing a learning organization although knowledge is known to be a powerful source of firms' competitiveness.

Since knowledge management has its roots in numerous allied areas for the enhancement of business operations, as are the quality management, reengineering process, the information systems and human resources development. Many organizations found that there are tensions between the applications oriented to knowledge and the executions of organizational changes (Moffett et al, 2003). According to (Akdere, 2009), the quality management applies knowledge management as one of its basic components. The knowledge management is the key element in the process of attaining business excellence. Without the knowledge change in the organization, the quality management can not achieve positive effects. Hung et al. (2010) showed that TQM is a mediator in the relationship between knowledge management and innovation. In contrast, Molina et al. (2007) considered knowledge transfer as mediator between TQM and performance. While some researchers considered knowledge management as a facilitator of TQM (Barber et al, 2006; Stewart, Waddell, 2008) other scholars concerned TQM as an antecedent for knowledge management (Colurcio, 2009; Jayawarna, Holt, 2009; Lin, Wu, 2005).

The quality management generates the organizational culture of confidence and division, which motivates the employees' commitment and the identification of the particular objectives which spurs the quality promotion and knowledge creation to motivate innovations (Hung et al, 2011). Because of constant improvement, the quality praxis alleviates the other management praxis as the organizational

learning (Ruiz-Moreno et al, 2005). This learning in the praxis of quality management is considered as the means that enables the companies to research new markets and contribute to their competitive advantage (Crossan et al, 1999). The quality management is connected with the theoretically founded organizational knowledge through its processes of the continuing endeavour investment, cooperative knowledge creation, and adaption to the consumers' changes and needs (Chiles, Choi, 2000). The effective quality improvement depend on the influence of the organization on the cognitive processes of its members, and presents the problems as possibilities for learning (Choo et al, 2007b).

CONCLUSION

Modern business is defined globalization of markets, requires a new approach in the process management of the company. A successful company can not be based on outdated techniques and management principles. The management of the organization must be aligned with the needs of users and the requirements of environments. Performance of the modern economy is determined by the ability of firms to respond to the demands that the market sets.

New business conditions require an adjustment of businesses and building an organizational structure based on new principles. This is especially important for companies from countries in transition - the ultimate goal of building a new organization is that it becomes extremely flexible and innovative, that can respond to the growing requirements of users in a short period of time and to establish a competitive advantage. Enterprises in Serbia recorded an independent position in the international market and low competitiveness. Its market position have to build on the improvement of knowledge and quality as key factors of modern business, given that the impact of these factors on business performance evident.

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THE ANALYSIS OF COMPETITIVENESS INDICES IN SERBIAN COMPANIES

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ABSTRACT

New competitive conditions require new approaches in the field of organizational management and development of competitiveness. In a long term, standards and the best practices represent the way to excellence. In a short term, innovation and improvement of productivity and knowledge imply achieving competitive capabilities. Domestic companies have had a problem with competitive ability at international level for many years. Insufficient investment in quality has resulted in extremely poor competitive position of domestic economy. To make local companies become competitive at the international level, it is necessary to alter the ways of thinking and adopt modern world achievements in the field of organizational management. This paper analyses the current indices of competitiveness and places Serbian economy within international and West Balkans framework. The final part of the paper deals with suggestions for improving the current state in short and long term period.

Keywords: competitiveness, management, quality, knowledge.

INTRODUCTION

Global competitiveness is becoming increasingly intensive, noticeable and offensive. The current moment of global economy can be marked by slow but sure rise of enterprises from newly industrialized countries, such as China, India, Brazil, South Africa, Turkey, etc. Enterprises from these countries are becoming global competitors. Their competitive ability is based on lower business costs, first of all because of lower labour costs, but also for their readiness to accept foreign investments and the most modern methods and management techniques. The main stimulus for these economies is increased domestic consumption as well as a numerous young population. The latter represents an advantage not only concerning education but everything else as well – as the income rises, people become more educated and they change their preferences.

The world economic crisis and its long lasting effects emphasize the need for permanent improvement of knowledge – in recent years only the best, no matter where they come from, can win. The winners are usually the companies which have performed optimization between the price and the quality on the grounds of reducing costs and permanent productivity increase by applying standardized QM concept and intensive innovativeness. Chinese and Indian companies are such examples. This implies the necessity for developing new business models aimed at establishing competitiveness on the global market. Rapid changes, short-lived advantage, disruptive technologies, revolution-bringing competitors, disturbed markets, omnipotent clients,

rebellious shareholders – are all the 21st century challenges, putting the worldwide projected organizational constraints on test and bringing the management model flaws, unable to keep the pace with time, into spotlight, (Hamel, 2009).

Nowadays, enterprises have to change both their structure and business goals. Customers are, in long term view, in the centre of organization's attention as well as in the focus of different interest groups from the surroundings whose requirements have to be noticed and satisfied. The most important elements for establishing global competitive position are quality and productivity. On the other hand, knowledge becomes a product and corporative intellectual property exceeds physical resources. The following attitudes support the above statements:

−   According to Imai (2008), every delay in applying the newest technologies is as expensive as delay in applying the newest management techniques.
−   According to Bešić & Đorđević (2009), a special attention must be paid to implementing new management approaches, conceptually and organizationally.
−   According to Reinert (2010), the change in companies' paradigm causes the change of companies themselves. The same happens with the executives as well - it is not possible to achieve and maintain a significant position without prosperous and successful management. In long terms, it is always skill and not capital that wins.

Competitiveness of domestic enterprises is still at a very low level. Insufficient application of knowledge, low technological level of enterprises, poor productivity and inefficiency are just parts of the problem that domestic companies are facing.

COMPETITIVE CONDITIONS - GLOBAL MARKET PRIWIEV

Competitive ability of a company in the modern business conditions is hard to achieve and easy to lose. The reason for this attitude lies in the fact that rapid technological advances have made possible an easy access to technology for everyone in the world under reasonable terms.

Global information era of the 21st century is rapidly changing traditional power symbols into old fashioned redistributed relations of power. Information once reserved only for the Government are now available for mass consumption. Cybernetic era has also created a new power border among countries, full of opportunities for developing countries (Nye, 2012). In addition, global economic crisis has highlighted a necessity for creating new business models.

The challenges which follow the process of establishing, keeping and developing competitive abilities on the global market are much greater today than 20 years ago. The following reasons are considered to be crucial:
−   New companies are mostly based on services,
−   New companies are mostly from the field of knowledge economy,
−   The change of techno-economic paradigm causes considerable changes,
−   The number of allowed mistakes is far smaller than before,
−   The new paradigm is, in great extent, in the phase of pre-standardization, which makes choosing the winners impossible, (Reinart, 2010).

In modern business conditions the following business functions with the strategic role are particularly emphasized in organizational management because of their market orientation: marketing, quality, research and development. The company's growth, development and success are determined by tight interdependence of these three functions and their synergistic effect. Marketing, as a business function, should create marketing program according to defined needs and customers' requests with the aim to fulfill customers' requirements, to make profit and satisfy all other interest groups within a society. Marketing management becomes knowledge management – it makes possibilities for increasing knowledge productivity of other business functions. Marketing represents the key instrument which makes knowledge more productive. The result of research-developing function is development of new technical-technological solutions. Each successful innovation

must coordinate technological as well as the whole marketing function. Marketing is essential for total process of technological innovation.

Quality, alongside with product diversity and marketing communications, represents the key element for creating a successful brand with a stable market position. Quality is becoming a primary developing aim expressed in the form of business excellence and achieving world class product and services. Business excellence implies that businesses constantly work on the implementation of quality of business organizations based on the increase in productivity and skills of each employee. Business excellence represents, in fact, a development of market economy, with a user in focus of the organization, permanent improvement operations based on knowledge and productivity of labor and business in line with the requirements of various interest groups in the region.

Competitive countries have, for many years, developed quality of their business because they were aware of its importance. Industrialized countries of the world such as China, India and Brazil are putting great efforts in spreading the concept of sacrificing business practices in order to create conditions for improving competitiveness of their economies. If we consider the first ten most competitive world economies, we can notice that the list is exactly the same as the year before (2014-15) whereas Switzerland, Singapore, USA, Japan and Hong Kong keep the same positions (table 1).Germany has improved its position and is now at the 4th place instead of 5th last year such as Netherlands which is now ranked 5th in comparison to the 8th position last year. Finland has fallen to 8th place (last year it was the 4th). Sweden has improved its position and is now at 9th place while Great Britain follows, position number 10. The following countries are now ranked from 11th to 20th place – Norway, Danmark, Canada, Qattar, Taiwan, New Zealand, UAE, Malesia, Belgum, and Luxemburg.

Table 1: Ranking of the top 10 countries in the world according to the competitiveness from 2015.

Country	Rank in 2015-2016	Rank in 2014-2015
Switzerland	1	1
Singapore	2	2
USA	3	3
Germany	4	5
Netherlands	5	8
Japan	6	6
Hong Kong	7	7
Finland	8	4
Sweden	9	10
Great Britain	10	9

Source: WEF (2011-2015)

According to the list issued by World Economic Forum for 2014, China is at 28th place, the same position as last year while Taiwan has fallen for one position, from 14th to 15th. India has considerably improved its position, from 71st last year to 55th this year as well as Russia from 54th to 45th this year. South Africa is now at 49th place comparing to 56th last year unlike Brazil which has fallen to 75th place from 57th last year.

COMPETITIVENESS INDICATORS – SERBIA IN THE CONTEXT OF THE WEST BALKANS

Since the early 1980s domestic economy has had problems with improving quality and productivity. The productivity problem did not appear in domestic economy only in the time of transition but it had been present before, as well. These problems were the result of inappropriate business performance which was not based on market principles. Certain products had unjustifiably high prices which were not competitive on the world market. Therefore, Serbian companies reduced export prices in order to gain competitiveness on the world market, while domestic customers had to pay this cost of unproductiveness through high prices. Old technology, poor quality, unattractive packaging and high prices are thus the main reasons for uncompetitive appearance of Serbian products on the international market.

Technological equipment also represents a significant element of productivity rising. The average machine age in Serbia is about 30 years. Compared to the situation in the region, this represents the approximate 12-year obsolescence. Serbian economy is, technologically, 29.5 years behind European Union, which was confirmed by a representative sample of 154 small, medium and big companies within six economical branches with similar production programs. The comparison was carried out in textile, food-processing, pharmaceutical, machinery, chemical and building material industries. Austria was taken as a criterion because of its similar natural, social and demographic characteristics in relation to Serbia (). The greatest obsolescence was noticed in textile companies (35 years), then in machine industry (34.5 years). Pharmaceutical companies were best ranked with 21 years' delay. Considering the regions, the equipment, tools and other production means are most obsolete in south Serbia (41 years) and the least in Backa (18.5 years' delay). In Belgrade the delay is 20.5 years. The most productive companies are those with the equipment and machines of the highest quality. These are pharmaceutical companies, some companies from the field of food processing and companies with foreign capital, which is totally 8.5 to 9% of the whole Serbian industry. Metal industry is in the worst situation, with 35 year- old- machines in average, and lagging of 36%, which is more than double compared to the average in EU countries.

According to the new report of the World Economic Forum which included 140 world countries, Serbia is at 94th place, the same place as in 2014 and among the countries such as Tunisia (92nd place), Albania (93rd place), Salvador (95th place), Zambia (96th place), Seychelles (97th place). Table 2 provides a ranking of the countries of the Western Balkans in 2011-2015.

Table 2: Ranking of the country of the Western Balkans towards competitiveness in 2011-2015.

Country	Rank in 2011.	2012.	2013.	2014.	2015.
Slovenia	57	56	62	70	59
Montenegro	60	72	67	67	70
Croatia	76	81	75	77	77
Macedonia	79	80	74	63	60
Serbia	95	95	101	94	94
BiH	100	88	87	-	111

Source: WEF (2011-2015)

According to the Table 2, Serbia and Croatia have kept their positions from the previous year while Slovenia and Macedonia have improved it. Montenegro has recorded a decrease in comparison to last year as well as Bosnia and Hezegovina (there were no data for 2014, so the results are two years old). When we look at the data for neighbouring countries we can see that Austria is at 23rd place, Hungary at 63rd, Bulgaria at 54th, Romania at 53rd, Greece at 81st and finally Albania at 93rd place. Romania and Albania have better results comparing to those from 2014, Bulgaria and Greece have kept the same positions while Austria and Hungary have worse results than last year. Table 3 provides a ranking of the countries of the Western Balkans towards competitiveness indicators. The basic requirements of competitiveness of the country consist of the following indicators - institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, the efficiency of capital markets, technological capacity and market size. As can be seen, Serbia is slightly better when it comes to business efficiency, than when it comes to innovation.

According to the World Economic Forum, all countries in the world are divided into five groups. The first group, 35 countries, consists of the countries with their economies based on resources. The third group comprises countries whose economies are based on the development of business efficiency (this group consists of 31 countries) and the fifth group includes the countries whose economies are based on implementation and development of innovative activities (this group consists of 35 countries). The second group consists of the countries in transition from the first to the third group (this group has 16 countries) and the fourth group consists of the countries in transition, the countries from the third to the fifth group (in this group there are 20 countries). Serbia is located in the third group of countries (the economy keeping efficiency), together with Montenegro, Romania, Bulgaria, Macedonia, Bosnia, Albania, Indonesia, China, South Africa and so on. Croatia is in the fourth group (transition from efficiency to innovation) together with Argentina, Brazil, Chile, Hungary, Latvia, Mexico, Poland, Turkey etc, while Slovenia is located beside the

fifth group countries that stem (economy driving innovation and sophistication). The fifth group mainly consists of the most developed countries in the world.

Table 3: Ranking of the Western Balkan countries to indicators of competitiveness in 2015.

Country	Rank in 2015. In sum	Rank to primary requirements	Ranking by business efficiency	Ranking by innovation
Slovenia	59	45	56	39
Montenegro	70	58	75	86
Croatia	77	69	68	90
Macedonia	60	60	64	82
Serbia	94	96	83	125
BiH	111	95	112	120

Source: WEF (2011-2015)

The World Economic Forum provides an analysis in the field of sustainable development, from the aspect of social sustainability and viability of environmental protection. (Table 4 - Western Balkan countries). The main pillars of the social indices of sustainable development are: income, youth unemployment, access to sanitation, access to drinking water, approach to health services, social welfare, participation of underground economy in the economy, social mobility, overall unemployment rate. The main pillars of the index in Accounting environmental protection include: power of legislation, protection of land, number of ratified international protocols and agreements, availability of water for agriculture, emission exposure to carbon dioxide ratio for fishing, concentration of particles in the air, quality of the environment.

Table 4: Ranking the Western Balkan countries by factor analysis of sustainable development in 2014.

Country	Ranking by social sustainability	Ranking by sustainability in the field of environment	Change in relation to previous period
Slovenia	4,52	4,78	Slight increase
Montenegro	4,08	4,38	Stagnation
Croatia	4,06	4,21	Stagnation
Macedonia	4,13	3,66	Stagnation, Slight decrease
Serbia	3,68	3,86	Slight decrease, Stagnation
BH	-	-	-

Source: WEF (2011-2015)

When it comes to the number of certified organizations at domestic market in the field of quality management, Serbia is the leading country of the region of the Western Balkans (table 5). On the other hand, the number of certified organizations in Serbia is not nearly satisfactory compared to other SEE countries, such as Hungary, Romania, Bulgaria and Greece.

Table 5: Number of certificates of ISO 9001 and ISO 14001 in the Western Balkans

Country	Standard	2011	2012	2013	2014
Serbia	ISO 9001	3228	3066	2366	2637
	ISO 14001	573	817	762	901
Slovenia	ISO 9001	1685	1614	1933	1672
	ISO 14001	414	420	468	425
Croatia	ISO 9001	2117	2614	2636	2807
	ISO 14001	488	760	828	951
Bosnia and Herzegovina	ISO 9001	1119	1239	794	846
	ISO 14001	148	174	141	150
Montenegro	ISO 9001	146	102	118	130
	ISO 14001	25	16	24	26
Macedonia	ISO 9001	290	482	399	446
	ISO 14001	91	204	131	137

Source: ISO (2012-2015)

CONCLUSION

Competitive advantage cannot achieve the level before the crisis in 2008. The world economic crisis changed business conditions, which is particularly related to resource management and market competitiveness. A lot of factors contribute to forming a strategic insertion, but three of them represent a particularly interesting threat to a well-timed renewal. The first one is the leading teams' tendency to disclaim or ignore the urge to restart the strategy. The second one is the lack of convincing alternatives to the unchanged state. The third one is the allocation rigidity, which complicates talent placement and regrouping behind the new initiatives.

Innovations, flexibility and productivity are guidelines for the future development in the field of competitiveness and organizational management. The very essence of the struggle for competitiveness lies in accepting changes. Knowledge is the main driving force of permanent productivity growth in the companies from these countries. Companies from transitional countries are faced with numerous problems – among them the most important are those related to improving knowledge and organization. Economic progress and development of the Republic of Serbia require creation and development of competitive economy based on knowledge, new technologies and innovations, as well as on overall implementation of integrated management systems.

According to Jeffry Sacks, one of world top economists (2014), Serbia should work on improving new industries and attracting foreign investment in the fields of agriculture, tourism or renewable energy. Budget deficit and high public debt are serious problems but the most urgent problem is a high unemployment rate related to young people, because the young represent the future of every economy. Small economies have to be extra flexible. It means that Serbia must find a way to respond to the changes of the global market. Small countries must play a game with numerous partners so they have to expand their activities to Asia and the Middle East as well.

To achieve commercial success a company needs to accomplish competitive advantage in the form of lower costs and / or product differentiation, with a long-term strategy of providing high quality products and services and continuous innovation. The main problem is the lack of competitiveness of domestic enterprises, which occurs as a result of poor productivity performance and the lack of implementation of new technologies, knowledge and inadequate application of the concept of quality management. Every business organization must be aware of the fact that the only way to establish and develop competitive capabilities is done by permanent performance improvement and achievement of operational excellence objectives. Unfortunately, we can still hardly see that domestic enterprises understand the importance of applying business excellence model in their business. The first step in this process should be the implementation of a quality management system ISO 9001 standard requirements and Development integrated management systems.

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OFF-BALANCE SHEET OPERATIONS OF BANKS

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ABSTRACT

The general trend in modern banking is moving towards the expansion of the scope of banking operations including the diversification of activity programs which banks offer to their customers. Balance sheet operations no longer guarantee security to banks as they are exposed to a great number of external risks over which they have no control. Therefore, nowadays modern banks are not focused on balance-sheet operations only, but also off-balance sheet activities, as an important source of revenue. Off-balance sheet activities provide banks with an additional source of income, a competitive advantage and a way to meet their clients' needs. This explains the main reason for an enormous increase in off-balance sheet operations during the past two decades in almost all major world banks. The aim of this paper is to point out the trends in domestic banking based on the developed countries experience in banking, bearing in mind that our banking falls far behind market operations in the highly developed countries.

Key words: bank, banking operating, off-balance-sheet operating, banking risks.

INTRODUCTION

Off-balance sheet operations of banks, also known as contingent business operations of banks, involve certain business changes in assets and liabilities not belonging to the bank and which do not cause changes in the balance sheet structure of assets and liabilities of the bank. The main characteristic of these banking operations is that they take place "below the line", which means that they are not entered into the bank's balance sheet since off-balance sheet operations of banks include only the contingent responsibility of the bank. Therefore, these are arrangements in which the bank is included in various ways but which do not affect the structure of assets and liabilities of the bank, although they significantly affect the revenues, i.e. profitability of the bank. Off-balance sheet operations of banks can be categorized in a twofold manner: *firstly*, as lending products (i.e. products relating to loans) which include financial guarantees and standby letters of credit, and *secondly*, as derivative products (i.e. risk management), which include, first and foremost, activities in the field of investment and commercial banking related to the activities in the securities market. The mentioned categorization is related to the so-called classical instruments of off-balance sheet activities of banks, although if observed more broadly, it should be noted that there are also some new instruments in off-balance sheet activities of banks, where some of them are technically so complicated that they are fully understood by a small number of market experts.

Off-balance sheet activities provide banks with specific business advantages, which have contributed to the sharp increase in off-balance sheet operations in almost all major world banks during the last two decades. In this regard, there is a view that the increase in off-balance sheet transactions in the banking sector of the US has affected the success of bank operations, helping them significantly in achieving their business objectives. Namely, the high level of competition in financial markets during

the 90s of the last century left banks with a decreasing space to maximize profits. This resulted in the creation of nearly ideal conditions for a sharp rise of banks' off-balance sheet operations, so that US banks mostly managed to keep their customers (clients) in this way. In doing so, lost revenues were recovered from various off-balance sheet activities of banks such as guarantee jobs, payment services, advisory and consulting services, brokerage services, agency operations, factoring and forfeiting operations, etc.

Taking into account the tough competition from non-bank institutions, in recent years banks have been increasingly compelled to gravitate towards the expansion of off-balance sheet activities, since such operations provide them with substantial revenue, which increases the overall profitability of banks. Generally, the main advantages brought to banks from balance sheet activities are reflected in the following: *firstly*, the transactions are not recorded in the balance sheet, thus avoiding the supervisory role of the controlling institutions in terms of capital adequacy, *secondly*, through these operations, banks enter into activities that are not traditionally connected to banking, thus improving their overall competitive market position (universal banking), and *thirdly*, banks make high revenue in the form of commissions, since these are highly profitable transactions. In this regard, we should bear in mind the fact that the prices of classic banking services are mainly standardized and that they have recently even been on the decline, primarily due to the increasing competitiveness of non-bank financial institutions.

Finally, in modern conditions, the development of off-balance sheet business operations of banks has led to the situation that the volume of off-balance sheet activities often exceeds the scope of the balance sheet operations of banks. It is also the main reason that the off-balance sheet activities of banks today demand much more attention than before, primarily due to the potential risks arising from off-balance sheet activities of modern banks.

TYPES OF OFF-BALANCE SHEET ACTIVITIES OF BANKS

Off-balance sheet operations of banks are becoming increasingly prominent in the business operations of modern banks in developed market economies. In countries with developed financial markets, banks are increasingly compelled to gravitate towards the expansion of off-balance sheet transactions, primarily due to tough competition in the loan market. In addition, banks are content to enter into off-balance sheet activities because they bring considerable revenue in the form of commissions. Hence, in major banks in developed market economies, the relationship between interest and non-interest income is changing significantly in favor of the increasing share of non-interest income, which reaches a rate of up to 50% in banks in some countries in relation to the gross income of banks.

Bearing in mind the more pronounced increase in the volume of off-balance sheet operations of banks, modern methodologies for measuring capital adequacy of banks have to take off-balance sheet activities of banks into account. Such an approach to off-balance sheet activities of commercial banks is of great importance in recognizing the actual value of off-balance sheet activities in modern banking. In this regard, a particularly significant activity is the one of the Basel Committee, which influences the member countries of the Bank for International Settlements in terms of risk management. Namely, for this purpose the Committee has made a number of recommendations and policies regarding the management of these activities, thus gaining importance not only in the national but also in the international banking markets. Similarly, in terms of loan risk, the Basel Committee gives the following types of off-balance sheet activities of banks:
1.   Guarantees and similar contingent liabilities:
     –   guarantees and acceptances,
     –   transactions with recourse,
     –   stand-by letter of credit,
     –   documentary letter of credit or commercial letters of credit,
     –   warranties, indemnities and performance bonds,
     –   endorsements.

2. Commitments:
 A)   Irrevocable commitments, asset sale and repurchase agreement – repos,
 –   partly-paid shares and securities,
 –   unconditional stand-by facilities,
 –   note issuance facilities and revolving underwriting facility.
 B)   Revocable commitments:
 –   credit lines,
 –   overdrafts accounts.
3. Foreign exchange, interest rate and transactions related stock index;
4. Advisory, management and underwriting functions.

However, it should be noted that the classification of off-balance sheet activities of banks depend mostly on the level of development of the banking and financial sector in some countries, the markets in which banks operate, the structure of financial markets and the degree of regulation thereof, as well as the type and character of banks, i.e. the banking system. Therefore, one might say that in our domestic banking conditions, the abovementioned classification of off-balance sheet activities of banks is not entirely acceptable. This conclusion stems from the simple fact that for the implementation of the larger part of off-balance sheet instruments, i.e. off-balance sheet activities based on them, it is firstly necessary to create required institutional assumptions which apply in highly developed market economies. Given that these assumptions have still not been created in our country, it is only logical that the need for their establishment in the forthcoming period is essential.

IMPACT OF OFF-BALANCE SHEET ACTIVITIES ON BANK PROFITABILITY

The profitability of an entity is the return on assets invested in business operations thereof. In this regard, the profitability of banks depends on the difference between active and passive interest rates. However, a very pronounced increase in off-balance sheet activities of banks and a non-interest income on this basis have had an increasing impact on the overall profitability of the bank in recent years. Given the intense competition in loan markets, banks are increasingly compelled to gravitate towards off-balance sheet banking activities because they bring a high income in the form of commissions. Namely, commissions comprise the most essential item in the creation of non-interest income of the bank. In addition, non-interest income varies depending on the size of the bank and presents a safe signal for the presence of more pronounced off-balance sheet operations. The profit which the bank acquires on the basis of various types of commissions belongs to the non-interest income of the bank, which has significantly exceeded income from interest rates originated on the basis of balance sheet operations during the last two decades, which is present in almost all major world banks. Profitability, as the key component of banks' performance, is expressed through two key indicators: *first*, Return on Assets – ROA, and *second*, Return on Equity – ROE. Although there are other indicators of the performance of banks' operations, the fact is that these two indicators are the most important indicators of profitability, and are thus used most commonly as indicators of the bank's profitability in the international banking practice.

ROA shows how much the bank has been effective in the management of total assets of the bank. With central banks and bank rating agencies, this indicator is the most trustworthy. However, for methodological reasons, for its calculation, it is recommended to calculate the average amount of assets during the year, because in this way the comparison of assets which grow during the year with the usual so-called seasonal fluctuations of profit that is generated during the entire year is avoided. This indicator of operating performance of the bank is expressed by the following formula:

$$ROA = \text{Net profit after taxes / total assets}$$

ROE is the most important indicator for the bank's shareholders, because it shows how much revenue can be expected on the basis of the carrying amount of capital that they invested into a particular bank. The bank's profit is the result of accumulated decisions in one year and depends on a number of circumstances, both macroeconomic given for the bank, as well as bank's decision management

regarding the business policy of the bank. This profitability indicator of the bank is expressed by the following formula:

$$ROE = \text{Net profit after taxes / equity capital}$$

Bearing in mind the previously defined formulae regarding the most important indicators of the bank's revenue on the one hand, with the maximum observance of the impact of off-balance sheet activities of the bank on its profitability, on the other hand, in the context of the problem under consideration, it could be said that the competitive and regulatory pressure on the models of ROA and ROE as indicators of profitability can be expressed as follows: ROE = ROA x EM, where EM stands for the Equity Multiplier, namely:

$$ROE = \text{net profit / equity capital}$$
$$ROA = \text{net profit / total assets}$$
$$EM = \text{total assets / total equity}$$

Bankers give special attention to the said pressures because they affect the two main carriers of the bank performance (ROA and ROE), as well as the Equity Multiplier (EM). Therefore, it follows that banks will preferably reduce the assets than add funds to them. This enables them to increase the off-balance sheet operations that slow asset growth and increase the amount of non-interest income, and the profit of the bank respectively. In this way banks reduce the equity multiplier, i.e. reduce the level of required capital (capital adequacy) and increase the return on assets, with other conditions unchanged. The effects of the aforementioned securitization on the bank profitability can best be understood with the help of a hypothetical model of return on equity (Table 1).

Table 1: Effects of securitization on bank profitability

Indicators	I Initial position	II Transitional period (transition)	III Rebalancing
Return on Assets ROA	0.01	0.0075	0.0125
Equity Multiplier EM	15.00	12.00	11.00
Return on Equity ROE	0.15	0.09	0.1375

As can be seen, the given example contains three states: *first*, the initial position, *second*, the transitional period or transition, and *third*, the state of rebalancing. The reduction of the equity multiplier in the stages of transition and rebalancing indicates that there has been a decrease in total assets with respect to equity capital. This reduction in total assets led to a decrease in ROA, which in turn led to a decrease in ROE. Similarly, in order for banks to return to the initial ROE of 15% with EM being 11, they would have to increase their ROA at 0.0136 (0.15 / 11). Bearing in mind the fact that banks were under great pressure from competition in this period, it is logical that rebalancing could not be established by increasing revenue based on balance sheet transactions. Namely, banks were forced to increase their business operations in the field of off-balance sheet activities and thus regain their profitability, primarily on the basis of revenue from the different types of commissions arising from these transactions. Therefore, at the stage of rebalancing, banks use high commissions and strive to reduce costs to increase ROA.

For the bank, conducting off-balance sheet activities means a source of additional revenue, competitive advantage and meeting the needs and demands of customers and clients. Increasing additional revenue from these operations means that the bank determines the amount of commission for each transaction. Hence, a significant share of non-interest income of the bank belongs to commissions earned on the basis of the performance of off-balance sheet transactions. Therefore, for example, if guarantees and letters of credit are turned through bank payment into a specific type of loan, then the bank will be able to collect not only commissions but also corresponding interests. The commission is to be arranged and charged in advance, simultaneously with the performed service, or immediately upon the completion of service. When it comes to bank guarantees, commission is calculated in percentage or per mille from the value of the issued guarantee, and is usually charged

quarterly. In determining the amount of commission, the bank should take into account the highest and the lowest commissions. The highest limit is determined by the market, which implies that the commission has to be competitive. The lowest limit is determined by the minimum profitability of the bank, so that the bank does not sustain losses on a specific operation or group of operations by charging certain fees and commissions. Otherwise, the bank can be exposed to the risk of losing a transaction due to the excessive price or realizing a loss due to low prices in specific transactions. In any case, the effects of both cases will be the same: the bank will realize the loss, regardless of failing to procure the transaction or obtaining it at too low a price.

The process of contracting commissions in relation to a guarantee on larger amounts includes the timely preparation of certain data and assessment of potential losses, i.e. risks that may occur in the near or distant future. In addition to operational costs, the bank can also have unforeseen expenses (e.g. activation of guarantees and conversions of contingent liabilities of the bank into the actual liability). Therefore, it is essential that prices, commissions and fees also include coverage of possible losses on this basis. The problem is in the assessment regarding the probability of risk which should be entered into the calculation, taking into account that the modern practice of banks shows that the transferred liabilities in off-balance sheet activities are only potential (contingent) and that they are not actual in their entirety.

In this context, it should be noted that the profitability of the banks is affected by numerous factors. Among them, the most important are the following: management quality, asset quality, economy of scale, off-balance sheet operations, business cost control and bank environment. In this regard, the bank's profit maximization and cost reduction can be achieved by using different strategies such as interest rate risk management, cost control, liquidity management, bank capital management, tax management and management of off-balance sheet activities of banks.

RISK OF CONTINGENT LIABILITIES

The risk of contingent liabilities arises from the off-balance sheet operations of the bank, which mainly refer to the following: *firstly*, various forms of guarantees, or contingent loans the bank issued charging certain fees for them and which are activated if the borrower fails to meet their liabilities in a timely manner, and *secondly*, the bank's liabilities on the basis of financial derivatives with other participants. Therefore, off-balance sheet activities of banks are risky by their nature. Bearing in mind the increasingly significant participation of off-balance sheet transactions in banks in highly developed market economies, there is no doubt that the risk of contingent liabilities is now given more attention within the overall risk management at the level of each commercial bank. Contingency of bank liabilities according to certain off-balance sheet operations implies that the risks and liabilities are moved to the future.

Although modern banking practice in the world shows that the potential liabilities of off-balance sheet activities of banks generally do not turn into actual liabilities, there is still a certain degree of probability that some of the potential off-balance sheet liabilities will become actual liabilities of the bank. It is for this reason that there are two important factors which determine the consideration of risk of off-balance sheet activities of banks, which are: *firstly*, that off-balance sheet activities of banks generate income from commissions and fees that increase the bank's profits, and *secondly*, that off-balance sheet activities do not affect the ratio of assets to the bank's capital.

Therefore, it follows that modern banks increase the volume of off-balance sheet activities mainly for two main reasons: *firstly*, because of the increase in total revenue, and *secondly*, due to the "avoidance" of capital increase, which in turn confirms the fact that in the risk assessment of balance sheet positions, the risk of off-balance sheet activities of banks should be included in order to obtain a more realistic picture of risk assets of the bank.

Observing the bank's potential exposure to risk, risk management objectives regarding off-balance sheet activities are to protect the assets and profits of the bank, i.e. to prevent possible losses. Also, by

using different techniques of risk management, it is possible to preserve banking resources and profit from accidental loss or to maintain the loss at an acceptable minimum of risk costs. However, the risks of off-balance sheet activities are created not only by the nature of these operations (the existence of bank's liabilities and third party liabilities) but also the permanent development of banking techniques and in this regard, the emergence of increasingly complex forms of banking business operations that are typically recorded "below the line in the balance sheet."

However, the recording of off-balance sheet banking operations outside of the balance sheet does not mean that there is no correlation between these transactions. Namely, they can be viewed in the context of portfolio risk, which means that off-balance sheet operations represent specific combinations of loan risk (for issued guarantees), interest rate risk (associated with the maturities of assets), liquidity risk (due to failure to meet liabilities) and the exchange rate risk. In addition, there is always a certain degree of probability that some of the potential off-balance sheet liabilities, or a part of some of them, can be activated and become actual liabilities of the bank. In this regard, the practice of banking business shows that with a correct risk assessment procedure faced by the bank and the borrower, off-balance sheet operations of banks are still rarely converted from potential to actual.

CONCLUSION

Proper management of off-balance sheet activities of banks is a very important factor in the performance of banks in the modern economies. This means that in the banking business operations special attention needs to be given to the development of an adequate management system for off-balance sheet activities, as well as the accounting and auditing thereof. In this context, both internal and external bank business controlling and disclosure of the said "below the line" activities can significantly contribute to forming a realistic picture of the banking business operations. If the off-balance sheet operations of banks are properly managed, this can contribute to minimizing the risk of the bank, increasing profitability and improving the overall performance of the bank. By increasing the quality of these indicators, the bank will certainly increase its value, i.e. the value for its shareholders and also improve its competitive position which is the goal of its business operations. Bearing in mind all the negative aspects of the global economic-financial crisis, which had negative influence on our economy in the past, it is nevertheless the fact that in our domestic conditions the off-balance sheet operations of banks have not yet been sufficiently developed. Our banking business lags significantly behind in relation to the market economy in developed countries. Therefore, it is necessary to intensify strengthening of off-balance sheet activities of banks in the forthcoming period in order to increase their non-interest income, which reaches up to 50% in certain banks in some developed countries in relation to the gross income of banks.

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FEDERAL TAX SYSTEM AND TAX BURDEN IN UNITED STATES

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ABSTRACT

Tax system as a subsystem of the total economy have to be determined on a stable and predictable way because as such it provides and creates basis for an intense capital and investment inflows. It is through appropriate tax structure, the system should contribute to adequate and equitable taxation and raising funds necessary for covering needs of budget users. The aim is to reflect the structure and design of tax system US with federal, state and local standpoint. As a federal state, US represents a special form of complex state in which the member states are obliged to carry out decisions of the federal government who is the bearer of the sovereign state authorities. Also, it's important to emphasize that the federal government has significant rights in taxation, regardless of the rights of member states which is completely different compared to the EU. The paper consists theoretical approach to the federal tax system and a quantitative access through graphical and tabular presentation of main taxes in the US.

Keywords: taxes, structure, federal, local, state, burden.

INTRODUCTION

Taxation is a complex issue that is specific from case to case in United States. The Federal Administration of the United States is funded from tax revenues where part of the money is diverted to social and economic funds and in funds to financing political campaigns while the tax payments is handled by the Federal Service Internal Revenue Service. The tax system is progressive which means that people with higher income pay higher taxes. The percentage of tax revenues depends on the amount of annual income, marital status and number of people who are financially dependent on the taxpayer. What's interesting and characteristic of the US tax system that the United States presents one of only two countries in the world in which non-residents are treated the same way as residents. So, all American citizens including those who don't live there, are subject to US income taxes which generate worldwide. Bearing in mind that the United States is federal republic with special state and local governments, we can conclude that the tax system is composite where each of these levels has its own laws and tax system. However, the scope of state tax law isn't in conflict with the federal laws. Also, most of state powers are transferred to the lower mainland regional, countries, municipalities and cities.

LITERATURE REVIEW

Every government should provide sufficient funds to finance public consumption and cover public expenditures. Policy should be created so that fiscally competitive state governments will internalize all significant fiscal externalities when selecting state tax rates. Krugman (2001) noticed that even if

one could devise a tax system which is economically optimal, the taxation includes ideals about equity and fairness. A society may be willing to sacrifice some level of economic growth in exchange for a more equitable distribution of resources. Analysis of the U.S. historical data, he found that high levels of economic growth tend to be related with periods of relatively equitable distribution of resources. Sherlock and Marples (2014) defined that the main sources of federal tax revenue are individual income taxes, social insurance and other payroll taxes, corporate income taxes, excise taxes and estate and gift taxes. On the other hand, Altig et. al (2011) determined tax reform as a relevant issue and induced that including the Taxpayer Relief Act of 1997 have made the system more complex. They emphasize the importance of fundamental tax reforms which mean different things to different people. Forbes (2012) said that federal tax code of the U.S. is a vast system of numbers and equations, deductions and credits, loopholes, forms and publications. It's important a purpose of tax revenues and how they are used. Helms (1985) researched this topic analysed by time series from 1965 through 1979 of cross sections of 48 states and his results indicated that tax increases significantly retard economic growth when the revenues are used to fund transfer payments.

ANALYSIS OF TAX SYSTEM IN UNITED STATES

Over the last 40 years, the U.S. federal tax system has undergone three changes where each of them move the tax system in the direction of less progressivity. First, there has been a dramatic decrease in top marginal individual income tax rates whereby this rate on the highest incomes declined to 28% by 1988, increased to 39.6% in 1993 and fell to 35% as of 2003. Further, corporate income taxes have decreased by half, from around 4% of GDP in the 1960s to less than 2% of GDP in the early 2000. Third, there has been a essential increase in payroll tax rates financing social security retirement benefits and Medicare where payroll tax rate on labour income has increased from 6% in the early 1960s to over 15% in the 1990s and 2000s (Piketty and Saez, 2006).

Figure 1 shows tax burden in United States and OECD average in period from 2000 to 2014 year. Using OECD's annual Revenue Statistics report, we can see that the tax burden in the U.S. increased by 0.6% from 25.4% to 26% in 2014. Since the year 2000, the tax burden in the U.S. has decreased for 2.2% or 28.2% to 26% while OECD average has increased for 0.2%.
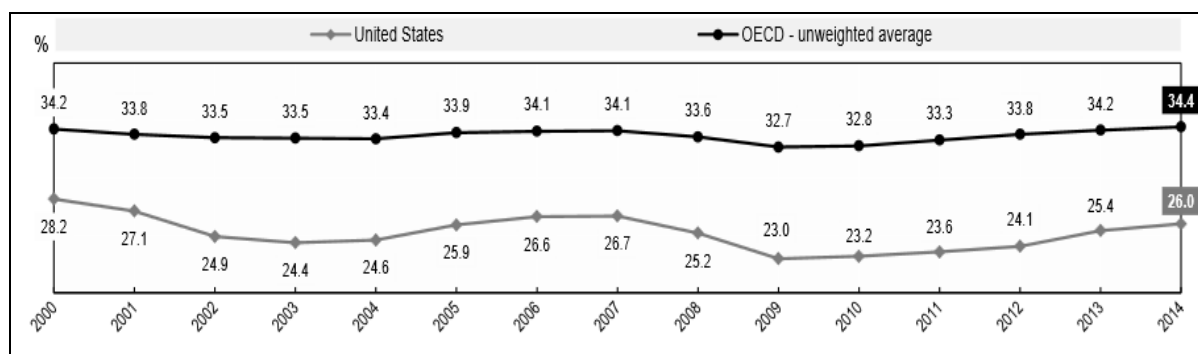
Figure 1: Tax burden in United States and OECD
Source: OECD Revenue Statistics, 2015

Tax on personal income and corporate income are determined as the taxes levied on the net income and capital gains of individuals and enterprises. Beyond, tax on goods and services include all taxes levied on the production, extraction, sale, transfer , leasing or delivery of goods and covers multi-stage cumulative taxes, general sales taxes, value added taxes, excises, taxes levied on the import and export of goods etc. Finally, tax on property is determined as recurrent and non-recurrent taxes on the use, ownership and transfer of property. These include taxes on immovable property or net wealth, taxes on the change of ownership of property and taxes on financial and capital transactions. This indicators relate to government as a whole and is measured in percentage both of GDP and of total taxation (OECD, 2016). Looking at the whole period, tax on corporate income is one tax whose percentage share of GDP increased for 0.37% while shares of other taxes have decreased. In fact, if we compare

2000 and 2014 year, tax on personal income fell from 11.87% to 9.94% of GDP and there is the biggest decrease in observed group of taxes.
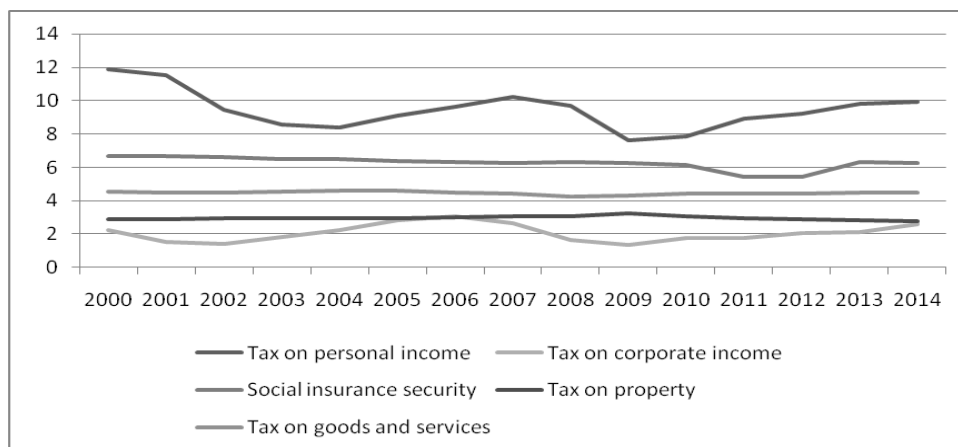
Figure 2: Taxes of GDP in United States
Source: Authors based on www.oecd.org

FEDERAL, LOCAL AND STATE TAXES IN UNITED STATES

Since we mentioned that there are three levels of tax authorities, the next figures reflect types of taxes and their shares for each level individually. Logically, the federal taxes have the largest share in tax revenues and followed by state and local taxes.
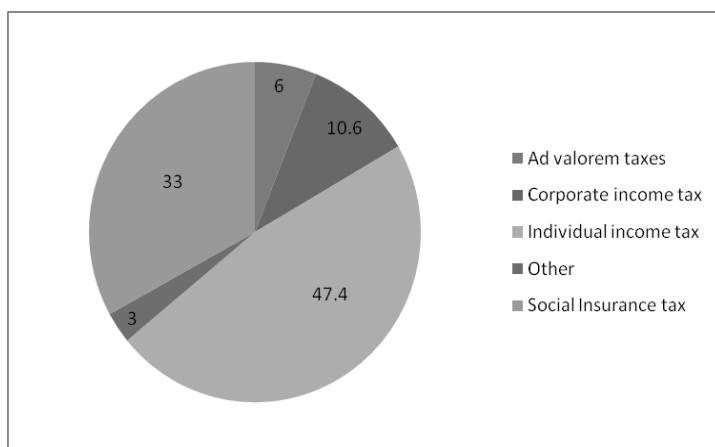
Figure 3: Taxes at federal level
Source: Authors based on
www.usgovernmentrevenue.com

The first figure manifests the sources of revenue at the federal level for 2015 year and as we can see that individual income tax and social insurance tax have the largest share at the federal level where their shares exceeds 80% or 80.4%. On the other hand, corporate income tax has share of 10.6% while the share of other taxes is significantly less.

Social insurance tax, ad valorem taxes and individual income tax are dominant taxes at state level in 2015 year while the first has 32%, second 27% and third 20%. Also, fees and charges have double share of 11% while corporate income tax has very minor share of 3%.

At the local level, sources of tax revenues notably differ from that of the federal level. Ad valorem taxes have 49% which is more than 43% compared with federal level. Further, fees and charges represent second type of tax of 22% while individual income tax and corporate income tax have share below 1% regarding 1.5%.
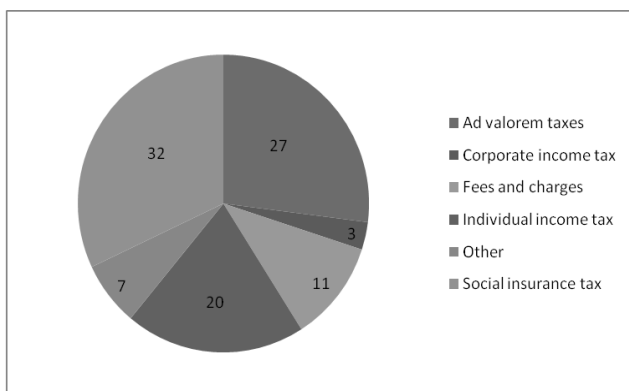
Figure 4: Taxes at state level
Source: Authors based on
www.usgovernmentrevenue.com
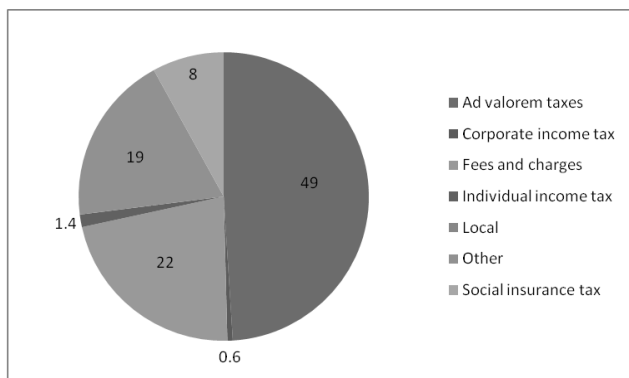
Figure 5: Taxes at local level
Source: Authors based on
www.usgovernmentrevenue.com
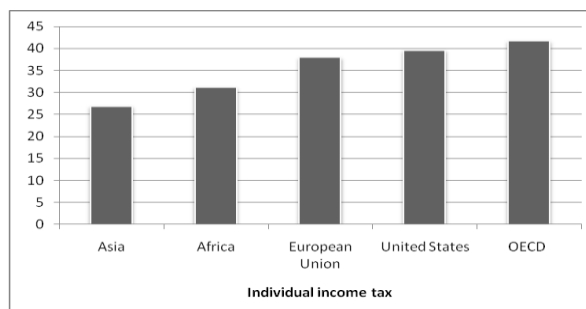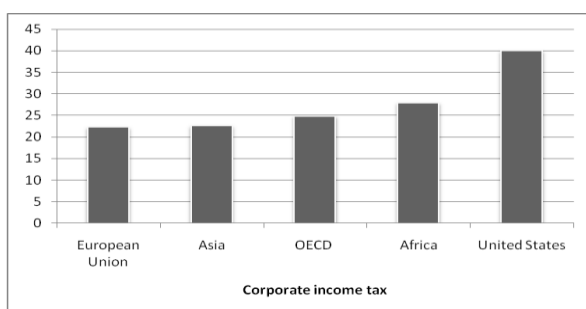
Figure 6: Corporate income tax and individual income tax in the world
Source: *Authors based on www.kpmg.com*

Figure 6 reflects level of corporate income tax and individual income tax in the world at the end of 2015 year. First, United States has the largest tax on corporate income of 40% which is more than average of European Union, Asia, Africa and OECD countries. Secondly, in terms of this tax, companies have similar tax burden in European Union and Asia where average tax rate is around 22%. On the other hand, U.S. tax on individual income is 39.6% which is less for 2.08% compared with OECD average but more than other observed average. For example, average individual income tax rate is 26.86% in Asia, 31.13% in Africa and 37.94% in European Union.

CONCLUSION

The tax system is one of the most essential components in any economy and its importance shouldn't be ignored. Analyzing the U.S. tax system, it's notable three level, i.e. federal, state and local where federal taxes have the largest share in tax revenues. Also, individual income tax and social insurance tax have the highest share at the federal level whereby the situation is similar at the state level where ad valorem taxes are presented at the larger degree. On the other hand, tax structure is different at the local state where more than 60% are ad valorem taxes and fees and charges. Looking at the observed period, all taxes have smaller percentage share of GDP compared to 2000 beside corporate income tax

which have had increased for 0.37%. We can conclude that the U.S. tax system has a high rate corporate tax rate and individual tax rate on income compared to the average of European Union, Asia, Africa and OECD countries.

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ESTIMATION OF OPPORTUNITY COST IN HIGH FREQUENCY TRADING

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ABSTRACT

Transaction costs are important part of each trade in financial markets. One component of transaction costs is opportunity cost, which is also a component of expanded implementation shortfall. It is defined as a cost associated with inability to fully execute an order. As it depends on the price movement over trading period and number of shares it will be estimated using expected price appreciation, expected permanent market impact cost and trade schedule using historical tick data.

Key words: implementation shortfall, opportunity cost, market impact cost, price appreciation

INTRODUCTION

Each trade with financial instrument includes transaction costs, its components can be explicit or implicit. Explicit costs by Johnson (2010) are "costs that are clearly identifiable and easily measured." They are fees, commissions, taxes. On the other hand, Johnson (2010) further explains that implicit costs are related to trading process and "they are less directly observable". They are spread cost, delay cost, market impact, price trend, timing risk, etc. Through pre-trade analysis, investors and trader are able to identify and model costs, and therefore take appropriate action to achieve reduction in their overall costs.

In 1988 Perold introduced implementation shortfall as measure of total transaction cost (without management fees). In his paper, Perold (1988) proposes to run paper (theoretical or ideal) portfolio alongside real one, then implementation shortfall is defined as difference between performance of paper and real portfolio. Calculation of performance of paper portfolio is done using mid-price, and this enables measuring spread costs which are included in real portfolio performance. Implementation shortfall is a sum of two basis components:
1. execution cost: cost of executed transactions and
2. opportunity cost: cost of non-executed transactions.

In their paper Wagner and Glass (2001) defined delay cost as "the change in a stock's price that occurs once the manager makes a decision to buy or sell a stock, but before releasing it to a specific broker." and showed that delay costs are part of transaction cost.
Delay cost is represented by:

$$Q(P_0 - P_d), \tag{1}$$

where Q represents order size i.e. total number of shares, P_d is mid-price in time of decision, and P_0 is mid-price when order was releasing to broker.

Kissell and Glantz (2003) included this result in their cost measure called expanded implementation shortfall that will be the basis for the definition of opportunity costs.

OPPORTUNITY COST

Perold (1988) states that opportunity cost "measures the paper performance of buys and sells [that are not executed]", he also calls it "the cost of not transacting". Kim (2010) explains that opportunity cost is "the standard deviation of the trading cost. This is a function of trade distribution, stock volatility, and correlation among stocks on a trade list over a given time frame." While Kissell (2013) defines opportunity cost as "a measure of the forgone profit or avoided loss of not being able to transact the entire order".

In cost analysis, we are more frequently interested in case of having unexecuted order at the end of trading period. One of the reasons of having opportunity cost is price movement in adverse direction and insufficient liquidity (Kumaresan and Krejić (2010); Kissel (2013); Aldridge (2013)). Mathematical formulation of opportunity cost given by Kissell and Glantz (2003) is

$$\Phi(R, \Delta P) = (Q - \sum q_i)(P_n - P_d). \tag{2}$$

It is easy to see that opportunity cost is a function of number of unexecuted shares, i.e. $R = Q - \sum q_i$, and price change $\Delta P = P_n - P_d$ between prices at the end (P_n) and at the time of investment decision (P_d). Inclusion of financial instrument's price at start of trading (P_0), enabled decomposition of opportunity cost on two components: investment related and trading related opportunity cost, respectively:

$$\Phi(R, \Delta P) = (Q - \sum q_i)(P_0 - P_d) + (Q - \sum q_i)(P_n - P_0) \tag{3}$$

The first term - investment related opportunity cost is associated with delay cost. This component can be omitted if one minimizes delay.

ESTIMATION OF OPPORTUNITY COST

In our estimation of opportunity cost we will assume that there is no delay cost, i.e. $P_0 = P_d$, therefore opportunity cost will be second term in formula (3). Also, let α be percentage of permanent market impact included in total market impact (I), and $t\Delta p$ price appreciation, then expected opportunity cost is (Kissell and Glantz (2003))

$$E\big(\Phi(R, t)\big) = (Q - \sum q_i)\left(t\Delta p + \frac{\alpha I}{Q}\right). \tag{4}$$

For our estimation, we used Vodafone Group plc (VOD.L) tick data in the period from 03.01.2006. to 31.08.2006. Daily trading was observed from 9:30 to 16:00, with this period divided at the time 10 minutes subintervals.

Quantity traded (Q) over 10 minutes period 1% of average widow volume, which is approximately 40000 shares. Permanent market impact was calculated using I-Star market impact model formulated by Kissell (2013). We considered just buy side with uniform schedule. Sell side is symmetrical. Also two cases were distinguished:
1.   first case, when orders were executed, so residual was decreasing, and
2.   second case, when trading was passive, so some or all orders were not executed in some period of time

FINDINGS

For illustration, we have chosen samples of one hour data when price was increasing and compared estimated versus real data. First and second figure depict behavior of residual and opportunity cost under same price condition, when natural price appreciation was positive. In first case all orders were executed. In second, because of passive trading and unfavorable price trend, they were not executed. Third figure illustrates case when price appreciation is negative, which indicates savings. Here all orders were executed.
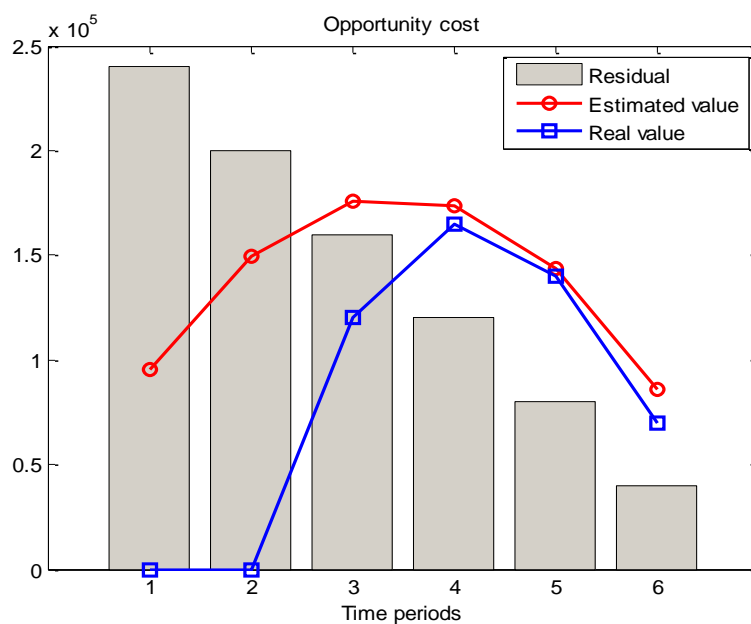
Figure 1: Opportunity cost with execution of all orders in schedule during period while price was increasing
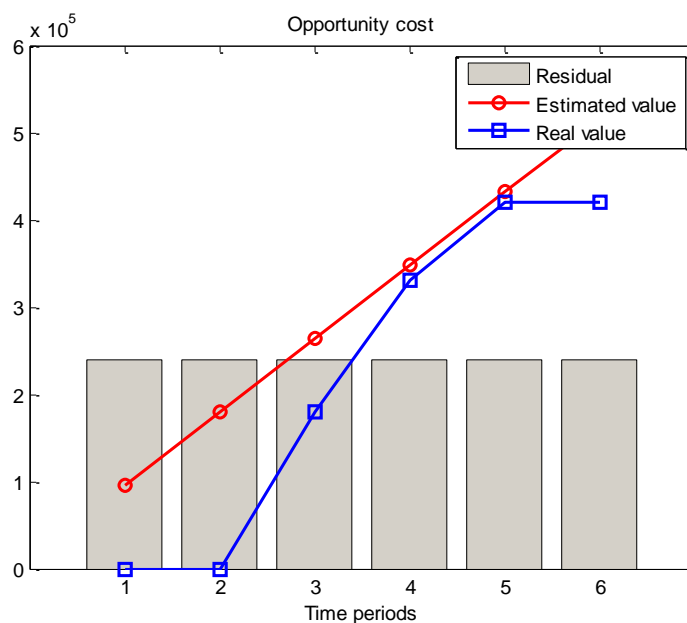
Figure 2: Opportunity cost with passive trading, when all orders were not able to execute in schedule because of increasing price
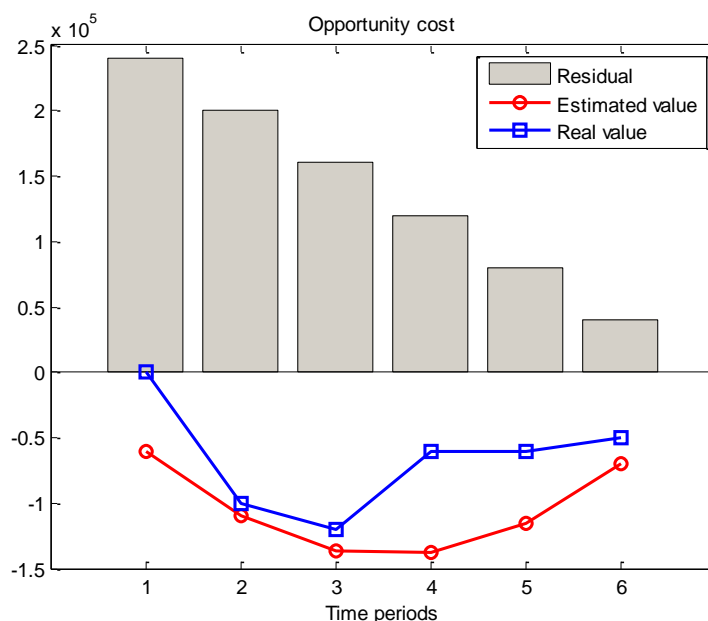
Figure 3: Opportunity cost with execution of all orders in schedule during period while price was decreasing

CONCLUSIONS

Previous illustrations give an insight in mechanism of opportunity cost and its estimation. With this in mind, investor or trader is able to predict most components of execution cost under different market conditions. Through process of pre-trade analysis, using historical data, they are able to find proper schedule of execution to achieve balance between market impact, timing risk and opportunity cost, especially to avoid additional cost of immediate execution of unexecuted part of shares. Additionally, detailed post-trade cost measurement ensures cost reduction of appropriate component. For example, high opportunity risk is usually sign of passive trading, and that information enables further improvement of trading strategy.

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INVESTMENT FUNDS IN SERBIA – CURRENT STATE AND PERSPECTIVE OF FUTURE DEVELOPMENT

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ABSTRACT

In transition countries including Serbia, investment funds have faced with a large number of problems in recent years. After their successful start, the global economic crisis has followed and has disrupted the most developed financial market which has resulted in a drastic reduction in trading of financial instruments on all European and world stock exchanges. The changed business conditions has brought new risks of business and the need to create new mechanisms for these risks and their management. The adoption of institutional regulations for the operation of investment funds in Serbia (Law on Investment Funds in 2006) opened up perspective of the development of highly porpulsive nonbank financial business which is very significant for the bank's development in future. With the help of investment funds, banks can keep under control and manage transfer funds from their savings to investment funds as well as new net investments in shares of investment funds.

Keywords: investment funds, open-end investment funds, closed-end investment funds, management companies of investment funds

INTRODUCTION

Investment funds are financial institutions which sell equity securities (shares) and thus they placed the collected funds on financial market. Investment funds represent special financial institutions that don't have bank status and which are considered as non-banking financial institutions. Their role is particularly important on the developed financial markets in the sphere of the financial system. For them, it can be said to represent the best form of capital mobilization.

The establishment and operations of investment funds should be based on clear and precise legal standards, to ensure the business stability and provide adequate legal solutions modalities of mobilization and attractive mechanism form allocation of financial resources, which can take the investment risk but also to ensure a risk's reduction and be in the function of investor protection. The adoption of the Law in 2006, it has completed the whole legal system which is related to the operations of investment funds as one of the conditions for development of the economy and attracting foreign investors and investments. As well as in some other European countries, the financial system in Serbia is focused on banks and the funds and other subjects of the capital market often are faced to regulation which makes their position more difficult.

One such example is the sole possibility of investing in domestic currency for residents of Serbia. In practice, this is a problem for many investors who don't want twice convert their savings from one currency to another which leads to higher transaction costs and represents psychological barrier to invest in funds. There is possibility of investing in euros for non-residents and they largely use, while

on the basis of contacts and complaints of potential domestic investors, we assume that they would greatly use if it will be enabled.

INVESTMENT FUNDS MARKET IN SERBIA

In the fund industry there are more products such as open-end, closed-end and private investment funds. The largest part of the assets of these types of funds is in the open-end investment funds in which investors can buy and sell investment units every day so that they have liquidity. During the crisis and dramatic fall in the value of shares, it held the liquidity of investments and so far it hasn't happened to be paid the value of assets in the legal time limit (5 days) to investors. On the other hand, considering the stock market indices have a record decline, property of funds is also decreased and didn't fulfill the investors expectations who have invested funds hoping for high returns in the first year of fund's business.

Table 1: Number of investment funds and investment management companies in Serbia

Type of investment funds	2010.	2011.	2012.	2013.
Open-end	15	15	16	11
Closed-end	2	2	1	1
Private	3	3	3	2
Investment management companies	9	8	6	5

Special emphasis is on open-end investment funds which have the greatest tendency to increase the capital concentration in the world. This funds is the nearest to small investors and represents a new option for investment that doesn't require a particularly high amount of capital and specific knowledge. In developed market economies, open-end funds represent the most dynamic sector of development in the framework of the investment funds system. In our legal system, these funds are defined in accordance with EU directives with a focus on investor protection and complete and greater awareness and transparency of the funds.

Among the open-end investment funds, funds of shares represent the kind of risky investment compared to savings in banks, cash or balanced funds, with potentially higher yields. In order to ensure of loss and at the same time open the possibility of higher yields, investors can pre-determine which is the maximum loss before they return to less risky forms of investment. Also, it should define the investment period that will be long enough to realize yields if the value of investment units is increasing which in the case of this type of investment considered minimally about 3-5 years. In this regard, it would be rational to about 10-20% of foreign currency savings is invested in open-end funds which means about 700 million - 1.4 billion euros in Serbia. This number reflects the large potential of the Serbian market and at the same time as far as the market still small compared to its natural potential.

In Serbia, investment funds can invest a part of assets in closed-end investment funds which are exposed to rapid-growing emerging markets such as Asia or invest in shares of companies as Apple which has the majority of production in China whose market of product is globally. There is a possibility that further improvement of regulations will enable that funds in Serbia invested directly in shares on the rapid growing emerging markets, as funds do from countries in the EU and region. Open-end investment fund operates on the principle of collecting funds through the issuance of shares and buying investment units at the request of the fund number. At the end of 2013 the total number of investment units amounted to 4.4 million units held by open-end investment funds and it's constantly growing since 2010 when it amounted to 1.7 million units. At that time, members of open-end investment fund Raiffeisen Cash held the largest number of investment units (35.9% of the total number OIF or 1,587,088 shares) while the lowest number of investment units was in the possession

of members open-end investment fund Ilirika Cash Euro (0.5% of the total number of OIF or 20,338 shares). In 2013 the initial value of the investment unit for all active open-end investment funds was identical and amounted to 1,000.000 dinars. For each fund the initial value of investment unit expressed in euros was different depending on the value of exchange rate of the National Bank of Serbia on the day of the activity of open-end investment funds. The value of average investment units (if we looked all open-end investment funds as one "Fund") to the end of 2013 amounted to 1,194.99 dinars or 10.42 € converted to euro according to the average exchange rate of the National Bank of Serbia.

Table 2: Number and value of investment units of open-end investment funds in Serbia

	Open-end investment funds	Number and value of investment units in euros							
		Number of investment units				Value of investment units			
		2010.	2011.	2012.	2013.	2010.	2011.	2012.	2013.
1	Delta Dynamic	89.072	66.686			3,33	2,99		
2	Delta Plus	276.467	222.113			6,87	6,28		
3	Erste Cash	152.565	341.390	207.511		10,45	11,81	12,11	
4	Erste EURO Balanced	46.152	41.039	37.332		11,95	11,95	12,86	
5	Erste EURO Cash		35.161	99.506			10,07	10,43	
6	Erste Cash								
7	FIMA Novac	12.520	6.159			10,77	11,94		
8	FIMA Proactive	490.819	478.973	347.502	326.300	3,69	3,51	3,33	3,60
9	Citadel Novĉani Fond	6.730	5.909			11,63	12,9		
10	Focus Premium	109.736				2,19			
11	Triumph Balance	13.368	11.041	9.551		12,43	11,17	10,97	
12	Ilirika Balanced				96.624				12,64
13	Ilirika Global	57.824	48.328	42.878		4,24	3,39	2,95	
14	Ilirika Gash			6.994				11,89	
15	Ilirika Gash Dinar				153.355				13,13
16	Ilirika Gash Euro				20.338				10,56
17	Ilirika Dynamic			66.784	114.913			2,51	2,70
18	Ilirika Plus			193.837				5,17	
19	Ilirika Euro			164				11,87	
20	Ilirika Gold		17.867	16.502			9,39	7,64	
21	Kombank InFond	105.132	86.405	95.577	94.979	7,05	5,56	5,44	5,70
22	Kombank Novčani fond				85.150				9,12
23	Raiffeisen Akcije	119.365				1,45			
24	Raiffeisen Cash	42.112	317.923	731.452	1.587.088	10,30	11,82	12,20	13,47
25	Raiffeisen Euro Cash			137.336	1.422.576			10,54	9,24
26	Raiffeisen World	128.213	150.111	248.400	445.933	10,07	9,79	10,50	11,25
27	Triumph	94.417	117.993	90.365	69.009	6,02	7,55	4,28	3,41
	Total number and average value of investment units	1.744.493	1.947.097	2.061.765	4.416.264	5,86	7,89	9,22	10,42

At the end of 2013, an open-end investment fund Raiffeisen Cash achieved the highest value of investment unit in amount of 1544,12 dinars (initial value of the investment unit of open-end investment funds amounted to 1.000,00 dinars) or 13.49 € calculated at the middle exchange rate of

the National Bank of Serbia on the same day (initial converted value of investment unit amounted 10.03 €). The realized value of investment units of open-end investment fund Raiffeisen Cash was 29,2% higher than the average value of the investment unit at the observed day. On the other hand, open-end investment fund Ilirika Dynamic achieved the lowest value of the investment unit in amount of 309,69 RSD or 2,71 €. The realized value of investment unit of this investment fund was 74,1% lower than the average value of the investment unit at the observed day. At the end of 2013 the realized average growth rate of value of the investment unit on daily level amounted 0,01% since of the beginning of operation of all open-end investment funds (the first open-end investment fund started to work at 08.03.2007). Looking at funds, the open-end investment funds Ilirika Cash Dinar (0,04%), KomBank InFond (0,04%) and Raiffeisen Cash (0,04%) had the highest growth rate in value of investment unit while open-end investment fund KomBank Money Fund realized the biggest negative growth rate in value of investment unit (-0,36%). Also, the realized average yield rate on the average investment unit amounted 19,5%. The open-end investment fund Raiffeisen Cash achieved the highest yield rate per investment unit (54,4%) while the Ilirika Dynamic had the lowest yield rate per investment unit (-69,06%). At the end of 2013 the total value of assets of all open-end investment funds amounted 5.3 billion dinars or 46,1 million euros and it's constantly increasing compared to 2010 when it amounted 1,1 billion dinars or 10 million euros.
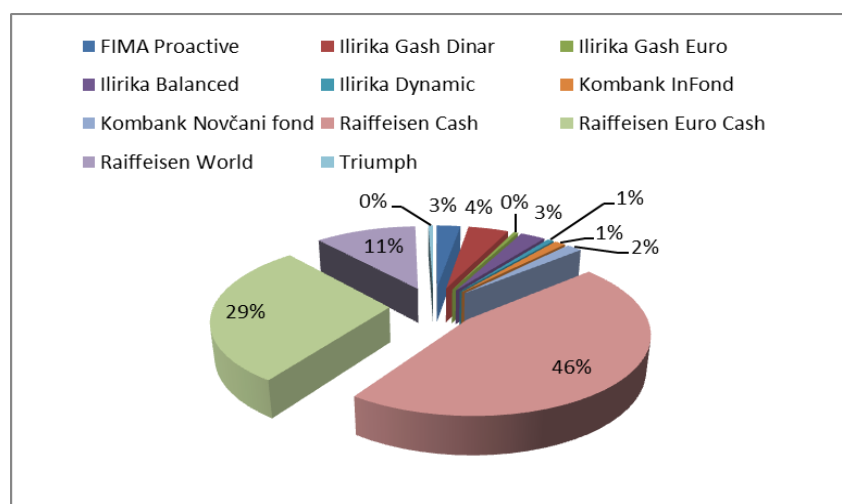
Figure 1: Share structure of open-end investment funds in the total value of assets of all open-end investment funds in Serbia in 2013

Raiffeisen Cash represents open-end investment fund whose assets value was 2,5 billion dinars or 21,4 million euros at the middle exchange rate of the National Bank of Serbia with share in the structure of the total value of assets of all funds with less than one-half (46,4%). Further, the open-end investment fund Ilirika Cash €URO had the smallest value assets of 24,6 million dinars or 215,2 thousand euros at the middle exchange rate of the National Bank of Serbia with share in the structure of the total value of assets with only 0,5% on the same day. The realized average growth rate of value of the assets on a daily level amounted 0,13% at the end of 2013 (primarily due to the expansion of open-end investment funds in 2007 and the first half of 2008). Observed by funds, an open-end investment fund Raiffeisen €URO Cash realized the highest average growth rate of value of the assets on a daily level from the beginning of activity in the amount of 1,39% while the open-end investment fund Triumph had the largest negative average growth rate of value of the assets (-0,10%)

PORTFOLIO OF INVESTMENT FUNDS IN SERBIA

Investment funds are suitable for medium and long term investment, saving money for schooling children, housing needs, realization of future business ideas. The motive for investing can have different starting points and goals but basically in all the motive is to get the profit by the mathematical law of compound interest for many years (depositing with interest on interest). For

different reasons, savers and investors have already experienced how the property can be multiplied but unfortunately and how the overall savings can be lost around the world. Such experiences certainly contribute to the growth of caution and reduce the possibility of unnecessary risk without special warning.
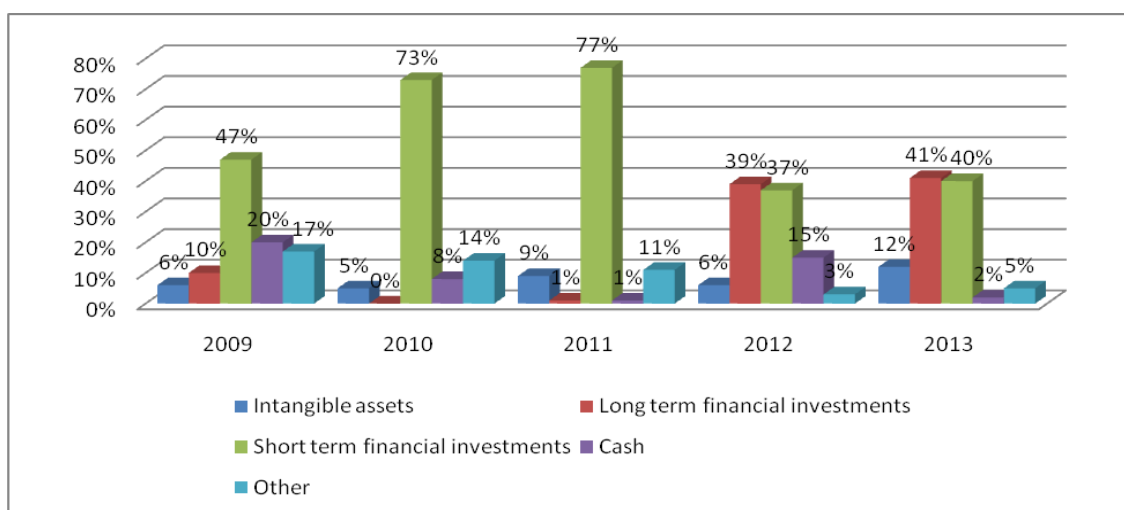
Figure 2: Investment structure of management companies of investment funds in Serbia

Based on the observed period, investment funds in short term financial investments-shares and long term financial investments-bonds was the most represented in the structure of investment with 40% and 41%. This relation has changed dramatically compared to 2010 and 2011 when the ratio was far higher in favor of short term financial instruments. The growth of investment in long term securities-bonds is result of the uncertainty on the financial market of Serbia.

Although Serbia is in the group of countries with poor investment funds, our country has the thankless position for two main reasons which management companies of investment funds couldn't affect. First reason is that the investment funds occurred in our countries shortly before the fall of the overall economy and before impact of the global financial crisis. The first investment funds have started to operate in peak moments on the Belgrade Stock Exchange which they haven't opportunity to buy long term securities by low prices. Another important reason is very strict legislation which didn't allow for investment outside the country. The combination of these two factors at the time of significant decrease indices at the BSE led to a dramatic fall of investment units whose value is ended solely on the value of domestic shares.

At the beginning of 2007 a large number of small investors, after having attracted large profits and expecting repetition of growth in the period after their investment, suffered a decline of their expectations and losses. It will take a lot of time, measured in years, before such investors be brave to invest again their funds on the capital market but it shouldn't doubt that they follow activities on the stock market and prepare resources for new investments.

CONCLUSION

Direction of investment fund's development in Serbia is determined by the further development of the capital market, regulation's improvement, achievement of macroeconomic and political stability, as well as education and informing the investment public. The primary aim of investment funds is through higher yields prove that they are better than alternative forms of investment, primarily from bank's savings. This is the only way to return the investor confidence which is shaken by the crisis. Investment funds are needed to Serbian economy which will in the near future to get in importance because of the pension system and citizen's need to take action in private financial precautions. Investors have to know that they must allocate time for their investment and choice of investment

strategy. Proper selection of investment strategies it can significantly improve quality of life. If that is the goal than it should choice for strategy which is good in good times and in bad times and it doesn't depend on development or speculation on the market. For various reasons, savers and investors in the world but also in Serbia have experienced how the property can be multiplied, but unfortunately and how the overall savings can be lost. Such experiences certainly contribute to the growth of caution and reduce the possibility of unnecessary risk and without special warning. To a large extent, our law protects investors from potential abuses and prevents major disruptions of the financial system.

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MEASURING COMPETITIVENESS OF NATIONAL ECONOMIES: CASE OF BOSNIA AND HERZEGOVINA

UDC: 338:339.137.2(497.6)

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ABSTRACT

Competitiveness measurement became an important instrument for balancing the development process of the economy. There are many opinions and methods of measurement and evaluation of competitiveness of national economies. The methods are different in structure of using the competitiveness indicators and ways of their processing. The aim of the paper is to calculate the main factors that determine competitiveness level of Bosnia and Herzegovina by Factor analysis. Factor analysis is suitable for positioning of internal relations between competitiveness indicators and for contraction of their high number to a smaller number of variables. The research conducted in this paper has confirmed that the existing competitiveness indices are not precise enough to determine which variables have the greatest impact on increasing the index of competitiveness in B&H.

Key words: Competitiveness, economy, measurement, factor analysis, Bosnia and Herzegovina.

INTRODUCTION

Competitiveness is a wide concept, which can be observed from various perspectives: through firms, products, branches of the national economies. The most elaborated of these is the concept of the competitiveness of national economies. A microeconomic perspective refers to the firms level view. It basically deals with a firm's internal dynamics that make firm strong or weak (Porter, 2008, Wingaraja, 2003, Nelson, 1992). In past decade, the microeconomic perspective is improved to a new insight that includes the effects of technology, innovation and clusters. Lall (2001) criticizes the neoclassical economics, which assumes that technology is avaliable and the firms are capable of using the technologies at „technical best levels". According to Wignaraja (2003) „at the macroeconomic level, competitiveness is the ability of a country to make products that meet the test of international competition while expanding domestic real income". Fagenberg (1988) defines international competitiveness of a country as the ability to realize economic policy goals, especially growth in income and employment, without running into balance-of-payments difficulties. Countries with different infrastructures, education systems, legal frameworks, specific economic - policy measures are indirectly competing to attract the investments of multinational companies. For the national economy of Bosnia and Herzegovina, recongnizing determinants of competitiveness at all levels is essential for long-term economic growth.

THEORETICAL APPROACH:THE COMPETITIVENESS OF NATIONAL ECONOMIES

Competitiveness of the national economy is a concetrated expression of economic, scientific, technological, organizational, managerial, marketing and other capabilities that are implemented in goods and services, successfully insuring their competing on domestic and foreign markets. The national competitiveness is an ability of a state to achieve high rates of economic growth, ensure an increase in real wages and promotion of domestic firms. Competitive ability to adapt to changes occurring in the global market is based on following economic factors such as: innovation ability,

investment volume, infrastructure, financial systems, modern technology, legal framework that supports innovative activities and technological development, etc. According to Porter (2008), if a state creates such business environment where there are favourable conditions for business and where the state gives maximum support to companies that perform operations on local and global markets, these conditions present competitive advantage of the nation.

Standard definition of competitiveness is rather flexible and can be used for numerous different purposes. Competitiveness of national economies has most commonly been defined in term of either trade performance or productivity change. The World Economic Forum (2012a, p. 4) defines national competitiveness as the 'set of institutions, policies, and factors that determine the level of productivity of a country'. The level of productivity is regarded as the main determinant of a country's returns on investment and long-run prosperity. The competitiveness can be driven by many factors, understanding of which has occupied the minds of economists for more than two centuries, beginning with the seminal work by Adam Smith (1776). According to Hollensen (2010), national circumstances create an environment in which businesses can gain international competitive advantages but it depends on the firm whether it grabs the opportunity to gain competitive advantage or not. Instead of focusing on the performance of individual sectors, more recent studies have examined country- and region-specific patterns of related industries and trade composition as an important corollary of successful economic development and understanding business environment (Hausmann and Klinger, 2006; Delgado, Porter and Stern, 2010b; Lin, 2011). According to Delgado et al (2008) business environment can be understood in terms of four interrelated areas: the quality of factor (input) conditions, the context for firm strategy and rivarly, the quality of local demand conditions, and the resence of the related and supporting industries.

METHODOLOGY: FACTOR ANALYSIS APPLIED IN CALCULATING THE MAIN FACTORS OF COMPETITIVENESS OF THE ECONOMY OF BOSNIA AND HERZEGOVINA

Primary data were collected by interviewing the rules of random sampling. The sample includes large and small companies in B&H, oriented to the domestic market, as well as export-oriented. The sample was also representative in geographical and sectoral significance. The prerequisite for the application of factor analysis is that the data are measured on interval scale. Respondents had to evaluate each specified statement, where 1 means "completely disagree" and 7 "strongly agree". Although the scale is ordinal, it can be considered and if the interval is based on the assumption that the intervals on a scale equal. In empirical studies often apply ordinal scale, but it is common that the collected data are analyzed as if they were collected on interval scale. In this paper data were analyzed on interval scale. Factor analysis is carried out in several steps: a) suitability evaluation of the data for the application of factor analysis, b) determining the initial results for the extraction of factors,c) determining the matrix of the factor structure and the final results after the removal of factors,d) implementation of the factors rotation if the initial matrix of the factor structure is not interpretable, e) determining the factor matrix and the final results after the factor rotation and f) interpretation of extracted factors after rotation.

Factor analysis of the determinants of competitiveness of the B&H economy was performed on set of original variables. Correlation matrix containing the coefficients of simple linear correlation of each pair of variables is the basis for the implementation of factor analysis. One of the preconditions for the implementation of factor analysis is the connection between the original variables and the basis for identifying a set of related variables is the correlation matrix. The correlation matrix of original variables indicated a correlation between some variables. Examination of the correlation matrix has confirmed the suitability of the data for the implementation of factor analysis. Kaiser-Meyer-Olkin measure following the criteria by which we examine the suitability of the data for the application of factor analysis. The value of the Kaiser-Meyer-Olkin measure (K) is calculated using the following formula:

$$K = \frac{\sum\limits_{\substack{i=1 \\ i \neq k}}^{p} \sum\limits_{k=1}^{p} r_{ik}^2}{\sum\limits_{\substack{i=1 \\ i \neq k}}^{p} \sum\limits_{k=1}^{p} r_{ik}^2 + \sum\limits_{\substack{i=1 \\ i \neq k}}^{p} \sum\limits_{k=1}^{p} q_{ik}^2}, \quad 0 \leq K \leq 1$$

wherein, r_{ik}^2, ($i \neq k$) square of the correlation coefficient between the variables i and k, q_{ik}^2, ($i \neq k$) square partial correlation coefficient between the variables i and k. Kaiser-Meyer-Olkin (K) is in the closed interval from 0 to 1. If the value of this measure is less than 0.5, the correlation matrix is not suitable for factor analysis. Kaiser-Meyer-Olkin measure calculated based on the previous formula is 0.910. The value of the KMO measure confirms that the data on the determinants of competitiveness are suitable for factor analysis. In addition to the value of the KMO measure can be calculated for the entire matrix and individual variables. Kaiser-Meyer-Olkin measure for each variable (s) are calculated using the following expression:

$$k_i = \frac{\sum\limits_{\substack{k=1 \\ k \neq 1}}^{p} r_{ik}^2}{\sum\limits_{\substack{k=1 \\ k \neq 1}}^{p} r_{ik}^2 + \sum\limits_{\substack{k=1 \\ k \neq 1}}^{p} q_{ik}^2}, \quad 0 \leq k_i \leq 1, \text{ i=1,2,....p.}$$

By calculating the Kaiser-Meyer-Olkin measure, based on the previous term, could be tested the suitability of each variable in the analysis and can not rule out the variables that are not of sufficient value. This increases the value of the Kaiser-Meyer-Olkin measure of the whole matrix. In this paper factor analysis of principal components (PCA) was used. PCA is based on the total variance, and does not differentiate the common and specific variance before condensation variables in the factors. Therefore extracted factors include specific variance. The basis for the implementation of factor analysis is unreduced correlation matrix, where the initial communalities used units, or on the main diagonal of the correlation matrix are units. After the orthogonal transformation of variables, is determined by a number of factors.

RESEARCH RESULTS: CALCULATED MAIN FACTORS OF COMPETITIVENESS OF THE ECONOMY OF BOSNIA AND HERZEGOVINA

With respect to the main diagonal of the correlation matrix which is analyzed for initial communalities used units, the sum of the initial communality is equal to the number of variables. When the inherent value of a certain factor is divided by the sum of eigenvalues, ie. the number of variables and multiplied by one hundred, a percentage of the total variance of that factor (p_j) will be given as a result:

$$p_j = \frac{\lambda_j}{p} * 100, \text{ j=1,2,...n.,}$$

where λ_j is the inherent value of certain factors (j = 1,2, ..., n), and p is the sum of eigenvalues.

$$p_1 = \frac{8,815}{12} * 100 = 73,462$$

From the results can be seen that the percentage of variance explained by two extracted factors is 91.404. Communalities (h_i^2) of certain variables show how much of variance is explained by these

common factors of variables. It is calculated as the sum of squares of factor loadings across all secreted factors for that variable, ie. as:

$$h_i^2 = \sum_{j=1}^{m} \lambda_{ij}^2 \ , \ i=1,2,.., \ p.,$$

where λ_{ij} is the factor loading of variables i and common factor j. For example, the proportion of explained variance by shared factors of variable 1 and communality of that variable is equal to:

$$h_1^2 = 0,936^2 + (-0,251)^2 = 0,940$$

Table 1 shows the matrix of the factor structure of the 12 variables after completing varimax rotation of factors. The results show that the structure of factor loadings amended, which was not the case with the unrotated matrix. The structure of factor loadings after the completion of the rotation allows for better interpretation of the factors in relation to the initial factor matrix.

Table 1: Factor structure matrix after Varimax rotation of factors (determinants of competitiveness)

Variables	1. Factor	2. Factor	Communality
1. The legal framework that supports innovative activities and technological development	0,968	0,043	0,940
2. Professional competence and ability of the government of B&H to meet new economic challenges	0,965	0,137	0,950
3. Reform of universities and research institutions	0,946	0,207	0,937
4. Education	0,969	0,193	0,977
5. The financial system (loans, venture capital, etc.).	0,975	0,147	0,972
6. Specific policies for the industry / competition (industrial zones, technological parks, clustering, specific incentives, etc.).	0,964	0,215	0,975
7. Infrastructure	0,871	0,103	0,769
8. More acceptable legal environment	0,932	0,267	0,940
9. Establishment of strategic cooperation and partnerships	0,936	0,236	0,931
10. Specialization of knowledge or products	0,309	0,858	0,832
11. Modern technology	0,167	0,929	0,891
12. Built reputation	0,030	0,924	0,854

Source: Calculations by the author. Method of extraction: Principal component analysis.
Rotation: Varimax with Kaiser normalization. Exercised 3 iterations.

The sum of squares of factor loadings of certain variables is equal to the communality of these variables. E.g. communality of the first variable after the completion of the rotation factor is equal to:

$$h_1^2 = 0,968^2 + 0,043^2 = 0,940$$

In orthogonal rotation of factors, sum of squares of factor loadings for each variable after rotation must be equal to the sum of the squares of these factor loadings implemented before the rotation of factors:

$$\sum_{j=1}^{m} \lambda_{ij}^2 = \sum_{j=1}^{m} \lambda_{ij}^{*2} \ , \ i=1,2,\ldots p.,$$

where the factor loading of variable i and common factors j before the rotation of factors, and λ^{*2} is factor loading of variable i and common factor j after rotation of factors. Comparing the results shown in Table 1 and Table 2 reveals that the communality after rotation of factors are equal before the communality implemented rotation. Interpretation of factors starting from the matrix of the factor

structure after completion of the rotation factors and identify to the variables that have high absolute loading on the same factor. In the process of rotating the factors three iterations were performed. In the rotated solution are two factors that meet the criteria eigenvalues and the percentage of total variance criterion. The structure of factor loadings after the completion of the rotation allows for better interpretation of the factors in relation to the initial factor matrix. It can be concluded that the two extracted factors and associated variables for each factor and their factor loadings: First factor is called "The quality of the national business environment" and includes the following variables: The legal framework that supports innovative activities and technological development (0,940), Professional qualifications and abilities of the B&H,Government to deal with the new economic challenges (0,950), Reform of universities and research institutions (0,937),Education (0,977),The financial system (loans, venture capital, etc.) (0,972), Specific policies for the industry / competition (indust. zones, technological parks, clustering, specific incentives, etc.) (0,975),Infrastructure (0.769), Acceptable to the legal environment (0,940), Establishment of strategic cooperation and partnerships (0,936).Second factor was named "Quality strategy and business operations of the company" and consists of the following variables: Specialization of knowledge or products (0,832), Modern technology (0,891), Built reputation (0,854).

Table 2: Results of conducted factor analysis for the determinants of B&H competitiveness

Variables	Factors		Communality	
	1	**2**	**Initial**	**Extracted**
The financial system (loans, venture capital, etc.).	0,975		1,000	0,972
Education	0,969		1,000	0,977
The legal framework that supports innovative activities and technological development	0,968		1,000	0,940
Professional competence and ability of the government of B&H to meet new economic challenges	0,965		1,000	0,950
Specific policies for the industry / competition (industrial zones, technological parks, clustering, specific incentives, etc.).	0,964		1,000	0,975
Reform of universities and research institutions	0,946		1,000	0,937
Establishment of strategic cooperation and partnerships	0,936		1,000	0,931
More acceptable legal environment	0,932		1,000	0,940
Infrastructure	0,871		1,000	0,769
Modern technology		0,929	1,000	0,891
Built reputation		0,924	1,000	0,854
Specialization of knowledge or products		0,858	1,000	0,832

Source: Calculated by author. Method of extraction: Principal component analysis. Rotation: Varimax with Kaiser normalization.

CONCLUSION

In an order to calculate determinants of competitiveness of national economy of B&H, factorial analysis was performed. Results indicate that enchaning competitiveness depends on: 1) The quality of the national business environment and its variables:The legal framework that supports innovative activities and technological development, Professional qualifications and abilities of the B&H Government to deal with the new economic challenges, Reform of universities and research institutions, Education, The financial system (loans, venture capital, etc.), Specific policies for the industry / competition (indust. zones, technological parks, clustering, specific incentives, etc.), Infrastructure, Acceptable to the legal environment, Establishment of strategic cooperation and partnerships; 2) Quality strategy and business operations of the company and its variables (Specialization of knowledge or products, Modern technology and Built reputation). Competitiveness has become a central characteristic of the economic policy debate. But the competitiveness debate, both in policy and academia, remains limped by confusion about what the term competitiveness

actually means. This paper offers main factors that determine competitiveness of B&H that is directly linked to its national economic performance. To explain competitiveness, a comprehensive framework has to be offered capturing the full range of influences, with a focus on fundamental factors that can be changed through new economic policies and practices.

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THE POSITION OF INSTITUTIONAL INVESTORS ON THE MARKET OF THE REPUBLIC OF SERBIA

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ABSTRACT

The primary insurance functions, likewise institutional forms of risk bearing in professional and expert activities are property protection, the financial role in the society and economy and its social attention, as an instrument of the state's care about its citizens. Accomplishing these functions and the success of insurance are immensely determined by the development of the market and the legal framework, which differ from country to country. Due to its underdeveloped market, the Republic of Serbia can hardly boast the breakthrough and results of the insurance activities. The topic of the paper is the position of insurance companies as investors on the domestic market and their impact on economic progress seen through the implementation of their financial function. The aim of the paper is to define the position and role of insurance companies as institutional investors, to determine the structure and potential of investment portfolios more closely and to explain in detail the role and position of insurers as institutional investors on the domestic financial market by a comparative observation of trends in some EU member states.

Key words: Investors, Insurance, Institutional, Financial, Market.

INTRODUCTION

Essentially, the notion of insurance has not changed through history. Its objectives and tasks have remained the same, while the mechanism of implementing insurances has been subject to changes. Protection, or the state of being insured, has always presented the basis of existence and implementation of insurance. It is an economic protection against harmful effects and economic disorders bringing about risks in all stages of social reproduction and in the everyday life of people (Avdalović et al., 2009).

The social benefit of insurance stems from its economic effects. In the context of supporting economic growth, insurance advances the conditions of life both directly (through life insurance: persons are insured for the case of death or survive, for the case of illness or disability) and indirectly (through property insurance and the accumulative function of insurance, contributing to increased production and economic growth and thereby to the welfare of people). All estimates indicate that the profit generated by investments funds in developed countries exceeds the level of interest on savings deposits in banks.

THE PLACE AND THE ROLE OF INSURANCE COMPANIES IN THE FINANCIAL SYSTEM IN MARKET ECONOMIES

In order to provide a better comprehension of the insurer's role and significance, it is necessary to explain the investing environment, i.e. the structure of the financial system, wherein insurance companies present an integral part. The legal framework is also an essential factor in deciding about the investment strategy to be implemented. The policy of investing funds from life and non-life insurance cannot be the same, thus within the legal framework for such insurance activities, there is a significant difference between these two types of insurance. Trading at solvency margin is a highly risky activity, hence this questions should be legally defined in advance, especially under the current conditions of business activities.

Over the last twenty years, the trend of internationalizing the financial markets has become increasingly intensive. The deregulation (decreased number of rules and directives) of the financial market has speeded up, while savings increased in some countries like Japan, and that significantly influenced the expansion of business activities. At present, the international capital markets are among the leading centres of collecting the funds of big corporations and banks.

Another important trend, which influenced the internationalization of the financial markets, is the accelerated development of the information and telecommunication technologies. These technologies enabled the networking of all major financial markets into a joint virtual space. Information are accessible to anyone in no time these days and transactions are not limited by the geographical area.

Financial Market Participants

Depending on the political and economic order of a state, currently, there are different institutions actively participating in the financial markets, which we can divide into:
−   central, monetary and financial institutions (central banks),
−   depository financial institutions (commercial banks, savings and loan organisations and others),
−   non-depository financial institutions (insurance companies, pension funds, investment funds, financial companies, contracting institutions etc.),
−   financial intermediaries (stock exchanges intermediaries, broker and dealer companies).

The financial market of the region is made up of financial and non-financial subjects. Among financial subjects, there are financial institutions and intermediaries who participate in the financial market and by virtue of it connect supply and demand. Their primary role is to provide the smooth functioning of the financial system straight through their intermediary function.

Institutional investors fall in the category of "big players" on the financial market. This group of investors comprise: banks, insurance companies, pension fund management companies, investment funds.

INSURERS' OBJECTIVES AND POLICIES OF INVESTING IN FINANCIAL MARKETS

Institutional investors differ in the type of contractual relation with the savings owners, which they further place on the financial market. Institutional investors are non-traditional financial intermediaries in contemporary finances, who, with the volume of their operations, essentially influence the fast development of the capital market and the patterns of creating of and trading with financial instruments, hence the overall economic development as well.

Insurers are an exceptionally significant group of financial market participants. They fall in the category of institutional investors, because they have a lot of capital, which they invest in a number of financial market segments. Given their regular incomes, insurers also play a relevant role in the

functioning of the capital market, especially in periods when capital demand exceeds supply. What makes them different from other financial intermediaries is that they, mostly, appear on the capital market as investors, less often as beneficiaries and never as mere intermediaries.

Investment Strategies

The issue of optimum or risky business also concerns the selection of strategy for and making a decision about the insurer's investment activity within legally permitted opportunities. The standard approach by Markowitz, based on risk projections of specific investment instruments, their correlation and expected return in the optimization process, sets the so called "efficient frontier" of investment (Urošević et al. 2010).

Efficient frontier investments have their return, which can be increased if that frontier is shifted to the solvency margin by increasing risk or by setting the expected minimum return. Investors have their common strategies and characteristics. Firstly, they define their own investment goals and preferences respectively, taking into consideration different constraints they are faced with in the process of making decisions on investments.

The strategy implies the definition of the position on the efficient frontier, in fact, the risk assumed and the return expected. Constraints may be linked to legal regulations, liquidity and solvency (Trzicinka, 1998). Liquidity and solvency related constraints refer to the investor's opportunity to withdraw part of his investment, or the whole of it, or his right to pay interest and dividend. Liability maturity dates, the validity of the contract, dates of payment and maturity are all decisive factors in investment activities.

Inflation risk and hazards of the financial market imply the investors' need to protect themselves, possibly by bonds indexed on inflation rates. When there is no protection possibility or when there are no such securities on the market, investors often opt for stocks or property (Ely et al, 1997). The opportunity of investing in domestic securities indexed or denominated in foreign currency do not represent the full range of investment opportunities in a sense of inflation risk reduction in swap, forwards, futures and other variants with currency clause.

Taxes often have substantial consequences on the expected return and risks of investment (Black, 1980). There are numerous risks in the world, which have an impact on each individual's or the whole economic community's life or property (Bessis, 1998). Risk has been, inter alia, defined as:

- the likelihood of loss,
- the probability of loss,
- uncertainty,
- deviation of real results from the expected ones,
- the probability of any, not expected outcome (Vaughan et al, 2004),
- the uncertainty of generating loss (Rejda, 1990).

Understanding the obligations of institutional investors, the liabilities, is a key in understanding how different types of investors formulate their investment strategies (Davis et al, 2001). Once all investment factors have been analysed, the decision-making process can start. The first things to define are the classes of instruments in which the investment will be effected. Most often, these are the instruments of the money market, bank deposits, loans given, bonds, stocks, property and foreign financial assets (Drenovak et al, 2011).

Funds Invested by Insurers in the Financial Market

Since insurance premiums are paid in advance, insurers may invest these up to the moment when the insured case occurs and when assumed contractual liabilities are to be met. Therefore, the function of investing funds by insurers is extremely important, and its goal is to preserve and increase assets.

Investment incomes are vital when a company has a negative result by virtue of its contracted insurance contracts.

Prior to making a decision about the classes of instruments, the funds should be allocated, the amount of available assets we intend to place on the market should be mapped, also due to regulations relating to investments. As a rule, the investment portfolio of an insurer comprises of more parts (Dickinson, 1998). The amounts of investments in specific instruments, securities or property are defined at a later stage. At this stage, the risk level and the desired return are assessed and the tactical allocation of funds is presented. A detailed consideration of liabilities and financial obligations steer us to alternative paradigms of assets allocation, which result in very diverse approaches to investment (Borio et al, 1997). The essential question is *solvency* , i.e. adequate funds for accomplishing liabilities assumed by contract at their maturity.

Pursuant to the Law on Insurance, it is the insurer's obligation to maintain the following technical reserve safety funds reserves for transfer premiums, unexpired risk reserve, reserves for bonuses and discounts, reserved damages and losses, mathematical reserves, reserves for balancing of portfolio, reserves for the insured participation in the investment risk. Among the most significant qualitative constraints of technical reserves are:
−   5 percent in the securities of the same emitter, being traded on the market,
−   1 percent in the securities of the same emitter, being traded on the market,
−   up to 10 percent in the securities which are not traded on the market,
−   up to 30 percent in the securities which are traded on the market,
−   up to 10 percent per a single property,
−   10 percent for inmovables from non-life insurance,
−   up to 30 percent for immomables from life insurance,
−   in a bank's deposit: up to 10 percent, and in a number of banks: up to 30 percent.

Also, as an obligation to maintain the level of funds there are guarantee reserves, which refer to: founder's capital, reserves set by statute and other documents, revalorized reserved, not appropriated profits of former years, not appropriated profit of the current year, max. to 50 percent and additional capital in a form of preferential stock and relating reserves. Decreased by: intangible property, investments, shares buyback, uncovered losses of former years and current year losses, shares in other companies for insurance. Mandatory capital reserves of insurers in Serbia can be invested according to the following regulatory conditions:
−   up to 10 percent in the securities of an emitter, which are traded on the market,
−   up to 2 percent in the securities of an emitter, which are not traded on the market,
−   up to 20 percent in securities on the market,
−   up to 20 percent in a single property, up to 30 percent in two properties and up to 60 percent in total in property, from life insurance funds,
−   up to 60 percent in bank deposits, but up to 20 percent in the same bank.

CONCLUSION

The position of institutional investors largely depends upon the financial system, the development of the market, the legal regulations, inflation and other factors. The ability to allocate funds, the concentration of funds and, as the matter of fact, the opportunity of collecting and implementing assets-items and the coverage of liabilities, are decisions made by the insurers, which define their investment strategy. The alternatives of investments are, by and large, determined by the regulations of the state and by the set objectives of the investment policy. Generating return on the efficient frontier of assets and liabilities or walking along the solvency margin at highly risky investments, are commitments aimed at higher return rates. Markowitz's optimization model (Lakic et al, 2015) for the selection of and making a decision about an investment should be supplemented by alternative considerations of introducing other techniques and adjusting the relations between assets and

liabilities. The investment portfolio implies the separation of the insurers' funds according to terms for funds collected from life insurance premiums and, especially, premium funds from non-life insurances. Various investment policies are created from the separated portfolios. Unlike life insurances, non-life insurance bears risks which cannot be fully diversified, but their contracted terms are shorter, so safety reserves should be directed towards short-term instruments.

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Session E: IT MANAGEMENT

ANALYSIS OF LEVEL OF APPLICATION OF INFORMATION TECHNOLOGY IN ENTERPRISES IN REPUBLIC OF SRPSKA

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APSTRACT

The SME sector is very important for the economy overall, primarily because of small and medium-sized enterprises which are very flexible, they are easy to adapt to changes that occur in the environment in which they operate. This business requires less financial resources than in the case of the large corporations. Small and medium enterprises are also sources of new working places and thus they help reducing unemployment. Because of all these positive characteristics, developed countries focus a big part of their economic attention on the development of the SME sector. We conducted research on a sample consisting of 124 companies in the entire territory of the Republic of Srpska. This research has shown how the information technology is presented in enterprises of Republic of Srpska.

Key words: economy, development, small and medium enterprises, information technology.

INTRODUCTION

There are different definitions of SMEs.

In Bosnia and Herzegovina there is no unique, common definition of SMEs. In late 2004 Ministry of Foreign Trade and Economic Relations in B&H launched an initiative for the definition of the concept of small and medium enterprises at the national level with regard that the entity levels using different definitions. The main characteristic of the entrepreneurial enterprise is innovation and diversity. Respectively, it is the bearer of innovation.

Entrepreneurial small enterprise is one that in addition to meeting the identified and created needs and opportunities, creating new value in the eyes of customers, experiences dramatic changes in their own growth and development, and generally it manifests exponential growth and development, measured by an increase in investment, job creation and profit growth (Petkovic, S., Berberovic, S., 2013).

The criteria to divide enterprises differs from country to country. The table 1 will show sdiversity of defining small and medium-sized enterprises between the European Union, Republic of Srpska and the Federation of Bosnia and Herzegovina.

ANALYSIS OF SMALL AND MEDIUM ENTERPRISES IN THE REPUBLIC OF SRPSKA

Most of the current transition countries (Central, Eastern and Southeastern Europe) were socialist countries with centrally planned economy. New entrepreneurial society that has still to be built in such

countries should be an association of people with pronounced individuality and different needs, with different rights and obligations. That society should be open and able to remain with significant imbalances and mismatches. The changes that these countries must pass need to be multi-layered, from restructuring of production and political relations to changes in the dominant system of values (Vukmirovic, N., 2006). The main characteristic of economy in the former socialist countries is state property, and therefore, all attention was paid to the development of large enterprises. Small businesses are completely neglected and stayed in the shadow of the big ones. However, with the disintegration of the socialist system and with beginning of the transition process and these countries have realized how small and medium-sized enterprises are important for the economy and how important it is to support the development of such enterprises. Before the recent political and economic changes in Central and Eastern Europe, the concept of SMEs did not almost exist. SMEs are considered the cradle of capitalism. In all transition countries, among others, in the countries of the Western Balkans, the process of economic and political transition is based on the development of entrepreneurship and private sector, as well as on creating a stimulation business environment for SMEs development. A certain number of countries have made significant progress in these activities, while other countries have been less successful, including BiH (Petkovic, S., Berberovic, S., 2013). In addition to these great difficulties, the development of the transition countries necessarily with no doubt, continues in the direction of building a market economy and the establishment of appropriate social relations, because practically there are no better alternatives (Vukmirovic, N., 2006).

Table 1: Definition of SMEs in the European Union, Republic of Srpska and the Federation of B&H

The criterion	EU-27			Republic of Srpska			Federation of B&H		
	Micro	Small	Medium	Micro	Small	Medium	Micro	Small	Medium
Number of employees	< 10	< 50	< 250	< 10	< 50	< 250	< 10	< 50	< 250
Income Statement	≤ 2 mill. €	≤ 10 mill.€	≤ 50 mill.€	-	< 2 mill. €	< 8 mill. €	≤ 400.000.€	≤ 4 mill.€	≤ 40 mill.€
Balance Sheet	≤ 2 mill. €	≤ 10 mill.€	≤ 43 mill.€	-	< 1 mill. €	< 4 mill. €	≤ 400.000.€	≤ 4 mill.€	≤ 30 mill.€
Independence	More than 25% of the capital or management rights can not be controlled by public institutions. Enterprises are owned by one person or few partners and do not have an ownership stake in other enterprises and vice versa.			SMEs operates independently, or if other economic entities involved up to 25% in the structure of its share capital or in its business decisions.			If another person or legal entities individually or collectively, are not the owners of capital or do not participate in the right of decision more than 25% in the SMEs, if it exceeded a share of 25%.		

Source: Petkovic and Berberovic, 2013.

STATE AND LEVEL OF SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT IN REPUBLIC OF SRPSKA

Today, the difference in the development of countries, social groups or individuals is in direct proportion to the difference in the level of application of information and communication technologies. Information society is defined as a society in which knowledge and timed, comprehensive and accurate information are basic management resources, which provide progress and the future to all its citizens (Rajcevic, S., 2008). On the level of Bosnia and Herzegovina there is readiness for development of science and technology that comes from the Agenda for Development of Information Society (October 2000, Belgrade) adopted by the countries of South Eastern Europe, which represents a global action plan for harmonized informatization and fast development of the region and Strategy of development and poverty reduction in B&H (PRSP) and with adoption of the Policy, Strategy and Action plan for development of information society in B&H by the Council of Ministers in December 2004. However, the Action plan was never realized. An electronic signature (Electronic Signature Law of B&H and the Electronic Commerce and Electronic Signatures Law of Republic of Srpska) has remained a dead letter on the paper, bylaws were never adopted that would enable the implementation of these two positive legal regulations. An electronic signature is necessary technological innovation that is a prerequisite for e-business! Governmental organ which will be

dealing with monitoring of the development of the information society at the entity and state level has never been established. At the state level, there was a problem of harmonization of proposal, to follow the constitutional structure of BiH, while at the entity level, there was no political will, nor the motive for the creation of such an institution (Rajcevic, S., 2008).

In December 2007 the Government of Republic of Srpska founded The Agency for Development of informationSociety (AIDRS) as the organ which is responsible for coordinating and monitoring of development of the information society in the Republic of Srpska. Republic Statistical Office of the Republic of Srpska, in cooperation with the Ministry of Science and Technology, had published data about research and development in 2011. Data were obtained on the basis of a statistical research "Research and Development in 2011". In 2011, 898 people were employed on the research and development with full-time and shorter than full-time, and 371 or 41.3% of them were women. When observing the field of research the largest number of researchers were employed in the fields of engineering and technology (42.6%), and least in the field of human sciences (1.2%). In 2011, gross domestic expenditures for research and development were amounted to 26.191 million KM, of which current expenditures amounted to 17.665 million KM (67.4%) and investment expenditures 8,526,000 KM (32.6%). Gross domestic expenditures were highest in the natural sciences (37.5%) and engineering and technology (34.0%). Scientific area was determined by the prevailing area, respectively, by area which employs the largest number of employees engaged in research and development. Republic of Srpska and Bosnia and Herzegovina must actively and quickly act in the direction of reducing the technological development gap, because of the process of transition from industrial to information society which in developed countries is at an advanced stage.

EMPIRICAL RESEARCH RESULTS

Based on our research, we were able to gather important data about the development of information technology in enterprises in the Republic of Srpska. The questionnaire relates to general information about the company through which we have collected basic information about the companies that participated in the research, as well as information about the technology that they used in their operations.

We have already mentioned that we made sure that this research encompasses the entire Republic of Srpska, whose territory is the subject of the research. We have chosen enterprises entirely randomly, as already has been discussed. The 80 enterprises of the 124 enterprises, that participated in the research, belong to the region of Doboj, or 64.52% compared to the total sample. Thus we clearly see that in our research the most frequent enterprises are from this region. If we look at the sample from the standpoint of year of the establishment of enterprises, we come to the conclusion that the "average age" of selected enterprises is for 15 years (Table 2), and that 50% of this enterprises were established before 2000 and vice versa. Most enterprises were founded in 2001, and the oldest company is from the 19th century (1895), while the youngest enterprise was established in 2013. From this it can be seen that the dispersion of data, by this characteristic, is rather high.

Table 2: Basic descriptive measures for the year of establishment of enterprises

Number	Sample	124
	Missing data	0
Average (year)		1997.
Median		2000.
Mode		2001.
Minimum		1897.
Maximum		2013.

When we talk about activities that enterprises from our sample deal with, statistically, over 55% of enterprises are from field of trade (wholesale and retail) and food industry, while all other activities (and there are over 15) are less represented in the sample. Only 4 companies, or 3.22% deal with professional, scientific and innovation activities, while another 7 or 5.64% of the enterprises are engaged in some sort of high-tech, such as communication technology, renewable energy, computer engineering. Number of employees in the

surveyed enterprises ranges from 1 to 700. The average number of employees is 30,1 which is not representative data bearing in mind what is the average deviation from this number (standard deviation). Namely, when we have a large variability, like in this case, it is proposed to use the median as a measure of central tendency because it better reflects the state of the observed phenomena. The median shows to us that half of the enterprises in the sample have 14 or fewer employees, while 50% have 15 or more. At the end of the analysis about the number of employeed, it should be noted that the most enterprises have 8 employees (Table 3).

Table 3: Descriptive measures for number of employees

N	Sample	124
	Missing data	0
Average		30,07
Median		14,50
Mode		8
Std. Deviation		68,6
Minimum		1
Maximum		700

As far as the division of enterprises by size, the most represented are micro and small enterprises. These data we will show in Table 4.

Table 4: Size of enterprises and number of employees in enterprises

Size of enterprises	Number of enterprises	% relative to the total sample
MICRO	34	27,42%
SMALL	73	58,87%
MEDIUM	15	12,10%
LARGE	2	1,61%
T O T A L:	124	100%

In Table 4 we can see that the most represented are micro and small enterprises. Therefore, in our sample there are 34 micro-enterprises or 27.42% that employing up to nine workers. 73 small enterprises or 58.87% compared to the total sample, employing up to 49 employees. There are 15 medium-sized enterprises or 12.10%, while the sample included only 2 large enterprises that employing 249 or more workers. Qualification structure of employees in our sample could be also better described using median values (because of the large deviation) and it tells that the average number of employees with university degree in these enterprises is 2, with higher education is 1, and with a high school is 10 employees. Concretely, 97.6% of enterprises there is no PhDs, then 90% of enterprises do not have a Master, two-thirds of employees have completed only primary school and so on. It is almost identical number of enterprises that have and those that do not have their own website (62 versus 61, while there is missing one data), you can see this from the following chart (Chart 1).

Do you have your own website?
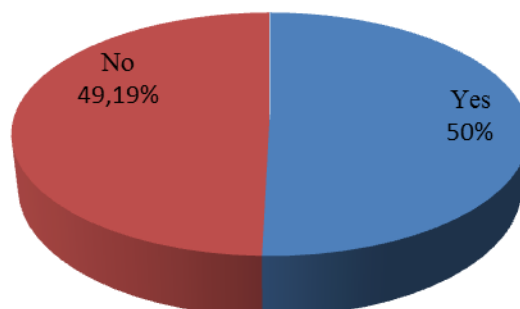
Chart 1: Division of enterprises in the sample according to the criterion of possession websites

Less of 39% (24 of 62) of the enterprises in the sample, that have their own website, were received on-line orders, while the majority of them (54 of 62) regularly updated page. Looking at this aspect from the point of the period of establishment, it may be noted that the enterprises that were founded after 2000 mostly have their own website and vice versa.

We used the method of chi-square test (contingency table form 2x2) to come to the conclusion that the observed difference is statistically significant. Using the test we come to the answer that there is no statistically significant difference between groups (p> 0.05). The structure is almost symmetrical, but we can't concluded that there is regularity in this regard (Chart 2).
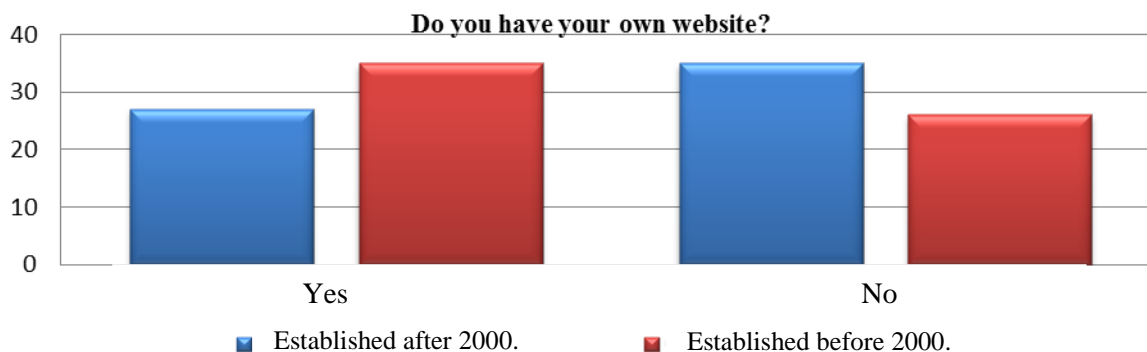
Chart 2: Possession of a website in relation to the period of establishment

It is very interesting that the enterprises that have a website at the same time have a significantly higher average number of employees compared to enterprises that do not have a website. Using the "t" test we confirm the veracity of previous conclusion. The following table shows that in 62 enterprises, that have a website, the average number of employees is 41,35, while in almost the same number (61) of enterprises that do not have a website the average number is only 16,66 workers. This difference is statistically significant, what we can conclude with a 95% of confidence level, because the value of t-test is 2.04 (where is p<0.05).

Table 5: Average number of employees by groups

	Do you have website?	Number	Average	Std. Deviation	Std. Error
Number of	Yes	62	41,35	92,743	11,778
employees	No	61	16,66	18,556	2,376

Enterprises from our research relatively take into account the technological advancement of their business. When they were asked if they regularly introduce new technologies, the respondents were divided, and there is the approximate number of those that said that they do introduce new technologies, as well as enterprises that do not introduce new technologies (Table 6).

Table 6: The introduction of new technologies in enterprises

Do you regularly introduce new technologies?	Number	%	Valid %
Yes	64	51,6	52,5
No	58	46,8	47,5
Total	122	98,4	100,0
Missing data	2	1,6	
Total	124	100,0	

When they were asked if they regularly introduce new technologies, 64 enterprises or 51,61% of the total sample had positive answer, while 58 enterprises or 46,77% gave a negative answer. Two enterprises did not have an answer to this question.

CONCLUSION

The individual entrepreneur is dependent on the environment in which it operates. If the environment acts with motivation on creativity and ability of entrepreneurs, there are much better chances of his or her success. An entrepreneur must improve itself continually, must expand its knowledge, must introduce new technologies in its business if he wants to keep step with the competition and if he wants to surpass the competition. The situation at the territory of Southeast Europe is much worse than at the territory of North and West Europe. Most of these countries are still in the process of transition and there are no developed capital markets. We saw that enterprises in our research relatively take into account the technological advancement of its business. When they were asked if they regularly introduce new technologies in their business, 64 enterprises or 51.61% of the total sample responded positively, while 58 enterprises or 46.77% gave a negative answer. Two enterprises did not have answer to this question. Only 4 enterprises, or 3.22% deal with professional, scientific and of innovation activities, while another 7 or 5.64% of the enterprises are engaged in some sort of high-tech, such as communication technology, renewable energy, computer engineering. Based on the data we presented, we can conclude that the application of advanced technologies, such as information technology, communications technology, computer engineering, in enterprises in Republic of Srpska is at very low level.

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DATA DRIVEN DECISION SUPPORT SYSTEMS IN MANAGEMENT

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ABSTRACT

The development of information technologies eases managers in performing basic activities and assignments, in achieving business goals. One of the main tasks of managers is to make business decisions. The managers worldwide found a need for some type of a system that would help them in their decision making. This paper defines decision support systems and their characteristics, where the focus will be on data-driven decision support systems. Besides that, this paper covers the application meaning of these systems as support of decision making, improvements of business intelligence and monitoring performance.

Keywords: business decisions, data-driven decision support systems, DSS, business intelligence

INTRODUCTION

Making the correct decisions at the right time is just one of many tasks of a manager. Process of business decision making is a complex group of operations, that creates a need for research focused on making that process easier. Modern and turbulent business environment makes the process of decision making harder because the principle of trial and error is not allowed.

In decision making, the facts and consequences of a decision are not always known. Because of that the managers are relying on their intuition and experience, and in this way the decisions are dependent on the one who's making them. In business, solving structured problems is eased with the existence of algorithms that a computer can use to solve those problems. Yet, the major problem occurs while solving unstructured and semi-structured problems, which are characterized with insecurity. While solving those kinds of problems, decision support system can be of big help.

These systems serve as a backbone in business decision making. Decision support systems can be divided into several types, one of which is data-driven decision support system. Operational and strategic business intelligence queries, static and real-time performance monitoring, and customer relationship management are all supported by data-driven decision support system. This system also has other purposes. This paper presents data-driven decision support systems, as well as their importance in business decision making.

DECISION SUPPORT SYSTEMS

In a last few decades, making business decisions is becoming more and more complex. Given that information systems have been involved in the business processes for many years now, their involvement in terms of business decision-making is nothing new.

There is no universally accepted definition of the concept of decision support systems that is accurate (Sauter, 2010). The term is used in several meanings, such as an interactive system that helps decision-makers, the general term for a computer application that improves decision making ability, and the name of the academic field, which explores systems for decision support in terms of their use. Decision support systems can be defined as information systems that are built to help decision makers in solving poorly structured problems in decision-making (Branković, 2008). The main objective of these systems is to provide quality information, but with an emphasis on solving unstructured or poorly structured problems. These systems can be used as an aid in decision-making on all levels of decision making. They support the decision-making process but do not make it automated, because the assessment and the final decision rests on the human.

The components of decision support systems are (Jauković, 1992):
–   Subsystem for data management,
–   Subsystem for model management,
–   Subsystem for knowledge management,
–   Subsystem - user interface,
–   User.

The first three components can be viewed as a basic technological subsystem for decision support (Branković, 2008). The thing that makes decision support systems different from other types of information systems, is a subsystem for model management, because other information systems do not contain this component. That way it can be considered that the decision support systems are created as an upgrade of other information systems with a subsystem for model management. Within the system for decision support model functions as a unique set of commands that has commands for input and output from the main program, and can be seen as an algorithm, procedure, mathematical function, chart, etc. It should be noted that some systems have only some of these components, such as a subsystem for knowledge management is an optional component that the knowledge-driven decision support systems have (Turban, et al., 2010). The user interface enables the analysis and interpretation of data in specific situations.

The software for the construction of new system includes modern programming languages, communication and web technologies, business intelligence tools, tools for data mining methods and tools for building knowledge-driven support systems. In the mid-nineties the term business intelligence first appeared (Branković, 2008). This term includes a set of tools and techniques for producing reports and setting up queries and revealing information, advanced analytic methods, and data mining in large databases and data warehouses. Sometimes, as the common name used for the decision support systems and business intelligence systems is the term - management support systems (MSS).

Decision support systems can be classified as (Branković, 2008):
–   Communication and group-driven support systems,
–   Data-driven support systems,
–   Document-driven support systems,
–   Knowledge-driven support systems,
–   Model-driven support systems.

DATA-DRIVEN DECISION SUPPORT SYSTEMS

Data driven decision support system is the most common of the five decision support systems (Power, 2002). They have been used for various purposes for over fifty years, and with the advancement of technology they're becoming more sophisticated. Data - driven decision support systems were first used by the Automatic Ground Environment (SAGE) air, while the updated data - driven decision support system was created by D. J. Powers, 2007 (Power, 2008).

Data- driven decision support systems provide operational and strategic business intelligence by putting the emphasis on access to and manipulation of internal company data and sometimes external data, which may have sources in the market, industry, economy, etc. In these systems, the database plays a major role in the structure of the system. For these systems, a characteristic component is the subsystem for data management. This subsystem consists of the following components (Branković, 2008):

− Database,
− Database Management System (DBMS),
− Data directory,
− System or mechanism for querying (Query facility).

The database is a collection of interrelated data organized to meet the needs and structure of the organization. These data are usually stored, and the subsystem for data management can be associated with data storage - data warehouse. Database Management System (DBMS) manages the process of creating a database and data warehousing via external sources, updating the database, extracting the necessary data, forming queries or reports, performs complex data manipulation and so on. Data dictionary is a catalog of all the data from the database, which contains data definitions, with the function of answering the questions of data availability, the source and exact meaning of some data. System for setting up queries accepts requests for data from other components of the subsystem for data management, and after processing it, it returns the data. Data warehouse system provides efficient access to data using computer tools adapted to specific tasks, as well as using general tools that provide additional functionality (Veljković, et al., 2008). Data driven DSS has achieved great progress in the early 90s, with the introduction of Online Analytical Processing (OLAP) software. The advantage of these systems is the ability to access large amounts of accurate, well-organized data. OLAP systems are characterized like this (Codd, et al., 1993):

− Multidimensional conceptual view,
− Connection to various data sources,
− Easy user access and understanding,
− Multi-user support,
− Intuitive manipulation of data,
− Flexible reporting,
− Analytical skills.

These systems are used to query a database or data warehouse in order to find answers for specific purposes. These systems are directed to managers and other human resources, or product suppliers.

IMPORTANCE OF DATA - DRIVEN DSS IN MANAGEMENT

Information is needed for the manager to make decisions and monitor the implementation of these decisions, monitor the status of the execution of current data, and follow the course of the decisions. In addition, a manager needs information in order to inform about the business-production elements, to monitor capacity, inventory, production, etc. A manager also needs information about interpersonal relations. What is important in regard to information is that they must be "fresh", available at any place and at any time. Based on this, we conclude that a manager wants a unique and integrated source of data, which will, through using tools, help provide decision support. Information is essential for everydays' work of the individual, because based on them, business decisions can be made. Decision-making implies choice of an alternative that gives the best outcome based on some criteria (Misković, 2013). The criteria enable mutual comparison of the alternatives. Quality and timely decisions are based on quality, timely and adequate information. User of a data-driven decision support system is every person that uses information in their work. Things in which decision support systems can contribute to management is the increased efficiency of operational processes and supporting strategic work and decisions. From the user's perspective the basic characteristics of data - driven DSS can be seen (Power, 2007). Within these characteristics the importance of these systems can be observed:

1. Ad hoc data filtering and retrieval - System helps users to search and obtain data. This search is performed via the drop-down menu with predefined queries.
2. Alerts and triggers - The systems allow users to be notified via email or other actions.

3. Create data displays - Users can change the way in which data will be displayed, as well as to show the data within time series or by displaying data history.
4. Data management - Users can group data, or change definitions and/or data models.
5. Data summarization - Users can observe data within the pivot tables or cross tabulations. This way, they can look at the data from different perspectives.
6. Excel integration - It allows users to extract and download data for further analysis.
7. Metadata creation and retrieval - Users can create reports and have some results of an analysis that contain metadata which they added. Metadata is also used to change descriptions of some information and to change labels. Trough metadata, decision support is explained and data that the system holds is made to be more understandable.
8. Report design, generation and storage - Users can report data in different ways, and to distribute them via printing, web documents or PDF documents.
9. Statistical analysis - Users can summarize or describe the data, create trend lines, etc.
10. View predefined data displays - Data-driven DSS have displays that are created by the designers. Dashboard displays are used in the system for operational performance monitoring. As for the long-term strategic performance monitoring goes, a scorecard is likely present.
11. View production reports - Users can receive pre-designed, periodic reports, that can easily be accessed.

Considering these characteristics, we conclude that managers can access data, perform analysis, and have access to reliable and consistent high quality information. Such information will lead to better informed decisions. These systems are used for solving unstructured and semi-structured problems, which is why they are best suited for managers of a higher level. Data driven DSS are important because they make daily operations more efficient in production packaging, labor and resource requirements, warehousing and freight expenses, inventory management, and order distribution (Cohen, et al., 2002)

CONCLUSION

Data driven decision support systems are intended to support, not to replace decision making. These systems allow flexible access to data, to ensure the quality of information, which increases the efficiency of decision-making. The decision making process is one of the key activities of managers, so, these systems are very important in this process. These systems have a great number of features aimed at the data, their gathering and processing for further analysis and creating reports. The main purpose of data - driven decision support system is to assist managers in monitoring operational performance or to create intelligence from historical data. Large global organizations see the importance of these systems through the ability to generate data, and support in making decisions based on that data. Smaller organizations can benefit from such systems because of the possibility of using these systems on large databases.

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KNOWLEDGE ORGANIZATION SYSTEMS AND GOOGLE ANALYTICS

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ABSTRACT

In today's business conditions that are characterized by dynamic changes and the development of technology, the flow of information is moving with unstoppable speed. Using the right information in the right way to build long-term relationships with clients, that is the main factor of successful business. Building long–term relationship with clients involves continuous marketing communication, for the purposes of diagnosing needs of customers, treating customers as equal partners in trade, and to encourage customers loyalty building. As a key segment of modern business, building long-term relationships with individual clients stands out the application online marketing communication techniques. In further text will talk about Google Analytics as a very important tool that is focused on identifying of the target market niches. In this paper, the focus is on speed, innovation and brevity of information through the online communication, which application is enhanced with Google analytics tool.

Key words: online communication, long-term relationships, blog, Google Analytics, SEO, target market.

INTRODUCTION

With the increasing use of the Internet in global business, the question arises of its use in international negotiations. The negotiation is an interactive process of communication that can happen when we want something from the other, or else they want something from us (Shell, 2006). This tool allows overcoming the problems of distance and social barriers (the question of age, sex and status). Users define their preferences and evaluate bids (Deresky, 2003). In the process of communication is important to create trust between the sides. Communication, one of the main elements of any negotiation is implemented using one or more communication media. Electronic negotiation is a process that uses electronic media, ie.media that use digital channels to transport data which allow negotiators to communicate and coordinate their activities. In the eu-negotiations importance is on media design and their relationship with other components involved in negotiations (Dobrijević, 2007). Negotiation is a social process, but electronic negotiation, although it retains the social aspect, also includes a significant electronic component (Kersten, 2003).

STRATEGIC IMPORTANCE OF PROCESS OF COMMUNICATION IN E=BUSINESS

Without communication it would be difficult even impossible to run any business. In fact, communication is happening all the time, on all levels and in all shapes of business operations. That is because all people must communicate in order to achieve any interrelationship between them selves. Actually, communication is making us who we are, because communication is basis for creating a

culture. Regardless of it being one basic and universal phenomena, like as we need certain skills and knowledge's for performing certain operations, communication also needs to adapt to certain business situations how it would be as effective as possible. Using just our inherited communication abilities is often insufficient for successful business communication. Although language is important component of communication, communication is not reduced to just understanding and using language.

Marketing Communication and Relations with Customers

Growth of active role of users influenced modification of marketing mix conception, and with it the structure of marketing mix instruments. Kotler and the group of authors long time ago pointed out that marketing mix traditional structure represents sellers point of view, thus its necessary for marketers to adopt perspective oriented toward user (Kotler, 1999). New marketing approach, based on user and its needs and demands, requires management of the whole servicing process. One of basic elements of this management process is clear, continuous communication with client/visitor, which secures constant exchange of information and constant reminding of client/visitor that they are really important, that it is "thinking" about them, and that their needs and habits are being respected (Stanković). Concept of managing the exchange of information with users (customer information management) (West, 2000), enables online efficient building of good business relations and more quality user service.

Among those activities and techniques are: personalisation, mass customisation, then organisation of promotional activities, creation and activation of extranet, as well as organising c2c (customer to customer) interaction through e-mail groups, forum, blog and chat. It is considered that its far more difficult to maintain business relations with online customers than with those on offline market. Visitors of electronic market and websites and blogs, are people who like searching and challenges which electronic communication and business brings. It is very impatient segment of people, prepared to start search of another blog, if the one which they are searching appears to them as uninteresting and complicated. Laurie Windham (Chaffey, 2002) described customer and his maintaining on online market this way: "Here is what makes keeping customer/visitor in online surrounding so terrifying. We have created that powerful, impatient customer/visitor, who is characterized by low level of attention and tolerance, in front of him are many choices available, as well as low barriers for changes in cooperation".

Customer Targeting Market Niches

By Salacuse "running business in own country is in similar relations to international businesses like inner politics of the country with international diplomacy" (Salacuse, 1991). Word negotiating describes process of discussion between two or more sides with goal of achieving agreement acceptable for both sides. This process is enough complicated even when it is about people from the same cultural surrounding, and when the subject is international negotiating it becomes even more complex because of differences in living styles, expectations, language, cultural values, formal procedures etc. At preparing for negotiations it is important to avoid wrong assumption that members of other cultures perceive, think and judge the same way.

Thus good analytics can help us to, in adequate way, approach targeted niche. It is mentioned why is better to get to know customers, blog visitors that is. Because of that it is very important how will you target them. Your visitors are males, 25 35 years old, like motorcycles, and you are having blog about motor vehicles in general. That means more publishing about motorcycles, but other categories shouldn't be overlooked, too. Now there problem appears niche. Market niche is group of buyers in certain branch who know exactly what they are seeking for on the internet. Targeted audience like that knows exactly which products or services they are searching for, and is ready to buy them regularly or to get informed about them. Getting to precisely determined market niche is real art and anyone who wants that must find proper keywords and make good optimisation of the internet page or blog. Thus is very important to get to right market niche in right time on right way. It is very important to choose customer niche for which you are writing. Writing about "everything" shouldn't be done, who are you

targeting then? Istok Pavlovic on his blog wrote a text about niches and targeting customers, pointing out micro niches, so niches of niches. Example: "computers" is broad niche, "software" is a little bit narrower niche, "pc games" are even narrower niche, "mmorpg" is micro niche. The more narrow niche is you are targeting narrower group of people and by doing that you are gaining number of concrete visits, visits which are bringing the highest earnings (www.istokpavlovic.com). In further reading will be words about google analytics as very important tool in identification of market niches in online trading putting focus on blog as means of online communication. Professor Varagic said that blog shouldn't be started because of wish for earning, that won't go that easily, profit comes later (www.draganvaragic.com). Thats why google analytics is supposed to enable high blog ranking, for fulfilling personal interests, which will later be rewarded the natural way, through gained profit.

GOOGLE ANALYTICS – TOOL FOR ONLINE BUSINES

Conversion Analytics - That provide insight on how customers are attracted, how many sales are achieved and how users interact with the site using a range of functions for analyzing Google Analytics. This is the most important report for ecommerce business owners (Weichel, 2012). Google Analytics is a powerful tool with which we can follow visits to websites, mobile and desktop applications, or some devices, like ATM. Google analytics is very important tool for bloggers who want to earn. Why? With help of Google Analytics even average user can generate some results which could navigate him to some profit. Also, as much as the tool is simple for beginners it is powerful enough for advanced users. It has very detailed presentation of happenings on the website, so it can be used as guide for person who is running a blog blogger toward his goal. That goal can be bigger sale of articles, sale of digital material, advertising space, writings etc. In the beginning bloggers are finding source of income in selling advertising space banners and/or putting Google ads on certain visible positions on the blog.

Google Adword is service through which firms and natural persons can publish their advertisements on websites which allow that. Those sites, blogs, portals, forums, using Google AdSense service are placing code on reserved place where advertising content (banners, links...) of firms and natural persons, who payed for displaying of their advertisements on Adwords service, will be shown to visitors. Income for blogger depends on multiple factors, and Google Analytics can help increasing that income. With setting up Google Analytics on the blog behavior of visitors is being monitored in order to increase profit. After registartion on Google Analytics using Google account, new site is added, verification code is taken over and is implemented into the blog code. When accessing blog is allowed to Google Analytics at the same moment it starts to collect data. Data is updated in real time, and summarized data for the whole day can be seen day after. On the Google Analytics main page (Dashboard) for the blog some basic information can be seen which is collected until now for 30 days period (by default settings). Those are summarized more important informatins which are just enough for the beginners.

The most basic information ie. the most basic statistics is shown in Fig.1. It is very important to the blogger, for start: number of unique visits, average time spent on blog, average number of opened pages by session and source of visits. Number of unique visits is very important data because it tells blogger how many persons visited his blog for chosen time period. Based on this number, and some more data, blogger can form price for renting advertising space. Average time on page is information which shows us how many time visitor spent on the blog. If visitor spent small amount of time it means that content is uninteresting and with that chance for clicking on the advertisement is getting smaller. The longer the time spent on website is the bigger is chance that visitor will notice advertisement and click on it.

Average number of opened pages per session is telling us how many pages users visited on average. Why is this important? The more pages user opens the more advertisements will be shown to him and probability of clicking on some of them is bigger. Sources of visits is another important data because we can find out where from we are having the biggest number of visits. If it is Google organic search,

then we are on right way. It depends on blog topics, sometimes visitors click on commercials more often if they are coming from social networks, and sometimes if they are coming from Google search engine. These results can show us that so we would know where to pay more attention when it is about promotion of publications. All data is gathered in the real time, also precise date can be determined since and until when we want to see them. Google Analytics stores all data since the moment when code for tracking is put on the blog. It should be kept in mind that if longer period and more complex information are chosen to be displayed, the more time will be needed for data to load.

	Dec 29		Jan 5
Sessions	**Users**		**Pageviews**
19,924	16,346		37,500
Pages / Session	**Avg. Session Duration**		**Bounce Rate**
1.88	00:01:16		74.02%
% New Sessions			
79.01%			
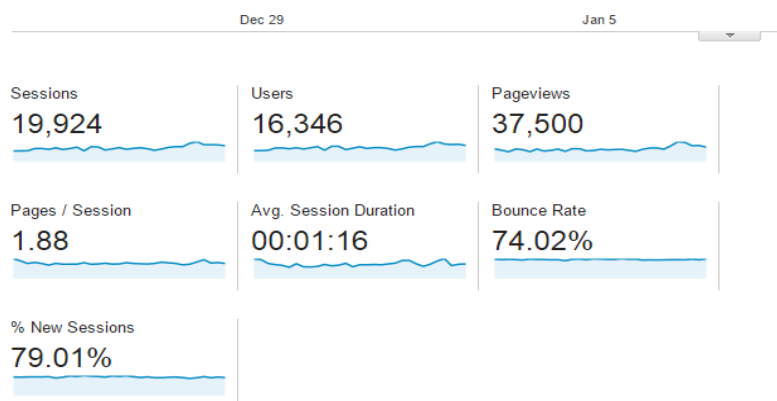
Figure 1: Basic data from the homepage of Google Analytics (Dash Board) (Saznajnovo.com)

SEO (Search engine optimization)

Looking at websites/blog in this way forces us to describe our assumptions about how visitors will use the site, which in turn tells us what we should be monitoring and testing (Clifton, 2012). The most common fear is data overload—collecting more information, just because you can, inevitably leads to more confusion, not clarity (Clifton, 2012). This matters to SEO practitioners because they need to be careful that the tactics they employ will not be seen as spam by the search engines and carry the risk of resulting in penalties for the websites they work on (Enge et al., 2009). After data integration which fall under interest group for longer time period, it is being used for improvement of content on blog itself how those results would be even better. Stated is being achieved by building SEO (Search engine optimization) for blog and every article itself. SEO type represents key phrases, which are consisted of two or more key words. It is much better to use phrases, but without putting too many words in one phrase. SEO is quite extensive for learning and is changing rapidly because Google too in short time spans changes its algorithm and criteria for estimating quality of content on websites, but there are some rules which are not changing as often. One segment in Google Analytics is dedicated to checking key words based on data from analytics ie. key words over which visitors are coming to the blog.

Those data can be used for further building SEO on blog, and how more visitors would be attracted. Making SEO for content based on gathered data is based on upgrading analytics. We are putting focus on section with key words, analyze which are those key words which are visitors typing in search, after that it is important to put them in next publications or to correct currently existent, next on the bottom of the article is required to add link to some similar how visitors would be kept on web-page. All that will extend time visitor spent on blog and because of that chance of clicking on advertisement is being increased. SEO type – alternative tags for images are helping Google robots to find them.
For advanced tracking of new results are used more advanced information's which Google Analytics is offering.

1) Audience is section where we can find out a little bit more about visitors in this case of the blog – for example: age, sex, interests, fields in which they are interested, etc. These information can help us in few ways. Lets say that we are running blog about cooking, recipes, tricks for housewives. Here we can see the age limits which are active on blog. So if the most active are women of 18 – 30 years of age it means that it would be good to write more tutorials for beginners. For us is important to have

content because of which will visitors come back again, which brings better chances for clicking on advertisements, and also it improves chances that women will suggest blog to each others. In this section we can find out from which countries/cities we are getting visits, from which devices, operational systems and also we can see "User flow" which is very important, Fig. 2 shows us stated. Google Analytics tip: User flow shows where are visitors moving through blog. If they leave it quickly, chance for click on advertisement is small. That means "Internal linking" must be built, ie. internal connecting of publications is required to be done, inside blog.
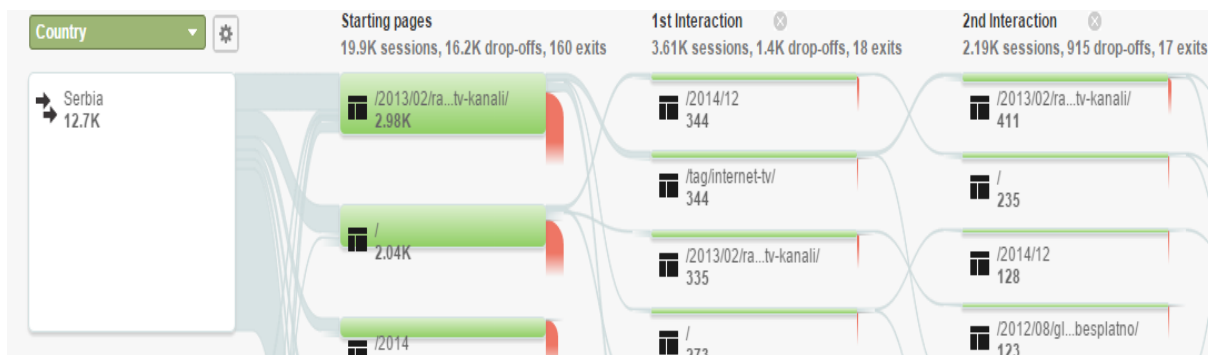
Figure 2: The flow of visitors ranging from the state of that visit blog (Saznajnovo.com)

2) Acquisition – allows checking if there is more organic visits, payed, direct, from social networks, email campaign etc. It is good to follow these date because it is suggested to have a lot of organic visits. That means that targeted visitors came to your blog using organic search and click of such visitor is worth more. With building SEO we can increase number of organic visits. Also, in this section key phrases over which people are coming to the blog. Again, key phrases are important and it is good to use them in building SEO for blog. Social tab is showing how many visits are coming from which social networks. Facebook is probably social network on which bloggers advertise the most, but when we think a little better Google Plus offers unique opportunity, in this case it has advantage over Facebook. Google loves its products, its not interested in other social networks. If post is published on Google+ and Facebook, when someone searches for that on Google the result from Google+ will be shown before Facebook. Besides that, click is worth more, and ensures tracking of flow of the visitors, but with data about from which social network they came.

3) Behavior collecting of useful information about publications themselves special analytics for every post separately is implemented in this segment. Every post is tracked for itself, how many total visits it has, average time staying, profit from AdSense, interactions, bounce rate, exit's which is shown on Fig. 3. Such information are important for determining did upgrading SEO for some site had effect. In case it didnt, it is possible to try with different key words/phrases. If goal is, and it is improving profit, it is needed to enlarge number of displays law of great numbers. Even without clicks Google AdSense gives certain amount of money for 1000 displays of advertisements. Google Analytics tip Bounce rate represents percentage of exits after first few seconds spent on blog. It is around 60% and it is good to have as small as possible percentage.

Figure 3: A more detailed statistics for an article (Saznajnovo.com)

CONCLUSION

By analyzing certain data, about visits to the blog, we can conclude what on blog is needed to be done if we want bigger income. It is crucial for every blog to have quality content and targeted users and adequate online communication. When content is of high quality, both Google and users themselves will value it, which further produces spreading of content between clients/visitors themselves and that increases number of visits and chance for clicking on the advertisement, selling products etc. Regarding that todays business requires going in step with changes which are happening on online market, person who runs blog, when decides to take targeted market niche, as well as to earn more, must be additionally educated about internet marketing and be daily informed in IT trends. Google Analytics as online tool represent one of IT trends which enable putting focus on innovative, narrow and continuous communication with wanted market niche.

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SEGMENTATION MODEL FOR FLATTENING OF INDIVIDUAL 3D LASTS

UDC: 004.9

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ABSTRACT

This paper discusses a newly proposed method that performs automatic segmentation of the 3D lasts. Received segments can be flattened by various surface parametrization methods in that way forming shoetrees which correspond to individual production schemes used in shoe manufacturing. Aiming to check the credibility of this method experiments were conducted where molds received from automatic segmentation method more closely corresponded to the molds were segmentation was performed manually.

Key words: segmentation, flattening, lasts, manufacturing.

INTRODUCTION

The segmentation of 3D digital models is applied with the aim to clusterize 3D object surface according to the color, form, vertices density and other criteria (Mangan and Whitaker, 1999; Peyre and Cohen, 2006). The segmentation most often used in practice aims at separating such surface areas where texture mapping in 3D space would be as much as possible reduced and deformed in plane (Telfer et al., 2010). The benefit of such segmentation would be more exact 3D object parametrized fragments, higher quality 2D images in the 2D plane and size of textures taking less memory. These clusterization algorithms are based on digital model separation according to gradient direction or surface splitting according to normal directions (Tang et al., 2004).

MANUAL SEGMENTATION OF 3D LASTS

In this chapter we are going present the manual segmentation of lasts, which is used in orthopedics to produce individual products. The manual lasts segmentation performed by experts is comprised by:
1.   Composition of the contour of the last's surface and sole.
2.   Last splitting by plane lengthwise.

The upper and the lower contours of the lasts are made up by eliminating sole and their upper part having regard to the arched curve in the surface which marks transition of the last to its sides. Then segregation of the lasts by plane is performed according to this rule: there is a point marked in the last which corresponds to the middle line of the finger next to big toe. Then a straight line is drawn through this point towards the arithmetic average of the last's upper surface and the final drawing goes in to the direction of the most distant point of the heel. Finally, lateral segments according to the designed last surface splitting lines are detached and serve as the basis for production scheme.

PROPOSED AUTOMATIC SEGMENTATION OF 3D LASTS

Currently, custom footwear production flattening of individual lasts is a manual job. Aiming to speed up the production process we can use automatic segmentation of the last digital model. In this chapter we are going to analise the possibility to segment the lasts without manual labor. We will present a ready-made, realized and tested method the result of which practically does not differ from the result of manual lasts segmentation.

Step 1: Orientation of 3D lasts

In the digitization process of the lasts with 3D scanner they are placed vertically so that sole is upside down, therefore their digital models respectively stand on XY plane (Figure 1) of Cartesian coordinate system. So we maintain that if the last is differently orientated it should be the basic condition to place it vertically.
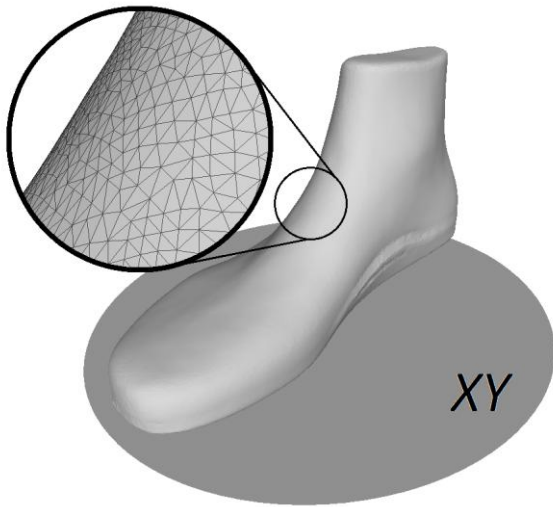
Figure 1: The last is placed on XY plane.
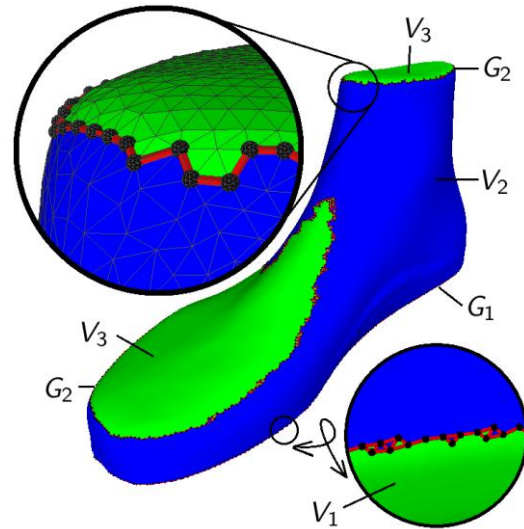
Figure 2: The intersection of the last segments performed by normal directions.

Step 2: The composition of the upper and lower contours

Because the last stands on XY plane its normal triangle sole directions are directed downwards, i. e. XY plane and angles which make up normal directions with that plane belong to interval $[-\pi/2; -\pi/4]$. Suppose $\triangle ABC$ is any triangle of digital last model whose vertices are positioned clockwise outwards of digital model. Suppose $\vec{a}(a_1, a_2, a_3) = \overrightarrow{BC}$, $\vec{b}(b_1, b_2, b_3) = \overrightarrow{CA}$, then $\triangle ABC$ normal equal to

$$\vec{n}_{\triangle ABC}(n_1, n_2, n_3) = \vec{n}_{\triangle ABC}(a_2 b_3 - a_3 b_2, a_3 b_1 - a_1 b_3, a_1 b_2 - a_2 b_1). \tag{1}$$

An angle between normal $\vec{u}_{\triangle ABC}(u_1, u_2, u_3)$ and normal $\vec{n}_{XY}(0,0,1)$ of XY plane equal to

$$\alpha_{\triangle ABC} = arcsin\left(\frac{n_3}{\sqrt{n_1^2 + n_2^2 + n_3^2}}\right). \tag{2}$$

Suppose $G = (V, E)$ is the basic graph corresponding to triangulated digital last model. Let's mark the subsets $V_1, V_2, V_3 \subset V$ of the graph vertices:

$$V_1 = \{v \subset V : A, B, C \in v, -\pi/2 \le \alpha_{\triangle ABC} \le -\pi/4\}, \tag{3}$$
$$V_2 = \{v \subset V : A, B, C \in v, -\pi/4 < \alpha_{\triangle ABC} < \pi/4\}, \tag{4}$$
$$V_3 = \{v \subset V : A, B, C \in v, \pi/4 \le \alpha_{\triangle ABC} \le \pi/2\}. \tag{5}$$

Let's mark $adj(v)$ the set of neighbour vertices of vertex v and $|adj(v)|$ – the number of the elements of the set. Respectively by eliminating edges $u_1 v_1$, $u_2 v_2$ out of graphs (Figure 2):

$$G_1 = (V_1 \cap V_2, \{uv \in E : u, v \in V_1 \cap V_2\}), \qquad (6)$$
$$G_2 = (V_2 \cap V_3, \{uv \in E : u, v \in V_2 \cap V_3\}) \qquad (7)$$

so that $|adj(u_1)| = 2$ and $|adj(u_2)| = 2$ by realizing shortest path Dijkstra's algorithm (Dijkstra, 1959) between vertices $u_1, v_1 \in V_1 \cap V_2$ and $u_2, v_2 \in V_2 \cap V_3$, we receive 2 new paths $u_1 \leadsto v_1$, $u_2 \leadsto v_2$. Respectively by adding eliminated edges $u_1 v_1$, $u_2 v_2$ to these paths, we receive graphs

$$G_1^* = (V_1^*, \{uv \in u_1 \leadsto v_1 \cup u_1 v_1\}), \qquad (8)$$
$$G_2^* = (V_2^*, \{uv \in u_2 \leadsto v_2 \cup u_2 v_2\}), \qquad (9)$$

complying with the top and the lower contours (Figure 3).
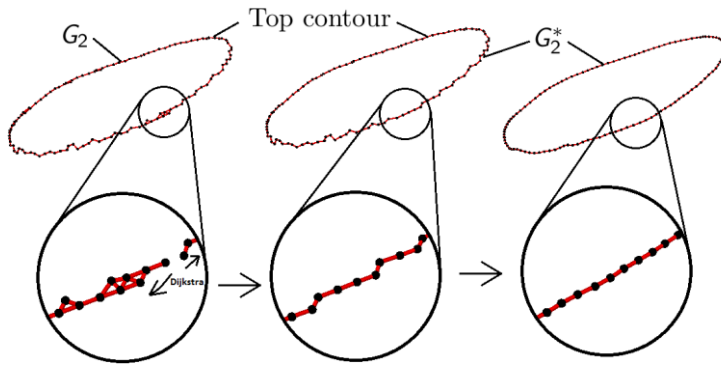
Figure 3: Smoothing of the last's contours.
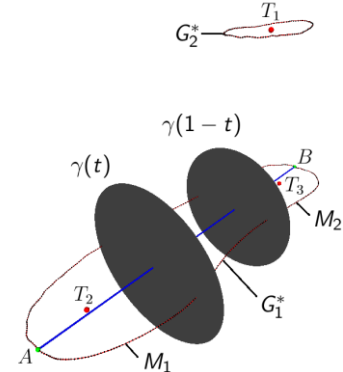
Figure 4: Calculation of the lasts plane segregation.

Step 3: Last segregation by plane

Plane in space is defined by 3 non-collinear points. The main task of segregating the last lengthwise is to receive 2 segments, which when segregated would be least deformed or in other words would be equal in area (Kolish, 2010; Luximon and Luximon, 2012). On the basis of the experiment and the last segregation lengthwise performed by experts it was determined that the first from the 3 plane points complies with the arithmetic average of the upper G_1^* contour points. The other 2 points belong to the straight line, which passes lengthwise the lower contour and best complies with it (correlates). One of the possible methods to find such 2 points is based on the composition of the segmentation of the lower contour as well as the calculation of arithmetic average of the points belonging to these segments. Suppose $A(x_A, y_A, z_A)$ and $B(x_B, y_B, z_B)$ are 2 points which are furthest apart from each other in respect to lower contour and $C(x_C, y_C, z_C)$ which is any point of the lower contour. Suppose $t \in [0,1]$ is the parameter showing where AB section would be intersected by plane

$$\gamma(t) : \sum_{k \in \{x,y,z\}} (k - k_A(1-t) - k_B t)(k_A - k_B) = 0,$$

which is orthogonal to primary straight line AB. Then point C is orientated on the left or right side of the plane $\gamma(t)$ by a sign of $\delta(t, C)$ value:

$$\delta(t, C) = \sum_{k \in \{x,y,z\}} (k_c - k_A(1-t) - k_B t)(k_A - k_B).$$

Mark the sets of lower contour G_1^* vertices:

$$M_1 = \{v \subset V_1^* : \delta(t, v) > 0\}, \qquad (10)$$
$$M_2 = \{v \subset V_1^* : \delta(1-t, v) < 0\}. \qquad (11)$$

M_1 set belongs to subspace restricted by plane $\gamma(t)$, closer to point A, M_2 set belongs to subspace restricted by plane $\gamma(1-t)$, closer to point B (Figure 4). Therefore the last is lengthwise segregated by plane defined by 3 points $T_j\left(x_T^{(j)}, y_T^{(j)}, z_T^{(j)}\right)$, $j = 1,2,3$:

$$T_1 = \frac{1}{|V_1^*|}\sum_{v \in V_1^*} v, \quad T_2 = \frac{1}{|M_1|}\sum_{v \in M_1} v, \quad T_3 = \frac{1}{|M_2|}\sum_{v \in M_2} v. \tag{12}$$

Finally the last contour G_3^* we need to find is to be projected in to plane α:

$$\alpha: \begin{vmatrix} x - x_T^{(1)} & y - y_T^{(1)} & z - z_T^{(1)} \\ x_T^{(2)} - x_T^{(1)} & y_T^{(2)} - y_T^{(1)} & z_T^{(2)} - z_T^{(1)} \\ x_T^{(3)} - x_T^{(1)} & y_T^{(3)} - y_T^{(1)} & z_T^{(3)} - z_T^{(1)} \end{vmatrix} = ax + by + cz + d = 0,$$

out of here

$$a = y_T^{(1)} z_T^{(2)} - y_T^{(1)} z_T^{(3)} - z_T^{(1)} y_T^{(2)} + z_T^{(1)} y_T^{(3)} + y_T^{(2)} z_T^{(3)} - z_T^{(2)} y_T^{(3)}, \tag{13}$$

$$b = -x_T^{(1)} z_T^{(2)} + x_T^{(1)} z_T^{(3)} + z_T^{(1)} x_T^{(2)} - z_T^{(1)} x_T^{(3)} - x_T^{(2)} z_T^{(3)} + z_T^{(2)} x_T^{(3)}, \tag{14}$$

$$c = x_T^{(1)} y_T^{(2)} - x_T^{(1)} y_T^{(3)} - y_T^{(1)} x_T^{(2)} + y_T^{(1)} x_T^{(3)} + x_T^{(2)} y_T^{(3)} - y_T^{(2)} x_T^{(3)}, \tag{15}$$

$$d = -x_T^{(1)} a - y_T^{(1)} b - z_T^{(1)} c. \tag{16}$$

We find the first vertex belonging to contour G_3^*:

$$v_0^* = \min_{d(\alpha,v)} v \in V,$$

here $d(\alpha, v)$ is the Euclidean distance from the point representing the vertex v to the plane. The projection of this point $P_0(x_0, y_0, z_0)$ representing the vertex P_0^* in plane α equals

$$P_0^*(x_0 + ta, y_0 + ta, z_0 + ta), \quad \text{where} \quad t = -\frac{ax_0 + by_0 + cz_0 + d}{a^2 + b^2 + c^2}. \tag{17}$$

The next step is to find the closest vertex v_1^* to plane α which is next to vertex v_0^* and the point P_1 representing vertex v_1^* is projected to α plane according to (17). Graph G_3^* is comprised from vertices v_0^* and v_1^* so that $G_3^* = (\{v_0^*, v_1^*\}, \{v_0^* v_1^*\})$. The following vertices $v_2^*, v_3^*, v_4^*, \dots$ are inserted into graph G_3^* by i – step according to the algorithm:

Segregation(G, G_3^*) – contour contrasting of the last and its segregation intersection point
Data: Graph G, 2 ending vertices v_{i-1}^*, v_i^* of G_3^* graph, where $i = |V_3^*| - 1$
Result: Contour G_3^* with added vertex v_{i+1}^*

$\vec{m_1} = P_{i-1}^* - P_{i-2}^*$;

$u \leftarrow adj(v_{i-1}^*)_1$;

for $\forall v \in adj(v_{i-1}^*)$ do

　　$\vec{m_2} = P_{i-1}^* - P_v$;

　　if $\angle(\vec{m_1}, \vec{m_2}) < \pi/2$ then

　　　　$P_u^* \leftarrow P_u$ according to (17);

　　　　if $d(P_v, \alpha) < d(P_u^*, \alpha)$ then

　　　　　　$u \leftarrow v$

　　　　end

　　end

end

$P_i^* \leftarrow P_u^*$;

$G_3^* \leftarrow G_3^* \cup (\{v_u\}, \{v_{i-1}^* v_u\})$;

The idea of this algorithm is to construct contour G_3^* by adding each time one vertex v_i^* and maintaining the former vertex positioning direction of the vector $\vec{m_1}$ and taking the nearest vertex v_i^* to the vertex v_{i-1}^*. When v_{i-1}^* and v_0^* coincides, course of algorithm run is suspended and contour G_3^* is deduced (Figure 5).

Step 4: Smoothing of segment contours and result deduction

Aiming to position points gradually from the contours G_1^*, G_2^*, G_3^*, it is possible to apply formula of moving average value. In general case it is possible to calculate the coordinates of the vertices using formula

$$P_v^* = \frac{1}{2} P_v + \frac{1}{4} \sum_{u \in adj(v)} P_u \ , \tag{18}$$

where v is the vertex of any graph the coordinates P_v, P_v^* of which are recalculated coordinates of a vertex P_v by smoothing contour using masks of Bezier curves (Sabaliauskas, 2015). Using this method all the coordinates of contour vertices are recalculated and the newly received vertex coordinates are assigned to primary contours G_1^*, G_2^*, G_3^* (Figure 3). By repeating this algorithm several times the contour will be more smoothed out.
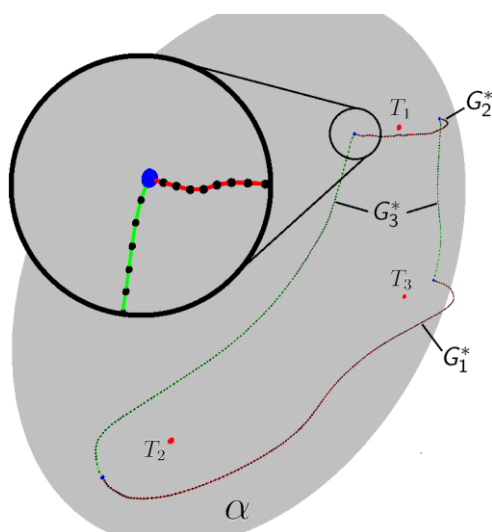
Figure 5: Last segregation by plane
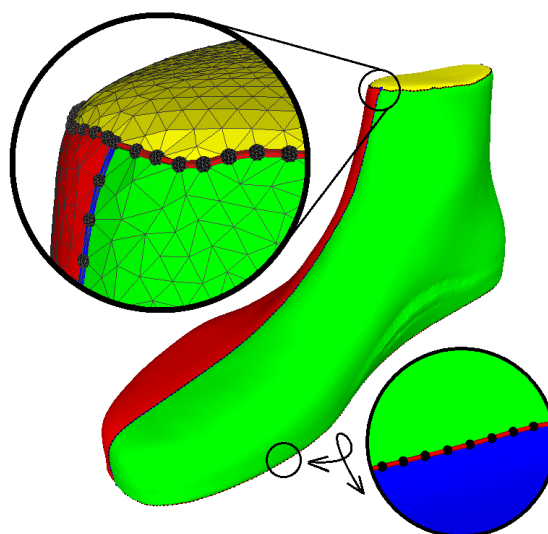
Figure 6: Composition of the final last segments

Finally we can get output results. Contours G_1^*, G_2^*, G_3^* restrict the left and right sides of the last which correspond to the molds. It is enough to find each vertex on every side belonging to each mold then realise breadth first search algorithm (Lee, 1961) with contour G_1^*, G_2^*, G_3^* restrictions (Figure 6).

EXPERIMENTAL INVESTIGATION

Aiming to check credibility of the segmentation method proposed in the article, experiments were conducted during which five pairs of the shoe lasts were divided into segments which were later flattened using ARAP surface parametrization (Xu et al., 2008) method (Figure 7).
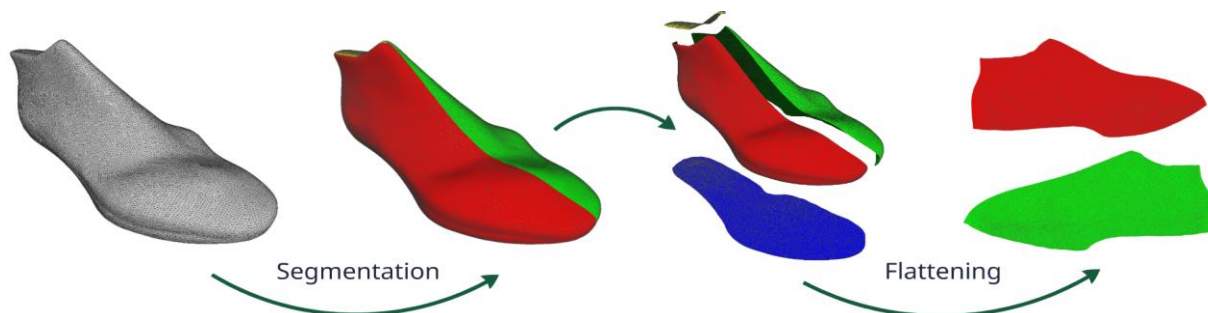
Figure 7: Automatic last surface segmentation and flattening.

Table 1 shows comparison of flattening of shoetrees by ARAP method to method of using wax foil, where segmentation is made by hand and by manual standard manufacturing method respectively. Comparison error of each fragment was appreciated by a formula $2C/(A+B)$, where A is area of original mold, B is area of flattened half shoetree, C is the maximum area which can be obtained by intersection of original mold and flattened half-shoetree (Table 1). A, B and C values were calculated by counting colored pixels of intersection of molds. Also, we have measured diferences between corner points called margins. The "Margins" values coincide to diff erence in millimeters between corner points of molds.

Table 1: Comparison of flattening results using ARAP method where segmentation is made manually.

ARAP			A	B	C	$\frac{2C}{A+B}$	Margins
1st pair of shoetrees	Left shoetree	Left side	578734	564603	558821	97,75%	14+8+8
		Right side	570831	563310	549576	96,91%	15+9+5
	Right shoetree	Left side	584171	570637	565360	97,91%	7+8+5
		Right side	574593	569054	556637	97,34%	10+11+8
2nd pair of shoetrees	Left shoetree	Left side	632804	611394	613862	98,68%	4+17+7
		Right side	637810	612580	605394	96,83%	7+8+2
	Right shoetree	Left side	638950	611928	610795	97,66%	16+4+4
		Right side	632804	613421	612701	98,33%	17+7+2
3rd pair of shoetrees	Left shoetree	Left side	550236	530668	531339	98,31%	9+4+3
		Right side	539557	524405	515685	96,94%	10+11+17
	Right shoetree	Left side	547489	534803	523175	96,68%	6+7+4
		Right side	539960	517571	521127	98,56%	14+11+13
4th pair of shoetrees	Left shoetree	Left side	591323	574939	567865	97,38%	2+5+7
		Right side	584236	566640	561424	97,56%	15+8+9
	Right shoetree	Left side	588692	576627	573699	98,46%	19+6+21
		Right side	582918	561662	553593	96,73%	10+3+12
5th pair of shoetrees	Left shoetree	Left side	505229	505701	501036	99,12%	9+2+2
		Right side	513236	511408	505466	98,66%	4+9+12
	Right shoetree	Left side	511584	508521	498055	97,65%	8+5+9
		Right side	508042	506398	501354	98,84%	4+2+5

CONCLUSION

In this paper an investigation of our new automatic segmentation method of 3D last was presented. Experimental results have shown that average values of relative similarity of flattened half-shoetrees equal to 97.70% and 97.82% which respectively correspond to those obtained from segmenting by hand and using our method (Sabaliauskas and Marcinkevičius, 2015). According to these results it is advisable to use automatic segmentation method. However, experimental results were obtained using only 10 lasts, therefore we need more data of 3D digital lasts to get more accurate results. In order to receive a better result of flattening future works of this problem will be testing mixed algorithms of parametrization of 3D mesh (Mogilnitsky et al., 2005; Ray et al., 2002).

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THE GOOGLE ANALYTICS AS A SOLUTION FOR THE ANALYSIS OF THE WEBSITE OF THE AGENCY "*023 STATUS*"

UDC: 004.738.1:005.5

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ABSTRACT

When thinking about the next step in online presentation, we take into account many things, such as how to contribute in gaining more site reviews, how to improve the coherence and achieve greater interest and how everything that was done results in the ultimate value to which is aimed. The answers to all questions mentioned above are enabled thanks to Google's service and they provide an insight into the entire web site statistics.Simply put, Google Analytics provides valuable data and also lets you know in which way the Internet is developing its presentation. All the answers to questions are at our fingertips. Who are the people who visit our web site? Where are they from? How old are they? Which content do they review? How long do they stay at our web site and does their visit result in benefit for the organization? This paper will present an example of an original research, online advertising of the 023 Agency, as well as the detailed analysis and the statistics of the same.

Key words: online presentation, overall reviews, statistics, Google analytics.

INTRODUCTION

Though not without flaws, accessories that are obtained through this program are not 100% sure, because it was free and easy to use; although it is probably the best choice for small or large sites. Administrators of websites have the ability to easily and accurately obtain detailed information about the activities of visitors to the website, which are transparent and significantly more accurate, but the biggest advantage are the data, analysis and the conclusions we can reach. As the digital world becomes more developed, so the measurement and monitoring of the effects of the work are rapidly changing. By using analytics it is understood that with new content, new types of data, as well as the type of device things drastically change, no longer as they once were;it leads to hyper segmentation of data. Numerous parameters show whether your internet performance is developing in the right direction, whether visits are getting more frequent, do you get to the target group and what to take.

THE ADVANTAGES OF THE ANALYTICAL PROGRAM

Google Analytics is probably the most popular analytical program to track how many visitors visit your site daily, weekly, monthly and yearly. Using this tool is possible for all those who have a Google account. Graphical user interface and better analytical tools greatly facilitate the integration of different types of data (Sajfert, 2006, 38).Google Analytics allows you to gain insights that are relevant for the given organization, how visitors use your web site, how they got to the site. The

control panel provides options behind which a variety of information is hidden and just getting around is not too complicated. Content Analytics helps to understand which parts of your website have a good effect, which pages are the most popular.It also shows how often people visit every page of your site, how long do they stay there and you can find out what exactly are your visitors looking for. With Analytics it can visually be analyzed how visitors move along your site.After gathering information about the reaction of visitors, the organization is able to define more closely the strategy that it will apply. Therefore, making the decision that determines the further strategy of the company at this stage is of paramount importance for further development and business results of the company (Sajfert, 2009-2010, 122).

It is very useful to understand how visitors interact with your site. One of the most powerful functions in Analytics is the advanced segmentation that allows isolation and analyze of subsets of traffic. Some of the predefined segments are:
− "Paid traffic"
− "Visits with conversion".

Although, personal segments can be made by using the flexible segment creator. The advantages of advanced segmentation are:
− It is enabled that all data from Google Analytics are parsed into segments, which makes it easy to manage
− The selection of one of the predefined custom segments
− Easy making of personal segment
− The use of segment on the complete previous traffic for better data analysis
− Gaining insights in order to improve future campaigns and online experiences.
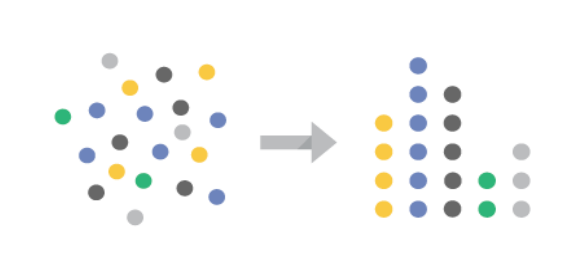
Figure 1: The segmentation of visits

METHODS

As the best indicator in thegiven situation which uses statistics and visits to the website content was used is Google Analytics. Google Analytics is the solution for analyzing web sites that provides information on the interaction of visitors to the site, as well as various parameters; therefor, a continuous interaction of companies and environment affect the very existence of the company and its future (Sajfert, 2009, 199);although a variety of techniques for monitoring and forecasting the future developmentsare developed such as econometric models, economic indicators, conjuncture tests, accurate direction determination, intensity and the time change is extremely complex (Bešić, 2007, 175). The analysis method is applied to the dissected segments of their simpler parts and components, a statistical method performs overall conclusion determination of mass phenomena in a given agency.

FINDINGS

The review ofvisits of the agency 023 Status'sweb site from the domain-registration date 14th December 2015 to 25th March 2016 shows that there are 2,369 users, which is a very good result considering the three-month existence.
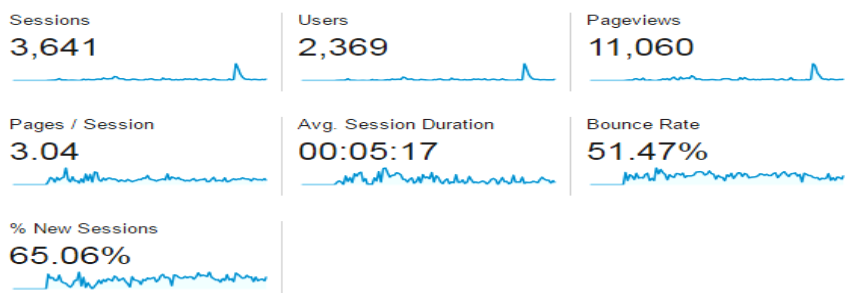
Figure 2: The overview of the general condition from the establishment date

These parameters indicate the number of unique visits the site as well as the information on the average time spent on the site. The analysis shows that the website from the date of the establishment was visited by 2,369 users and that each person averagely spends 5:17 minutes on the page. Bounce rate is a number that shows how many visitors viewed only one page and left the site. If the number is higher, it is an indication that something should be changed because it may adversely affect the business, and therefore affect the society as it is a project of a social character and a problem at the national and global level. Companies must observe problems by anticipating changes in their environment, rather than simply reacting to them, to align their goals with the goals of the public, especially consumers and the state, and to make positive changes in order to promote the common interests of companies and society (Đorđević, 2007, 3).
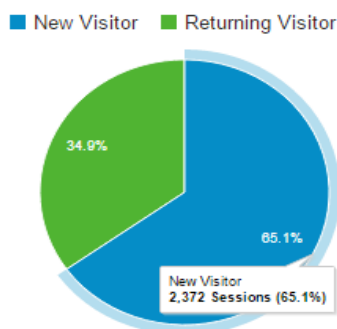
Figure 3: Indicator of new visitors and visitors who are returning to the site

Blue color indicates how many new visitors are there. The review of sessions in blue field is 2,372 (65.1%), while the green color indicates the number of visitors who return to the website. Its sessions are 1,269 (34.9%). A very good indicator of visitors is the insight from which cities and countries you are visited the most in order to know in which direction to focus marketing. By seen from the point of view of space, the market can be local, national, regional and global (Đorđević, 2004, 41).

	City	Sessions	% Sessions
1.	Zrenjanin	682	18.73%
2.	Belgrade	643	17.66%
3.	Novi Sad	523	14.36%
4.	Kraljevo	345	9.48%
5.	(not set)	260	7.14%
6.	Sombor	125	3.43%
7.	Nis	111	3.05%
8.	Kula	84	2.31%
9.	Pancevo	66	1.81%
10.	Subotica	53	1.46%

Figure 4:The top 10 cities by the number of sessions

The indicators provide data of visits from all the cities from the first day of establishment, so it would be thankfully to perform market segmentation, because visitors are different both in terms of economic development, levels of education, and in their demands and motives. The reason for market

segmentation by the company is the fact that the company understands the need to divide the market into smaller segments the market is not homogenous and consumers differ from one another (Sajfert, 2015, 66).

	Country	Sessions	% Sessions	
1.	Serbia	2,813		77.22%
2.	Russia	192	5.27%	
3.	United States	74	2.03%	
4.	Montenegro	67	1.84%	
5.	(not set)	52	1.43%	
6.	Bosnia & Herzegovina	48	1.32%	
7.	Germany	48	1.32%	
8.	Netherlands	39	1.07%	
9.	Croatia	33	0.91%	
10.	Sudan	31	0.85%	

Figure 5: The top 10 countries by the number of sessions
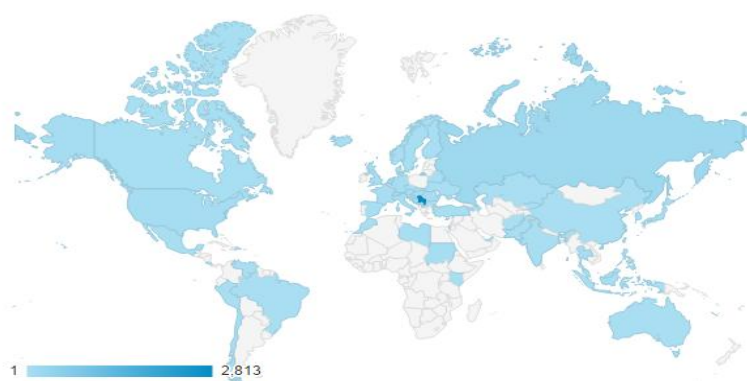
Figure 6: Indicator of visitors by countries
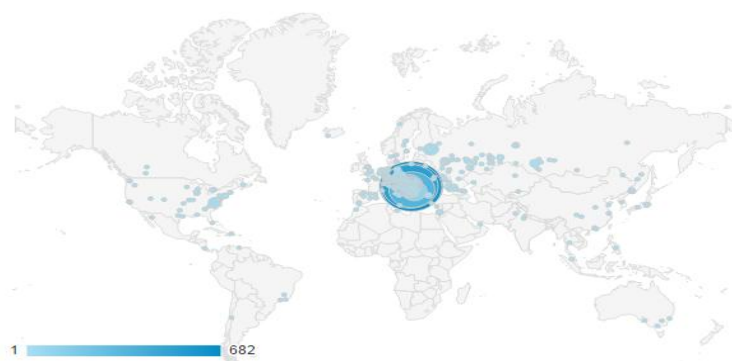
Figure 7: Indicator of visitors by the cities
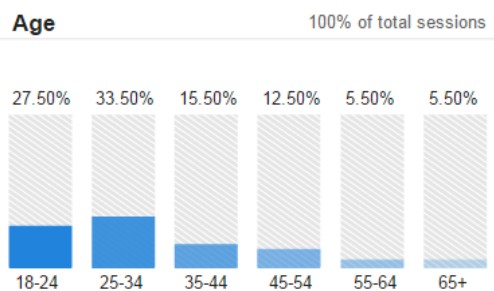
Figure 8: Indicator attendance by age of the visitors

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Significant information are those of what age are your visitors, and which sex is dominant. In this way, information can be customized to most of its visitors, you know who you are writing for and who you are addressing to, in particular, this means that marketing management becomes the activity of information processing (Sajfert, 2006,17).
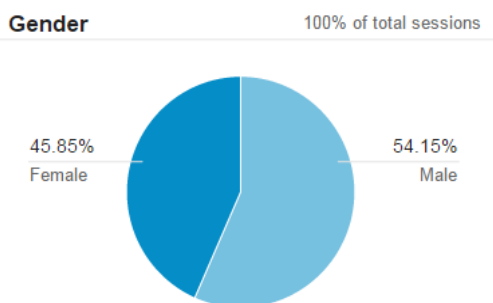
Figure 9: Indicator attendance by gender

Figure 10: Trackback report

Trackback are the reports that other sites link to the content, in this case they show that the users got to the website through the portal of Radio Television Santos and portal Zrenjaninski.

DISCUSSION

Based on the data analysis, the agency "023Status" has an excellent insight for future business strategy, in which cities should advertisementsbe strengthened, how to focus the content of the website according to the age of visitors, the languages in which translation should be done depending on the number of visit on the state level, etc. The ultimate goal of the agency is that, according to Đorđević, it becomes flexible and innovative, that can respond to the growing requirements of users in a shorter period of time and to establish a competitive advantage which must include in itself an emotional component (Đorđević, 2007, 9). Based on the presented research, next steps are to create a website on the Russian language with regard to the largest number of visitors, after Serbia coming from Russia, as well making website on German. Also working web page where there is no trafic and work in the Hungarian language. Based on age-century visitors agency need to work on content that will be interesting for people older than 35 years, and to improve existing content and bring novelties to the average retention of visitors increased.

CONCLUSIONS

Each on-line business requires continuous monitoring and dataaddressing. Google Analytics is an essential part of any marketing strategy. From a visual standpoint, it is a lot of charts, tables and figures which change periodically and analysis of these figures may seem tedious. However, the opportunities provided by the analytics are enormous and it is impossible to present all now.After all, the most important thing is that the data obtained in this way are valuable and represent excellent guidelines for what to do next. The online business is important to keep constant attention and continuous work on innovation. Based on all shown it can be concluded that Google Analytics, is a

good choice to analyze and monitor the progress of web pages because now the agency with the given data can focus on marketing plan and campaign to target groups. Data analysis revealed what has been done well, which shows that a good number of visitors keeps coming back to the website and to increase the number of new visitors. Aslo studies have shown that the improvement of quality should be improved, in the form of more comprehensive content and keywords, so that website would be ranked higher and that comes out on first place in searches, which is the goal of marketing agency.

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EMERGING TECHNOLOGIES IN HEALTH CARE OPPORTUNITIES FOR IMPROVING MANAGEMENT AND SERVICES

UDC: 614.2:004.738.5

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ABSTRACT

Decades of application of information technology in health care is generally not yielded the expected results. There is a certain gap between the actual benefits and potential benefits from the use of health information technology. The aim of this paper is to present and describe several emerging technologies and models that exist today and to point out to the possibilities of their effective application in health care. Technologies such as Cloud computing, Knowledge management and Big data, Internet of Things and Serious games could improve the existing health care system up to highest level of quality of service and could ease and improve management, thus empowering both physician and patient. Some of these technologies that are listed are already in use in some institutions in the world. We have discussed application of these technologies in the light of growing trends in information communication technology in health care and the current state of the application of information communication technology in General hospital "Djordje Joanovic" Zrenjanin. With optimum and creative application of emerging technologies it is possible to reduce the gap between the actual benefits and potential benefits from the use of information communication technology.

Keywords: healthcare information technology, cloud computing, knowledge management, big data, internet of things, serious games

INTRODUCTION

Decades of application of information technology (IT) in health care is generally not yielded the expected results. There is a certain gap between the actual benefits and potential benefits from the use of health information technology (HIT). Information and communications technology (ICT) has a critical role to play in changes to the Health System (HS) (Kilbridge, 2002). Emerging digital technologies offer enormous potential to improve quality, reduce costs, and increase patient-centeredness in healthcare (Depasse et al., 2005). Unfortunately, the measurable results of health care system improvement in the course of over half a century of HIT development are not evident to the extent expected. This is especially evident when compared to the significant benefits realized in other industries, (Bower, 2005; Middleton et al., 2013) according to the outcomes of research (King et al., 2014; Burke et al., 2013; Appari et al., 2011; Goldzweig et al., 2009) in relation to the strong initiative of the government (Berwick et al., 2015; Blumenthal, 2010; Steinbrook, 2009; Blumenthal, 2009) and the legitimate expectations of patients, their families and the population as a whole. The aim of this paper is to present and describe emerging technologies and models and to point out to the possibilities of their effective application in health care.

MATERIAL AND METHODS

In the study we used a narrative review method. We performed a comprehensive search through Medline, and ResearchGate using the following key phrases: emerging technologies in healthcare, big data in health, knowledge management in healthcare, cloud computing in healthcare, internet of things in health, serious games for health. In the data collecting phase, a total of 58 articles were gathered, 36 of which were assessed for inclusion or omission of key issues and from among these, 22 articles were in focus of our research. Articles in which it was possible to see the practical application of these technologies as well as the benefits realized in health care were of the greatest interest to us. These were carefully scrutinized. The background research was done using the Gartner. Opinions expressed in the review are also based on personal experience as authors, medical workers and IT professionals.

EMERGING TECHNOLOGIES IN HEALTHCARE

There are a number of significant technologies and emerging models that are making a big sensation and impact on the healthcare information technologies and its applications. When referred emerging technologies in health care the following trends could be observed: Cloud computing and Healthcare, Big data analysis in Healthcare, Health sensing (Yang et al., 2015). This list is often expanded with: Internet of Things, Internet of everything, Knowledge management with big data and serious games. The list does not end here but we will limit the review to these technologies and models. It is very difficult to observe and describe these technologies and their impact individually, because they mutually overlap and complement each other perfectly. However, we will try to define each technology and point to actual or potential benefits that can bring to the healthcare.

Cloud computing in healthcare

Gartner defines cloud computing as a "style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies" (Gartner, cloud computing, web, accessed 05.04.2016). Services layers in cloud computing, are divided into four working layers: the application layer (SaaS), the platform layer (PaaS), the infrastructure layer (IaaS), and security as a service (SecaaS) layer (Whaiduzzaman et al., 2014). Today, we are witnessing the still growing list of layers comprising: storage as a service (SaaS), communications as a service (CaaS), network as a service (NaaS) and monitoring as a service (MaaS). (Techtarget, XaaS, web, accessed 05.04.2016). This list is expanding everyday. There are four types of cloud: public cloud, private cloud, community cloud and hybrid cloud.

In the study of Weng et al. (2010) it is emphasized that healthcare reform has mandated that it is time for HIT to be renovated and cloud computing is at the center of this transformation. Authors describe the benefits of cloud computing infrastructure which offer healthcare providers, insurance companies and researchers to use enhanced computing resources with lower initial capital. With its enormous computing power and storage, big data would become better managed (Weng et al., 2010). In the study of Althebyan et al. (2016), it is presented a proposed system which is developed to handle huge number of patients simultaneously by collecting their vital signs and biosignal data by transmitting the data to a dedicated cloud. It is possible to uncover significant trends that might affect the patients' health in a specific area (Althebyan et al., 2016). From the management aspect the principle advantage of cloud computing is its low cost. Currently, Amazon for example offers EC2 as part of AWS's Free Tier. Cost-effective and on-premise IT solution is easily possible for organizations, eliminating the need to purchase or evaluate hardware or software, or to hire internal IT staff. From the standpoint of IT management, cloud computing can increase the scalability, flexibility and cost-effectiveness of infrastructure. Additionally, more efficient use of computing resources can help preserve the environment and promote energy savings (Kuo et al., 2011).

Knowledge management in healthcare

"Knowledge management (KM) is a business process that formalizes the management and use of an enterprise's intellectual assets. KM promotes a collaborative and integrative approach to the creation, capture, organization, access and use of information assets, including the tacit, uncaptured knowledge of people." (Gartner, knowledge management, web, accessed 05.04.2016). Knowledge Management is therefore a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that endeavor to improve organizational performance (Girard&Girard, 2015). The final goal of Healthcare Knowledge Management is to structure, provide and promote timely and effectively healthcare knowledge to healthcare professionals, patients, individuals and policy makers on demand (Cabrita et al., 2010). Knowledge managements system (KMS) plans are used to provide high quality, high value cost-effective care in medical science. Reasons for utilizing KM strategies, includes: preventing knowledge loss, gaining more competitive advantage, reorganization, formal rectification of faults found during investigations and audits, continuous learning, synchronization with other organizations, serving to clients' needs, preventing a limited flow of knowledge and preventing the isolation of the department, individual or organization from taking place (Hassanian et al., 2010). According to the outcomes of research of Ghosh et al. (2008), KMS can reduce costs and help health workers to cope with the information overload and bring current research developments into practice. It is presented how knowledge could be created during the interaction between the patient and nurse and then stored in the KMS by the nurse, making it available for other nurses in future scenarios. Today, knowledge management is a discipline that is increasingly associated with the concept of big data.

Big data in healthcare

"Big data is high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation." (Gartner, Big data, web, accessed 05.04.2016). Big data in healthcare refers to electronic health data sets so large and complex that they are difficult or impossible to manage with traditional software and hardware. Big data in healthcare is overwhelming not only because of its volume but also because of the diversity of data types and the speed at which it must be managed. In relation to KM, big data enables organizations to develop their strategies based on knowledge (Kaivo et al., 2015). In the research of Raghupathi et al. (2014), it is indicated that potential benefits include detection of the disease in the early stages when it can be easily and effectively treated. Big data could help reduce waste and inefficiency in the following three areas: Research & development, Public health and Genomic analytics (Raghupathi et al., 2014). From decision makers' perspective, integration of big data and dynamic simulation modeling (DSM) enables unique opportunities to transform healthcare delivery. DSM can serve as a bridge between the immense of evidence offered by big data and informed decision (Marshall et al., 2010). Analytical insights gathered from meaningful data analysis of health care can cause changes in the business and clinical models that can lead to the expected occurrence of value-based purchasing, and can realize efficiencies through smarter delivery of care (Sukumar et al., 2010).

Internet of Things in healthcare

"The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment." (Gartner, IoT, web, accessed 05.04.2016). Medical care and health care represent one of the most attractive application areas for the IoT. In a comprehensive survey of Islam et al. (2014), it is presented that IoT has the potential to improve many medical applications such as: remote health monitoring, fitness programs, chronic diseases, and elderly care. Furthermore, the IoT has the potential to reduce device downtime through remote provision, help in replenishing supplies and efficient scheduling of limited resources. (Islam et al., 2015). MultiSense patch presented in the study of Steinhubl et al, (2015) is a wearable sensor developed by Rhythm Diagnostic Systems which was field-tested in an Ebola

Treatment Unit in Sierra Leone. This sensor saves critical health care worker time and reduces exposure to pathogens (Steinhubl et al., 2015). The Industrial IoT (IIoT)-driven healthcare monitoring is an emerging healthcare service that may potentially revolutionize the healthcare industry. Analysis of data gathered from a myriad of interconnected smart devices augments the healthcare professional's decision-making power and helps patients have an active role in managing their personal health. Avoiding preventable deaths due to hospital error, IIoT has the potential to save 50,000 people each year in the US (Hossain et al., 2016).

Serious games in healthcare

In the book "Serious Game an Introduction", Alvarez & Djaouti, (2012) presented a definition of Serious game which reads as follows: "A mental contest, played with a computer in accordance with specific rules, that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives." (Alvarez & Djaouti, 2010). According to the research of Giunti et al. (2015), Serious Game (SG) allows transforming a tiresome, repetitive exercise carried out in the real world into a pleasant and motivating activity in a game or a virtual world (VW). In a randomized controlled trial (RCT) they have proved to be equal or more effective than conventional neuropsychological interventions (Giunti et al, 2015). In the article of Tolentino et al. (2015), several serious games are presented regarding to alcohol abuse and games that discuss social consequences of alcohol use. Therefore, SG could be used as a new way of learning combinations of action and emotion that could assist with prevention and treatment of alcoholism (Tolentino et al., 2015). Project entitled "SG4R" standing for Serious Games for Rehabilitation is applied to health and specialized to lower limbs rehabilitation. Anonymous survey within specialists proved that VR devices and haptic robots applied to serious games (SGs) is convincing tools for health and that health professionals are strongly welcoming VR tools based on SGs (Gobron et al., 2015).

GENERAL FINDINGS

We found 22 papers that clearly show the benefits of the application of emerging technologies and models in health care and provide justification of their usage. Research has found that it is possible to significantly improve both service and management with reviewed technologies and models.

DISCUSSION

Our institution has significant experience in introduction and use of HIT and ICT. One of the most recognizable applications of HIT is definitely hospital information system (HIS). HIS that we currently use is "ZIS SHP2" developed by ComTrade IT Solutions and Services. It is a relational database system with many options and analytics. System is running through a web-based interface. This system indubitably provides certain benefits for the employees, management and population. According to the findings of this research, potential progress could be achieved using technologies such as the internet of things, cloud computing and big data analytics. In this way, it could be created a smart self-documenting environment that significantly assists the health professionals in their workflow and management in decision-making.

In our institution, we began to systematically deal with knowledge management in 2003. We created knowledge management system for managing internal medical knowledge gained from documents in CME. This system, which is based on a relational database, indubitably brings certain benefits to the employees and management. According to the findings of this research, our suggestion is that this system could be redesigned with cloud computing and big data concepts in mind. We have made an internal portal as a complementary KM solution for sharing of the internal knowledge and skills as well as news and various notifications. This portal is a part of our internal knowledge management. According to the findings of this research, due to large amount of unstructured and structured data, this system should be redesigned to run in a cloud environment (hybrid-cloud). We have also made an

external portal for publishing medical knowledge, important information to citizens of our region, government agencies, our sponsors and other organizations. In our opinion, this portal if it could be expanded with cloud computing and social networks, it would become an important complementary part of our knowledge management. As we found in the review, series games are becoming very important in medicine and healthcare. In our organization, we have been practicing serious games in Physical medicine for the treatment of patients during their rehabilitation. We have constructed an environment for practicing serious games composed of an Xbox 360, Kinect and a video-beam projector. We used the following SG for rehabilitation: Kinect sports, Fruit Ninja and Disney. SG proved to be very satisfactory as a kind of therapy for rehabilitation.

CONCLUSION AND FUTURE IMPLICATIONS

Emerging technologies and models such as Cloud computing, IoT, Knowledge management with Big data analytics and Serious games could improve the existing health care system up to highest level of quality of service and could ease and improve management, thus empowering both physician and patient. We have observed application of emerging technologies and models in the light of growing trends in ICT in health care, and the current state of the application of ICT in General hospital "Djordje Joanovic" in order to see what we have been able to practically implement and to recognize the benefits of its proper application, as well as to realize what our next steps are. In our institution, we managed to implement some of mentioned technologies but we have awareness of the fact this is only the initial stage of their implementation. With optimum and creative application of emerging technologies it is possible to reduce the gap between the actual benefits and potential benefits from the use of HIT.

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Session F: ABSTRACTS

APPLICATION OF MULTI CRITERIA DECISION MAKING TO URBAN PLANNING - A REVIEW

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ABSTRACT

Nowadays a wide range of operational and research activities in different fields of urban planning consist of decision making problems. Decision making is the main element in the analysis in regional studies and skills related to the success of the planning process. This paper has been written in the field of urban planning decision making. This paper provides a survey of the literature on multiple criteria decision making (MCDM) applications to urban planning problems. Articles were classified into four application areas and scopes. This research contributes to the existing literature on the urban planning and MCDM. This provides a unified source of references that could be useful for students, researchers and practitioners. The paper ends with an assessment of the literature presented, aiming to reach some conclusions, as well as indicate future trends in this line of research.

Key words: Decision making, Multi Criteria Decision Making (MCDM), Urban Planning.

HRM IN PRIVATE AND PUBLIC ORGANIZATIONS IN SERBIA

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ABSTRACT

Human resource management (HRM) is a management concept which obtains many practices and activities. Although there is a substantial literature on HRM in the private sector, the practice of HRM in the public sector is still scarce. In the private sector HRM is found as a factor for gaining competitive advantage, especially if HR practices are implemented in the way of high-performing working practice (HPWP). In the public sector HRM is seen as paternalistic management, with the standardization of employment practices, collective bargaining and working practices that emphasize equal opportunities for employees. The goal of this research is to explore the characteristics and differences between HRM practice in organizations from the private and public sector. The subject of the research is HRM practice (staffing, training and development, compensation and benefits, and industrial relation and communication) in the private and public organizations in the Republic of Serbia. The methodology of the paper includes exploration of the available literature on the theme and statistical analysis of the differences between HR practices in organizations from the private and public sector. The research is based on the HR data gathered in the second CRANET research round, performed in 2015.

Key words: Human resource management, private sector, public sector, Serbia, Cranet.

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IMPORTANCE OF MARINE ECOLOGY RESEARCH - HUMAN CONTRIBUTION TO MARITIME PROFESSIONALISM

UDC: 502.51:656.61

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ABSTRACT

In the opus of maritime professionalism is "ship for long voyages", they are observed as urbo-dynamic and urbo-restrictive system. With this aspect in both cases maritime professionalism which is directly related to "seaman-ship-service operation" is based on hierarchical modality which performance represent the overall working-life. Overall works that make following maritime professionalism significantly influence the risk-notice processes and events that in many cases must immediately and without delay in order to resolve the current risks, have been removed. In the maritime profession, it is evident that the value of educational concepts comes to the fore much more than in other professions. When this finding is known then the potential risks or process denunciations of sailor in the current event and the time that is being operated must adverse the event that could prevent or as soon as possible to remove, as this is not always the case for cancellation occurring on land. The advantages in solving unexpected or unfortunate events that can process for updating the land in relation to the cancellation or the risk that occurs when the ship is at sea is much "lighter" because they can quickly hire other systems, and that in a short subject time can be from other geotherestic areas. Every dismissal has consequences for violation of the labor environment and educators' professional expediency is an important environmental issue. For this reason, maritime educational program and plan of scientific research must be able to wield the vital values in the opus matrix educational preventive correspondence has practical significance for ecological sustainability.

Keywords: marine ecology, sustainable development, urban-dynamic system, urban-restrictive system, "the ship for long voyages," primary prevention, secondary prevention.

INTRODUCTION

Educational subject of Marine Ecology in building their scientific milieu observes, elaborate and diagnose potential job layoffs environmental (risks) that always have consequences for the eco-system destruction, regardless of whether it is viewed through the event, conditions or time.

The matter, which identifies issues relating to the distortion of Environmental determinants in the maritime profession Prof. Dr. Djurović suggests that the maritime education centers (secondary school maritime, Faculty of Maritime Studies, maritime training institutions mariners and their professional modernization) in curricula and programs introduced as a binding Marine Ecology educational subject which in itself implement all the theoretical and practical necessity that is related to environmental prevention.

Scientific and educational stuff offered by Marine ecology is based on scientific values which are applicable to observe in the matrix Pp (primary prevention), as the dominant human material. Primary prevention (P1 or Pp) in the opus Sea ecology has the task and aim to familiarize the trainee at the daily dangers that threaten "the ship, crew and cargo transportable), regardless of whether they come from or are caused by external or internal activities.

Professional tasks on the one hand and the conditionality in navigation on the other hand must always be observed through the danger that may occur and result in the cancellation as a very high concern, both for the ship and crew as well as for transportable utility load and the environment in which the ship is located. In the case of risk of the ship as a dynamic urban system, this is located at oceans, seas, light-aquatic area or in the terminals, as well as "dry" or "wet dock" represents certain speciality for many reasons.

High risk on the board that has emerged as the ship sailed (on the sea, ocean, lake or river) does not represent an isolated danger (for urban space ship), but also for the observed aquatic area (or sea water) systems and the environment. Violation of urban water shipping destabilizes aqua space by disturbing aqua biotope value, or flora-fauna vitality.

The degradation of aquatic spaces in further analyzes aggressively operate on at the development of flora and fauna, which represents a very serious bio-anthropogenic and environmental predictable dysfunction.

Primary prevention rests on the vitality of various educational modalities that must always be ready to find the best response that provides for the inability of destruction that are directly or indirectly harmful to the conservation and sustainable planetary development. When it comes to secondary prevention (Sp or S2), it with its educational modalities helps to stop further disruption of ecological value.

Secondary prevention as educational materials in the opus of environmental sustainability has the task and goal that have already occurred, by subjects, the system in the work process or natural phenomena. Environmental disharmony can be in the current expanding dysfunction system being promptly stopped, thus, in this way to be preserved the eco-system values and their necessity.

Marine ecology as a very important educational and scientific professional study is closely linked with practical value, professional maritime gradients offered by the Maritime ergosofology and ergosozology.

Permanency of scientific capital, which is basically offered by modern triad that occurs by mobilizing Maritime ecology - Maritime ergosozology - Maritime ergosofology, has great character and professional educational vitality that is, indisputably recognized in the International Maritime Convention entitled "Manila 2010".

When it comes to the preservation of working life values and the dispersion of their vitality, which refers to the maritime professionalism, impressive scientific role in this area has Urban ship and "Alpha and Omega" risk free navigation and preservation of aquatic space, manpower engaged (ship crews) and a transportable cargo.

CONCLUSION

When it comes to ecology, regardless of whether the question is related to environmental protection of sea, ecology of natural resources, industrial or "other ecology" always bear in mind that this is a protection of natural and other everyday goods. The science has recognized the importance of preserving natural resources as well as all of those other resources "for the benefit" of human transience, so because of this aspect declares "Day of ecology", "Day of environmental protection", Day of protection of forests, rivers, sea, water, birds, animals and much more. That's all well and makes us happy, but we know that in addition of marking these days once a year, it does not happen anything else that would be of interest for a total of planetary conservation and sustainable development.

IMPORTANCE OF MARINE ECOLOGY RESEARCH - HUMAN IMPORTANCE OF SHIP BALSNIH WATER IN HEARING PORT URBOSOZOLOGIE

UDC: 331.101.1:656.61

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ABSTRACT

Ship ballast water has always represented an important element in the oeuvre of safe navigation of the ship below the transportable cargo. When it comes to the time the ship's ballast water, this term has the meaning that the system (in particular ship-vessel) was in a state of equilibrium that he provides a safe voyage to the ship itself, and for trailerable burden. International Convention relating to the loading ballast water are aimed at ship captain to commit after loading cargo in the port the ship brought into equilibrium position (ballast) to the ship, cargo and crew as well as other systems of communication would have led to a risk position. Marine urbosozology is a very important maritime professional educational subject that aims to compose a matrix theoretically-practical findings that are based on safety navigation. The ship as a dynamic (mobile) urban system, is subject to special observational-elaborative requirements to be able to freely meet safe and risk-free transport a service activity. One of the conditions of safe navigation, it is certainly filling ballast tanks with water in the port of departure and emptying ballast tanks with water after sailing ship in the harbor.

Key words: ballast water transfer nedomicil species, Marine urbosozology, safety.

INTRODUCTION

Taking ballast water in ships' ballast tanks predictable is not only an important process, but a process to which the International Convention on ballast water management and safety in navigation, obliges the relevant marine authorities (captain, Ig deck officers, ..) to unduly respected shipping ballast water as prerequisite to sailing was much safe.

Check ballast water in ships' tanks provides safe navigation without being able to ship or vessel while sailing, anchoring or maneuvering to bring the risk position.

The obligation of loading ballast water in ships' ballast tanks, or other ballast burden promises to ship the boat will not laterally tilted to its navigation system and general safety of the ship, cargo and personnel were endangered.

Discussion about the importance of embarkation ballast water in ships' ballast tanks belonging to the scientific observation that is taught throughout the course titled Marine Urbosozology.

The possibility of transfer of marine organisms through ballast water on board the ship's ballast tanks known since the mid-nineteenth century, when the hitherto solid ballast (sand, stone and other cargo) replaced ballast tanks that are filled with sea water. The presence of certain microorganisms and even "micro flora / fauna" which is the ballast water advance to the ship's ballast tanks and thus their presence changed biotopn, as with discharging ballast water they are non-resident.

Certain types of microorganisms that are found in ballast water at unloading the ballast water have significant negative consequences for biological diverzibilitet after aquatic, and then to preserve the domicile of flora and fauna, and hence the sequence and negative connotations to human health.

Marine urbosozology as a scientific discipline has its justified educationally great place to study maritime professionalism, especially when one takes into account that the "ship sailing long" working Domiciliary space in which engaged sailor spends more month.

The "ship for long voyages" is the urban dynamic and urbo-restrictive system. Observational approach "board the ocean liner" as urbo-dynamic system refers to the elaboration of its dynamics in the special navigation conditions (storm, maneuver, ...) which also signific its movement, ie, dynamics, while the people and the burden of all the time spent at sea, or its geophysical dynamics, can not observe the dynamics.

When it comes to "board the ocean liner" as urbo-restrictive system, in relation to seafarers engaged or transportable cargo, it is evident that the current ship-urban space is restrictive and if the ship as a geophysical system dynamic.

From the aspect of safety of the marine space, which we observe in the context of ecology, discharge (discharge) ballast water from the ship's ballast tanks at sea has always represented a high risk of indigenous biodiversity (flora and fauna).

The possibility of transfer of marine organisms through ballast water on board the ship's ballast tanks known since the mid-nineteenth century, when the hitherto solid ballast (sand, stone and other cargo) replaced ballast tanks that are filled with sea water. The presence of certain microorganisms and even "micro flora / fauna" which is the ballast water advance to the ship's ballast tanks and thus their presence changed the biotope, as with discharging ballast water they are non-resident.

Certain types of microorganisms that are found in ballast water at unloading the ballast water have significant negative consequences for biological diverzibilitet after aquatic, and then to preserve the domicile of flora and fauna, and hence the sequence and negative connotations to human health.

Today it is necessary to provide quality mechanisms to control entry and discharge of ballast water from ships-vessels, in order to reduce any risk of degradation of the aquatic eco-BIOCAM and their domicile.

Ballast water can be sweet or salty, which ships loaded for stability and quality, and therefore of safe maneuvering.

The total capacity of the tanks for ballast water can be from a few cubic meters (for fishing vessels) to a few hundred or thousand cubic meters (for cargo ships-long voyage ships, tankers, ...)

The available information shows that the annual world's seas and oceans is transferred around 10x109 tons of ballast water.

Preventing pollution of aquatic space by discharging ballast water from the ship's ballast tanks and discharging oily water that is generated due to the operation or servicing of the main and auxiliary ship machinery systems.

CONCLUSION

Thanks to the obligations imposed by the International Convention for the Control and Management of Ships' Ballast Water and Sediments, which was adopted at the Diplomatic Conference which was held in London from 9 to 13 February 2004, the first international law that is binding on the prevention and

reduction of harmful aquatic organisms through the loading and unloading of ships' ballast water. Today there are a number of methods that can be adequately applied for minimizing and preventing the entry of various aquatic organisms through ballast water. One very useful method to prevent the transmission of harmful pathogens and certainly the pre-treatment of ballast water during intake (fueling) ballast at sea during unloading ballast, and after unloading water to land (in the harbor, pier, ...) in a pre-planned receiving ballast tanks.

Subject Maritime urbosozology and Maritime urbosofology has the task and aims to educate and virtually oblige all responsible institutions and individuals to use their knowledge and actions have an impact on the prevention or reduction of pollution and ocean (navigable waters), not only the unloading or loading ballast water but also other unfair committing that threaten the vitality of aquatic space, ie. Florea fauna, whose devastation directly or indirectly affects the health of the man and his vitality and sustainable eco-system.

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