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TECHNICAL FACULTY IN BOR  
MANAGEMENT DEPARTMENT**

**XIII INTERNATIONAL MAY CONFERENCE ON  
STRATEGIC MANAGEMENT**



**XIII STUDENTS SYMPOSIUM ON STRATEGIC  
MANAGEMENT**

**BOOK OF PROCEEDINGS**

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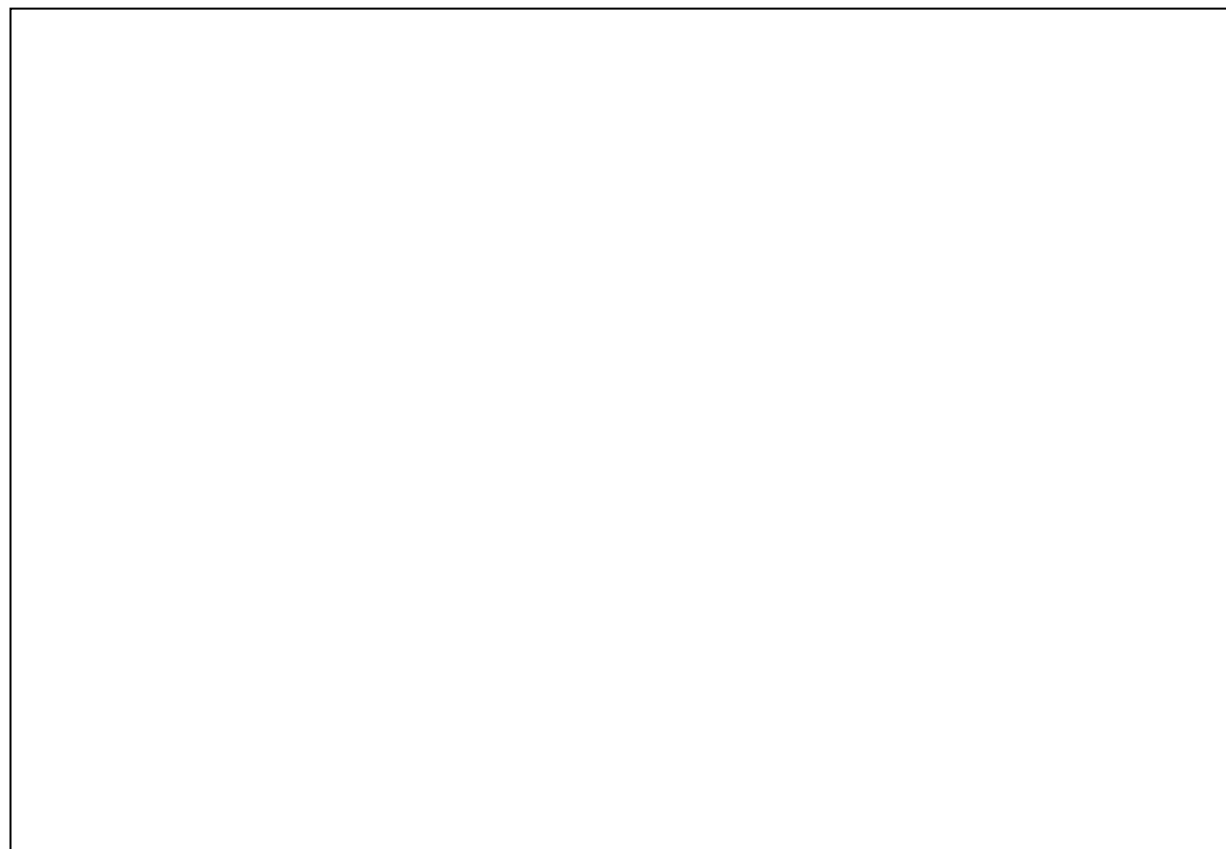
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**INTERNATIONAL MAY CONFERENCE ON  
STRATEGIC MANAGEMENT**

## Plenary papers:

### **EXPERIENCES ON APPLYING MCDA AND VOTING METHODS TO THE MANAGEMENT OF STATE-OWNED LANDS IN FINLAND**

**Jyrki Kangas<sup>1</sup>, Veikko Hiltunen<sup>2</sup>, Jouni Pykäläinen<sup>1</sup>**

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**Abstract:** Several MCDA and voting methods have been applied in the management of State-owned areas in Finland. Researchers and practitioners have made close co-operation in both testing methods and in putting their applications into practice. In the strategic planning processes of the State-owned lands and waters, management alternatives are assessed in terms of both economic, **ecological** and **socio-cultural sustainability**. A participatory approach is applied. Tools provided by operations research have frequently been applied in the planning. Forest simulation and linear programming have long been used in studying wood production possibilities. The first tests with AHP were performed about 25 years ago. The first MCDA application in participatory planning was published in 1993. Since then, many multiple criteria methods have been applied, including A'WOT, SMART and different voting schemes. They have typically been applied in an interactive manner, the process thus being called IDA (Interactive Decision Analysis). Specifically tailored techniques include MESTA, an internet-based decision support tool that makes use of Multicriteria Approval with acceptance thresholds. Also ELECTRE, PROMETHEE and SMAA have been tested. Both top-down, bottom-up and integrated planning approaches have been practiced. When choosing the methods, compromises must often be made. Simple and easily understandable methods may mean deficient analyses and loss of information. Complicated methods enable deeper analyses and more complete exploitation of the available data, but they might be hard to understand. In any case, interactivity greatly improves the efficiency of the planning process. Straightforward MCDA tools are needed in participatory phases and in planning via information networks. It is often useful to utilize more than just one method, exploiting hybrid approaches. In participatory processes, qualities such as fairness, transparency, and mutual understanding on the reasoning of the decisions are important. For that reason, methods based on social choice theory have gained popularity.

**Keywords:** Decision making, Multi-criteria analysis, Natural resources management, Social choice theory, Voting methods

## **FORMING COMPETENCES OF SOCIALLY RESPONSIBLE MANAGEMENT AS A SIGNIFICANT DRIVER FOR PROFESSIONAL DEVELOPMENT**

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**Abstract:** We can observe a growing international interest in the question of assessing CSR as one of a company's intangible assets. Today CSR has an opportunity to become a strategic competitive advantage.

Being aware of the complexity of the current situation, society, business and the state have come to the concept of sustainable development, which consists in combining economic growth and ensuring social security of the population and minimizing the negative impact on the environment.

Corporate Social Responsibility (CSR) has become the contribution of business to sustainable development. CSR means achieving commercial success in ways that rely on ethical standards and respect for people, communities, and the environment. Among other things, the concept under consideration involves providing the parties concerned with complete and reliable information about the company's performance.

At this stage in the development of the world economy, there is no longer an issue of whether or not to implement Corporate Social Responsibility. International corporations are now expected to have a CSR program and to implement a definite CSR policy. This implies that students in higher education are required to develop competence and skills in the design and implementation of CSR programs within corporate culture.

This paper is to show, identify and analyze the main global and Russian tendencies and perspective in the field of Corporate Social Responsibility education. The authors have conducted a research that presents attitudes to main aspects of the CSR current changes. Based on secondary and primary data the paper shows the need for special proactive methods of teaching aimed at forming management skills in higher education students in the implementation of CSR principles at company level. The research presents results of 26 projects in the field of CSR ordered by seven companies and fulfilled using design thinking methodology by third year students in the Bachelors Program in Management. The study also includes results of an assessment of the students' attainment of CSR goals and methods relevant to forming a corporate culture. The companies evaluated the results: 86% of the projects correspond to corporate culture standards; 69% of projects are distinguished by specificity, significance, and achievability of results; 71.3% of projects contain optimal implementation mechanisms; 70% of projects have a realistic and reasonable budget and 79% of projects contain creative ideas and approaches.

Therefore, the approach to the formation of CSR management competencies in higher education is shown.

**Keywords:** corporate social responsibility (CSR), sustainability, socially responsible management, forming competences, design thinking

## 1. INTRODUCTION

All over the world we could observe a growing interest to the question of CSR's assessment as one of company's intangible assets. Today CSR has an opportunity to become a strategic competitor's advantage.

At this stage in the development of the world economy, there is no longer an issue of whether or not to implement Corporate Social Responsibility.

International corporations are now expected to have a CSR program and to implement a definite CSR policy. At the current stage of the society development people (the community) demand high quality CSR activities, aimed at the most crucial challenges of our existence. We are no longer satisfied with CSR activities as part of building a Strong Brand Image campaign, but expect s CSR policy that would benefit to the prosperity of our local community, city, country or planet (Kotler, 2002).

This implies that students, receiving their bachelor degree in Management, are required to develop competence and skills in the design and implementation of CSR programs within corporate culture.

This notion is explicit in the UN Decade of Education for Sustainable Development Final Report. The Decade of Education for Sustainable Development has activated hundreds of thousands of people to reorient education globally towards a central goal: to learn to live and work sustainably (UN Decade of Education for Sustainable Development Final Report, 2014).

ISO 26000 Guidance on social responsibility is completely in line with this proposition. Talking about practices to integrate social responsibility in organizations, Guidance on social responsibility singles out development of competence for social responsibility as the key prerequisite (ISO 26000 Guidance on social responsibility, 2009).

When making decisions, including with respect to new activities, an organization should consider the likely impacts of these decisions on others. In doing so, an organization should consider the best ways of minimizing the harmful impacts of its activities and of increasing the beneficial impacts of its behaviour on society and the environment.

The above mentioned aspects are reflected in the Federal State Educational Standard for Bachelor program for Managers. The General professional competence formed in the course "Corporate social responsibility" is the ability to find organizational and managerial solutions and willingness to take responsibility for them from the standpoint of the social importance of decisions (Kosareva, 2014).

## 2. KEYNOTES OF THE STUDY

The study was carried out within the framework and curricula of the course "Corporate Social Responsibility", which is a part of Bachelor program 38.03.02 Management. The duration of the course – 36 hours, including 26 hours of project activities. The object of the study were 143 students of the Academy, in their 3-ed year of bachelor program in Management (Kosareva, 2016). The subject of the study was the process of formation of the competence of socially responsible management. The aim of study is to evaluate the effectiveness of the developed proactive educational method in the formation of competence of socially responsible management in higher education.

In the course of study the authors:

- defined a list of observable and measurable behavioral indicators of the competence of socially responsible management;
- developed educational method, that enables effective learning experience for socially responsible management in higher education;
- evaluated the applied educational method in forming competences of socially responsible management as a significant driver for professional development

In the course of this study, the 3rd year students of Bachelor program "Management" developed 26 projects in CSR activities, commissioned by 7 companies: Adidas group, PricewaterhouseCoopers, recruitment holding Ancor, Cotton Way, RusFinance Bank (Societe General Group), RosEuroBank, Moscow Credit Bank (Safronova, 2012).

In order to evaluate the formation of competence of socially responsible management, the following behavioral indicators were defined:

- understanding of the term "social responsibility"
- the ability to consider aspects of corporate social responsibility in the development and implementation of management decisions in the company
- understanding socially significant needs of the target group
- economic efficiency of CRS, through the feasibility of the budget of CSR project

In order to assess efficiency of the applied educational method in forming competences of socially responsible management we tested the students twice:

- incoming test on their understanding of the term Corporate social responsibility and their awareness of CSR practices
- final testing through the evaluation of completed projects and Customer questionnaire feedback

The incoming test showed the following results (Tables 1-3):

Table 1. Question "How much are you familiar with the concept of CSR"

I have never heard of CSR	19%
I have heard of CSR, but can not give a definition	56%
I know, what a CSR is, and can explain the concept	25%



Table 2. Question: “Name social responsible companies in Moscow”

I don't know any	59%
1 company	8%
2 companies	16%
3 companies	5%
4 companies	3%
5 and more companies	8%

Table 3. Question: “What spheres are the CSR activities of the companies, you have named?”

I don't know	66%
Charity	16%
Environmental protection	11%
Social security	3%
Promotion of a healthy lifestyle	3%
Support of their staff	3%

The data indicates a low level of awareness of the principles, main topics and problems to be solved in the framework of socially-responsible management, the goals and objectives of CSR.

### 3. METHODOLOGY OF STUDENTS' PROJECT WORK

The methodology of students' project work aimed at solving the Company's tasks in its CSR sphere and commissioned by the Company, with application of Design Thinking method for maximum client-centered result provides for a consistent implementation of the following stages, with the obligatory control of the achievement of intermediate results (Liedtka J, 2015).

#### Stage 1. Presentation of CSR activities of the Client-Company and target setting

Representatives of the Client-Company meet the students and tell what kind of CSR activities the company is engaged in, why CSR is important for the company, namely what are risks the CSR policy helps to avoid; what the strategic objectives the CRS activities are aimed at, and how CSR is integrated in the corporate culture of the company. Then the Company presents its brief.

At this stage the following methodical tasks are achieved:

- actualization of the phenomena of CSR as a real business-task of the Client-Company;
- actual first-hand information on the practices of integrating CSR in the Company's operation;
- motivation of the student by a real order of the Client-Company for the development of project ideas.

## Stage 2. The development of empathy for beneficiaries.

Applying Design-Thinking techniques students come up with a Portrait of a specific Person and describe the conditions of his life, his habits, his dreams and aspirations, his doubts and fears.

At this stage the following methodical tasks are achieved:

- emotional interest in solving the problem;
- divergence in finding solution to the task set by the Client-Company;
- setting criteria for socially responsible decisions, that take into account the interests of the target audience;
- practice in applying ethical criteria when taking the managerial decision.

## Stage 3. Research of the User Journey Map.

The students tell stories about their characters or Persons. While analyzing the stories we detect gaps in the User experience – the situations, where social expectations of the Users do not match the corporate practice.

At this stage the following methodical tasks are achieved:

- gaps in the User experience
- social needs of our Users in these gaps
- CSR project to optimize the Users' experience and meet the detected social needs

## Stage 4. Brainstorming session.

At this stage we make the process of thinking more divergent. All ideas are classified using Prioritization «Importance to the user / feasibility for the project team / value for the company». The «Big Bets» ideas are then tested on the Users' scenarios - they are visualized through user-centric stories (Storyboarding)

At this stage the following methodical tasks are achieved:

- evaluation and prioritization of ideas by focusing discussions on importance and feasibility
- testing ideas on the Users' scenarios

## Stage 5. Rapid Prototyping & Passport of the Project Idea

At this stage a new concept is expressed in a tangible form. It is a «low-fidelity» prototyping, intended to create visual (and sometimes experiential) manifestations of concepts. The prototype gives us the possibility to evaluate the main characteristics of the product and then we continue to test the product by 4 strategic aspects «Need / Approach /

Benefits / Competition». We finish the stage by drawing-up a Passport of the Project Idea - a document stating the essential data for the business plan.

At this stage the following methodical tasks are achieved:

- materialization of ideas and testing assumptions ;
- drawing an estimated budget and implementation schedule;
- preparation for the presentation to the Client-Company.

Stage 6. Presentation of the project to the Client. Feedback and project assessment.

At this stage the following methodical tasks are achieved:

- development of presentation technics;
- definition of criteria for evaluation of the project in accordance with the formed competences;
- project assessment;
- feedback analysis and point-rated assessments of completed work.

At this final stage the educational goals of the project are realized and assessment of the following indicators of the competence of socially responsible management is performed:

- understanding of the term "social responsibility";
- the ability to consider aspects of corporate social responsibility in the development and implementation of management decisions in the company;
- understanding socially significant needs of the target group;
- economic efficiency of CRS, through the feasibility of the budget of CSR project.

#### **4. ASSESSMENT**

The assessment of the above mentioned formed indicators is based on the feedback from the students' project teams and Clients-Companies (Tables 4-7).

Indicator «understanding of the term "social responsibility" (Table 4)

The students gave the following answers to the question of the end of the course questionnaire: «Do you consider CSR activities beneficial to the Company?»

Table 4. Do you consider CSR activities beneficial to the Company?

CSR activities have no impact on the financial results of the Company	4%
CSR activities improve the image of the Company, but have no impact on the financial results of the Company	10%
CSR activities influence the financial results of the Company	41%
CSR activities is one of the key provisions of the Company's sustainability	45%

Indicator «The ability to consider aspects of corporate social responsibility in the development and implementation of management decisions in the company» (Table 5)

Clients-Companies gave the following answers to the question in the final questionnaire: «To what extent does the presented solution takes into account aspects of corporate social responsibility of your Company?»

Table 5. To what extent does the presented solution takes into account aspects of corporate social responsibility of your Company?

The presented solution is in line with the Company's CSR	100%
The presented solution is not in line with the Company's CSR	0%
The solution wasn't found	0%

Indicator «Understanding socially significant needs of the target group» (Table 6)

The tasks set by the Clients-Companies to the students can be grouped into 4 major areas: recruitment, involvement in CSR projects, employee motivation/enhancing Employer brand and increase employee engagement and customer focus. Understanding socially significant needs of the target group was rated by the Client-Company on a scale where 10 points was the highest rating.

All projects were rated in the range of 7.33 to 10 points, which indicates the formation of the indicator "Understanding socially significant needs of the target group".

Table 6. Understanding socially significant needs of the target group

Area	Task	Understanding socially significant needs of the target group (max 10 points)
recruitment		
	increase of high-quality job-applications	8
	increase of high-quality applications to the leadership program	7,5
involvement in CSR projects		
	effective internal communications system to inform on the forthcoming CSR activities	7,33
	involvement of the employees in CSR projects	9,66
	strengthening of horizontal relations between departments	9,66
employee motivation/enhancing Employer brand		
	women's leadership development	7,5
	development of work-life balance programs	7,33
	motivation of young employees to develop effectively at the starting position	8
increase employee engagement and customer focus		
	transfer of clients to our departments within the Company	10

Indicator «Economic efficiency of CRS, through the feasibility of the budget of CSR project» (Table 7).

The course is not directly aimed at teaching budgeting. However, the understanding of the economic efficiency of the project (including in the framework of the CSR activities of the company) is one of the key skills of a Manager. Assessment of this indicator conducted by the Client-Company according to the criterion through the feasibility of the budget of CSR project.

Table 7. Economic efficiency of CRS, through the feasibility of the budget of CSR project

Average point for the criteria « Feasibility of the budget»	6,85
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## 5. FEEDBACK ANALYSES

Assessment of how the developed methodology provides for the formation of competence as a driver of professional development was received from Customers and students (Tables 8-9).

Clients, representatives of HR Department of large companies set the highest score on criteria which are in priority of indicators laid down in the curriculum of socially responsible management. (Table 8)

Table 8. Evaluation of projects by criteria from the Client-Company

Criteria	Average rate (10 points max.)
Compliance with the corporate culture	8,42
Creativity	7,77
The optimal implementation mechanisms	7,13
Feasibility of the budget	6,85
Specific, relevant, achievable results	6,81

Students gave the following answers to the question: "Write what you learned about CSR in the framework of this course?" at the end of the course questionnaire. (Table 9)

Table 9. Write what you learned about CSR in the framework of this course?

The project has allowed to gain practical experience in the field of CSR	87%
Developed a sense of how important the interaction of business and society is and how versatile it can be	58%
After completing the course I realized the important role of CSR activities in the Company's policy towards its employees	45%
Loved the feeling that your decision in CSR affect the workflow of real business	27%
The idea of our CSR project is viable, because it not only affects the consumer in person, but corresponds to the modern trends of the concept of sustainable development	14%

Students' comments:

*«Feel the rush of ideas and a desire to grow»*

*«Positive emotions, I feel that I have made a useful and interesting project»*

*«It was great, creative, fun, original. The course is different from the majority of courses by approach and an ability to be assessed by the Client-Company»*

Thus, the obtained results allow to consider the presented methodology of forming competence of socially responsible management through the development and implementation of projects on corporate social responsibility as effective and the one that provides future managers with important theoretical and practical knowledge for successful professional development.

## REFERENCES

1. Kotler Ph., Roberto N., Lee N. Social Marketing: Improving the Quality of Life, 2nd ed., 2002
2. Kosareva E.N., Gavrilina O.P. Problems and prospects of the development of business education in the Russian Federation at the current stage (Проблемы и перспективы бизнес-образования в Российской Федерации на современном этапе), Human capital and professional education, №1, Moscow, Russian Federation, 2014.
3. Kosareva E. Safronova N. Continuing Education for Managers as the Basis of Innovation Economy (Experience of the Russian Presidential Academy of National Economy and Public Administration) Serbian Journal of Management, 2016, Volume 11 Number 1
4. Safronova N.B., Chankhieva F.Ju., Marketing of CSR projects of the Russian Companies (Маркетинг проектов социальной корпоративной ответственности российских компаний), Management in XXI century: development resources of education and business, StPetersburg, Russian Federation, 2012, 71-73.
5. Liedtka J., Ogilvie T., Designing for Growth: a design thinking tool kit for managers (Думай как дизайнер) Mann, Ivanov & Feber, Moscow, Russian Federation, 2015
6. Shaping the Future We Want, UN Decade of Education for Sustainable Development Final Report, UNESCO 2014
7. ISO 26000 Guidance on social responsibility, International Organization for Standardization, 2009

## **ANALYSIS OF THE OCCUPATIONAL SAFETY FACTORS IN PRODUCTION COMPANIES, AS IMPORTANT SEGMENT OF THEIR STRATEGIC DEVELOPMENT**

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**Abstract:** This paper explores the impact of the main occupational safety factors in the overall occupational safety in manufacturing companies in Serbia, as an important segment of their strategic development. The paper aims to validate and test the proposed conceptual model of occupational safety. Hence the SEM (Structural Equation Modeling) methodology was applied. Statistical analysis was performed using the software package SPSS 18.0 and LISREL 8.80. The seven-hypothesis model was developed and tested on a sample of 1544 participants employed in 26 production companies. Results of empirical research confirm most of the formulated hypotheses and point to the existence of positive correlation among them. Within research conclusions the special emphasis is placed on those safety factors in which the significant opportunities for improvement have been identified. Finally, the results indicate the fact that the production companies can achieve their strategic development in a satisfactory manner only if they establish adequate occupational safety procedures for the employees at their workplaces.

**Keywords:** Occupational safety factors, production companies, employees, strategic development, modeling.

### **1. INTRODUCTION**

The measurement and analysis of safety in manufacturing companies that rely on traditional indicators, such as occupational injuries, provide important feedback about the shortcomings of the system of occupational safety, as well as the accidents themselves. However, this way of measuring occupational safety represents a reactive approach to managing this field and it measures events and results that have already occurred. The most recent research emphasizes the proactive evaluation of occupational safety, by means of appropriate safety factors that enable the identification of any potential flaws in the organization's safety system, thus decreasing the probability of the occurrence of occupational injuries [1, 2, 3]. In the process, the analysis of the perception of the employed, their interpretations of the system and safety strategies have an important role, and are predominantly dependent on the safety climate and organizational values in general [4]. Hence, creating and fostering a positive safety climate has a key role in improving safety performance within an organization [5]. In this regard, in order to improve safety climate performance it is necessary to identify crucial factors of safety that show imperfections, and then individuals or groups in the organization that affect these factors [6].

The theory and research in the context of strategic management and organizational behavior suggest that perceptual power can be an essential element of effective management



of business systems [4, 7]. Since the strategy of occupational safety management represents an integral part of the strategic development of a company, the importance of the perception of all the relevant factors of occupational safety is underscored [4]. The aim of the conducted research in manufacturing companies on the territory of Serbia was to analyze the factors of safety through the perception of employees. Research results present a model of occupational safety that allows for the identification of weaknesses and deficiencies of certain safety factors. In this way, the proposed model becomes a useful tool in improving occupational safety performances, as well as a more successful goal realization of the strategic development of a company.

## **2. RESEARCH HYPOTHESES AND THE CONCEPTUAL MODEL**

### **2.1. SAFETY AWARENESS AND COMPETENCE AND OCCUPATIONAL SAFETY**

The employees dedicated to safety who have adequate perception of safety at their workplace experience significantly less injuries at work compared to the ones that are not adequately dedicated to this problem [8]. Of course, in order to ensure appropriate behavior of the employees at work, it is necessary that they possess certain knowledge related to work activities, as well as to occupational safety in general [9, 10, 11]. Actually, these competences and knowledge enable adequate reception of information, problem solving, critical thinking, interpersonal relationships, communication and other factors increasing the dedication to conduct procedures of occupational safety [9]. Hence, we suggest:

**Hypothesis H1:** *Safety awareness and competences positively affect occupational safety.*

### **2.2. SAFETY COMMUNICATION AND OCCUPATIONAL SAFETY**

Conditions of occupational safety can be considered through the relationship among employees and their work activities, through coordination and communication in the production process, as well as through the process of safety implementation at workplaces [12]. In this regard, effective communication channels need to be established among the hierarchical levels of management structure, as well as among the channels of the implementation of the information related to occupational safety for all job positions. In this way, a type of feedback is formed that enables management to take insight into any potential discrepancies in the implementation of safety procedures, and it likewise enables taking the appropriate measures afterwards [13]. Finally, in the safety communication system, each distributed information should be fully understandable to its recipient. Only in this way can one expect a satisfactory safety performance for all the workplaces in a company [14]. Therefore, we suggest:

**Hypothesis H2:** *Communication about safety has positive impact on occupational safety.*

### 2.3. ORGANIZATIONAL ENVIRONMENT AND OCCUPATIONAL SAFETY

Kwon and Kim conducted an investigation of the occupational environment to identify the elements that affect safety in the workplace. According to them, the competences and motivation of the employees do not have such a significant impact on safety in comparison with the safety characteristics of the occupational environment and safety procedures compliance with realistic demands [15]. On the other hand, some authors emphasize that the individual attitudes related to safety perception and subjective evaluation of the organizational environment are also important for the safety of employees at workplaces and behaving in accordance with the safety regulations, as well as to objective measures of safety in the organizational environment [16].

Certain studies are based on the fact that there are organizational differences in large and small companies, i.e. public and private companies, which require a different perspective on safety. These conclusions can be applied to ergonomic, physical and chemical factors of the occupational environment related to occupational safety [17]. Hence, we suggest:

**Hypothesis H3:** *The organizational environment has a positive effect on occupational safety.*

### 2.4. MANAGEMENT SUPPORT AND OCCUPATIONAL SAFETY

Management support and commitment to the safety of employees at their workplaces belong to a group of key factors of safety according to numerous authors [18, 19, 20, 21, 22, 23]. Therefore, the management of occupational safety should be one of the main tasks of the management [24]. Occupational safety management is an adequate indicator of positive and supportive attitudes of the management towards the integrity and safety of employees [25]. Employees' perception of positive attitudes and actions of the management leads to the reduction of the number of injuries at work and fixing the safety situation in the workplace [26, 27]. Therefore, we suggest:

**Hypothesis H4:** *Management support has a positive effect on occupational safety.*

### 2.5. RISK JUDGMENT AND OCCUPATIONAL SAFETY

Risks represent accompanying subsidiaries of almost all production activities and may result from natural causes or human factor [28]. Risk is the possibility that someone or something is under the influence of an adverse event [29]. In order to diminish the possibility and intensity of an adverse event, risk needs to be managed. In this process, the most sensitive activity is identifying risks. Safety measures, i.e. occupational safety, will directly depend on the manner in which this activity is performed. Finally, a risk management process in its psychosocial dimension creates perception and assessment of risk by employees, which can contribute to a safer behavior [28, 30]. Hence, we suggest:

**Hypothesis H5:** *Risk judgment has a positive effect on occupational safety.*

## 2.6. SAFETY PRECAUTIONS AND OCCUPATIONAL SAFETY

Working conditions, i.e. safety of employees at workplaces get to be enhanced by an effective application of occupational safety management system. Occupational safety management system is conducted by applying safety measures adopted by the top management of an organization [31]. In this way the number of injuries at work is reduced and the performance and profitability of the organization improves, which is strategically very important [32]. Therefore, we suggest:

**Hypothesis H6:** *Safety precautions have a positive impact on occupational safety.*

## 2.7. SAFETY TRAINING AND OCCUPATIONAL SAFETY

It was fairly a while ago, back in 1931, that Heinrich, one of the pioneers in the investigations of occupational safety, stated that the most important factors that cause occupational injuries include physical and psychological inadequacy of staff, carelessness, negligence, lack of supervision and control and, finally, the lack of or inadequate safety training [ 33]. However, the greatest responsibility lies with the management of the organization to prevent injuries at work [34]. To improve the safety of employees in the workplace, the organization of work should be improved. In addition to other elements in the sphere of work organization that have previously been discussed, safety training should be emphasized here. Besides informing employees about the technical aspects of performing tasks in a correct and safe way, safety trainings have a psychological dimension in terms of raising awareness [9, 35]. Henceforth, we suggest:

**Hypothesis H7:** *Safety training has a positive impact on occupational safety.*

Based on the 7 proposed research hypotheses the conceptual model of positive impacts was formed, which is shown in Figure 1.

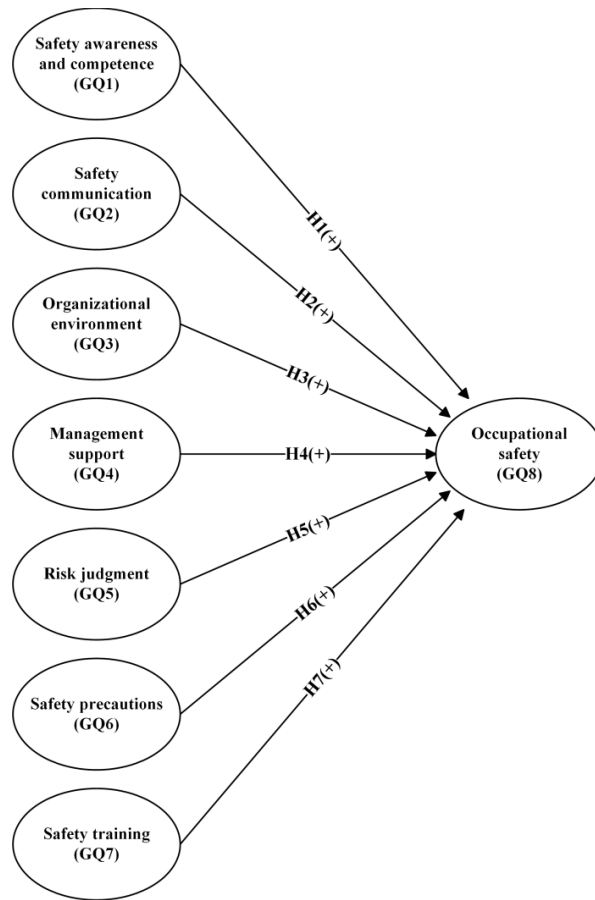


Figure 1. Conceptual model

### 3. RESEARCH METHODOLOGY

As part of the research, the methodology of the questionnaire was used to collect data. The questionnaire was developed by one part of the authors of this paper during the previous research of the issues of occupational safety in production companies [36, 37] based on the available relevant literature [38, 39, 40, 41]. Its application is universal, which is the case with the majority of this type of questionnaires (a certain number of questionnaires that may be encountered in the literature is designed for the use in specific economic production activities). The questionnaire paper consists of two parts. The first part contains 8 questions demographic in character, while the second part consists of 23 questions divided into 8 groups related to the field of occupational safety.

#### 3.1. SAMPLING AND DATA COLLECTION

Anonymous survey was conducted among employees within the 26 production companies at the territory of Serbia. The business scope of companies is as follows: construction industry (6 companies), footwear industry (4 companies), electrical equipment production (3 companies), PVC carpentry production (1 company), cosmetic products

production (1 company), textile industry (3 companies), recyclable materials processing (1 company), cement production (1 company) and furniture production (3 companies), mechanical engineering (3 companies). The survey was conducted on a sample of 1758 employees, 1544 of which were properly filled out representing 87.82%. A five-point Likert scale with values from 1 to 5 was used for grading the responses, where 1 meant the lowest importance (I strongly disagree with the given statement), and 5 meant the highest importance (I strongly agree with the given statement). The ratio of the size of the sample (1544 subjects) and the number of questions (23 questions in the questionnaire) is 67.13, which is far more than the recommended minimum level of 5, according to Hair et al. [42]. Demographic characteristics of the participants of the survey are presented in Table 1.

Table 1. Demographic characteristics of the sample

Variables	Category	N	Percentage %
Type of industry	1. Construction industry	468	30.3
	2. Shoes manufacture	112	7.5
	3. Electrical construction	168	10.9
	4. PVC joinery production	39	2.5
	5. Cosmetic industry	81	5.2
	6. Textile industry	216	14.0
	7. Recycling	69	4.4
	8. Cement production	135	8.7
	9. Furniture industry	167	10.8
	10. Mechanical industry	89	5.7
Size of company	Less than 50 employees	252	16.3
	51 – 100 employees	671	43.5
	101 – 300 employees	417	27.0
	Above 301 employees	204	13.2
Position in the company	Production workers	1081	70.0
	Workers indirectly related to production	197	12.7
	Administrative workers	179	11.6
	Managers	87	5.7
Educational level	Elementary school	379	24.5
	High school	1048	67.9
	Higher education	65	4.2
	University	52	3.4
Years of work experience	Less than 5 years	942	61.0
	6 – 15 years	417	27.0
	16 – 25 years	102	6.6
	Above 26 years	83	5.4
Gender	Male	853	55.2
	Female	691	44.8
Age	Less than 29 years	502	32.5
	30 – 44 years	814	52.7
	45 – 54 years	181	11.7
	Above 55 years	47	3.1
Accident involvements	Yes	252	16.3
	No accident	1292	83.7

## 4. RESULTS

The set of collected data was analyzed using statistical tool software packages SPSS 18.0 and LISREL 8.80.

### 4.1. DESCRIPTIVE STATISTICS

Table 2 shows the descriptive statistics of the tested sample. Standard statistical parameters are shown: sample size, range, mean, standard deviation and variance.

Table 2. Descriptive statistics

Mark (Variable)	N	Range	Mean		Std. Deviation	Variance
			Statistic	Std. Error		
Q 1.1.	1544	4	4.56	.018	.702	.492
Q 1.2.	1544	4	4.54	.018	.723	.523
Q 1.3.	1544	4	4.31	.021	.833	.695
Q 1.4.	1544	4	4.31	.022	.867	.752
Q 1.5.	1544	4	4.45	.021	.832	.691
Q 2.1.	1544	4	3.71	.029	1.126	1.268
Q 2.2.	1544	4	3.89	.028	1.085	1.177
Q 2.3.	1544	4	3.55	.027	1.076	1.157
Q 2.4.	1544	4	4.09	.025	1.001	1.002
Q 3.1.	1544	4	2.95	.033	1.284	1.648
Q 3.2.	1544	4	2.97	.033	1.312	1.722
Q 3.3.	1544	4	2.95	.034	1.346	1.812
Q 4.1.	1544	4	4.14	.027	1.073	1.152
Q 4.2.	1544	4	3.65	.034	1.355	1.836
Q 5.1.	1544	4	2.55	.036	1.399	1.956
Q 5.2.	1544	4	2.39	.036	1.309	1.713
Q 5.3.	1544	4	2.65	.033	1.281	1.641
Q 6.1.	1544	4	3.60	.030	1.181	1.396
Q 6.2.	1544	4	3.96	.025	.986	.972
Q 7.1.	1544	4	4.18	.031	1.214	1.474
Q 7.2.	1544	4	4.23	.027	1.064	1.132
Q 8.1.	1544	4	2.75	.033	1.280	1.639
Q 8.2.	1544	4	2.30	.031	1.214	1.473

### 4.2. THE RELIABILITY ANALYSIS OF THE SAFETY INDICATORS

High quality statistical data processing requires the determination of the validity and reliability of the measuring scale as a starting point, i.e. of the results obtained on the basis of the collected and processed data [43, 44]. For this purpose, the assessment of internal consistency of the instrument for data collection was carried out using Cronbach alpha test [44, 45, 46]. Cronbach's formula is used to calculate the average values of the correlation between items of the measuring instrument (alpha coefficient) when the answers to questions are rated on the basis of the degree of the given threshold (e.g. The Likert five-point scale).

According to this test, the values of the coefficient  $\alpha$  greater than 0.70 represent a good possibility of modeling results of the questionnaire based on the considered population

[47]. Judging by the obtained Cronbach alpha coefficients of internal consistency of the sets of questions in the questionnaire (GQ1 - GQ8), the validity and reliability of the questionnaire on occupational safety was proved, i.e. the regularity of the formed groups within it (Table 3). In this way, one can expect reliable results of the research.

Table 3. Interconsistency coefficients of the questionnaire

Groups of questions	Number of Items	Cronbach alpha coefficient
GQ1 (Safety awareness and competence)	5	0.802
GQ2 (Safety communication)	4	0.741
GQ3 (Organizational environment)	3	0.922
GQ4 (Management support)	2	0.771
GQ5 (Risk judgment)	3	0.839
GQ6 (Safety precautions)	2	0.777
GQ7 (Safety training)	2	0.733
GQ8 (Occupational safety)	2	0.745

#### 4.3. FACTOR ANALYSIS

##### **Kaiser–Meyer–Olkin (KMO) and Bartlett test**

In order to apply factor analysis, testing the adequacy of the sampling was performed (MSAs - Measures of adequacy sampling) using a Kaiser-Meyer-Olkin (KMO) test and Bartlett test of sphericity. On the basis of the literature recommendations, the minimum acceptable value for KMO indicator is 0.6, while the level of significance of the Bartlett's test is  $p \leq 0.05$  [48, 49, 50].

The obtained result of the KMO coefficient is 0.822, which indicates that the collected data are suitable for the application of the factor analysis. Furthermore, the Bartlett test of sphericity indicates significance ( $\chi^2 = 3639,764$ ,  $p < 0.000$ ), indicating that there are correlations among the items within the measurement instrument, that is, that the correlation matrix is not an identity [42, 51].

##### **Correlation Matrix of the Variables**

Next sections of the study examine the correlation between the 23 items of the questionnaire (variables) and safety in production companies. For large samples the correlation coefficients at the 0.01 level are considered acceptable, while with the smaller ones the level of acceptability of correlation coefficients is 0.05 [52]. In the explored sample most of correlation coefficients in the matrix fulfill the eligibility level of 0.05. This indicates a significant correlation between the 23 items of the questionnaire, and therefore the application of factorial analysis is justified. Correlation matrix of eight factors of occupational safety is shown in Table 4.

Table 4. Inter-correlations among eight occupational safety factors within proposed model

Coefficient	GQ1	GQ2	GQ3	GQ4	GQ5	GQ6	GQ7	GQ8
GQ1	1.00							
GQ2	0.53	1.00						
GQ3	0.59	0.54	1.00					
GQ4	0.53	0.66	0.68	1.00				
GQ5	0.51	0.56	0.58	0.54	1.00			
GQ6	0.46	0.46	0.54	0.69	0.52	1.00		
GQ7	0.52	0.62	0.68	0.56	0.62	0.58	1.00	
GQ8	0.56	0.51	0.64	0.57	0.47	0.63	0.49	1.00

### Exploratory Factor Analysis

Exploratory factor analysis (EFA) was carried out with the aim of extracting the main factors of occupational safety in production companies. The relations between the measured variables are such that on the basis of the recorded correlations the regrouping into a smaller set of variables can be performed, which represents a concise and understandable structure of the studied field [42].

By EFA analysis conducted over the set of 23 variables connections and relationships among the proposed groupings were established, and the obtained results (factor loadings and communalities) are shown in Table 5.

Factor loading represents the correlation coefficient between the original variable and the extracted factor. Communality variable ( $h^2$ ) is defined as a proportion of its total variance calculated on the basis of common factors [53].

Table 5. Results of Exploratory Factor Analysis

Variable	Factor loading								Communalities
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	
Q 1.1.	.641								.716
Q 1.2.	.634								.731
Q 1.3.	.572								.609
Q 1.4.	.543								.550
Q 1.5.	.367								.529
Q 2.1.		.508							.576
Q 2.2.		.645							.722
Q 2.3.		.417							.618
Q 2.4.		.636							.546
Q 3.1.			.688						.808
Q 3.2.			.638						.856
Q 3.3.			.630						.854
Q 4.1.				.551					.684
Q 4.2.				.642					.635
Q 5.1.					.598				.717
Q 5.2.					.468				.710
Q 5.3.					.582				.704
Q 6.1.						.394			.619
Q 6.2.						.504			.530
Q 7.1.							.555		.743
Q 7.2.							.457		.727
Q 8.1.								.447	.635
Q 8.2.								.378	.502



#### 4.4. STRUCTURAL MODEL

Using the software package LISREL 8.80 Path Model Analysis was performed in accordance with the conceptual model shown in Figure 1.

Figure 2 shows the results of the analysis of the structural model. Above the arrow the value of the regression coefficients ( $\beta$ -path coefficient) is shown. They explain the strength of the relationship between the dependent and independent variables and are related to the effect of Safety awareness and competence (GQ1), Safety communication (GQ2); Organizational environment (GQ3), Management support (GQ4) Risk judgment (GQ5), Safety precautions (GQ6 ) and Safety training (GQ7) on the dependent variable Occupational safety (GQ8). Below the arrows (in parentheses) the values of the t-test are provided. The coefficient of determination ( $R^2$ ) is presented on a graphical symbol of the dependent variable. It signifies the participation of the explained variance in total, i.e. how the variations of the dependent variable are explained by the predictor variable.

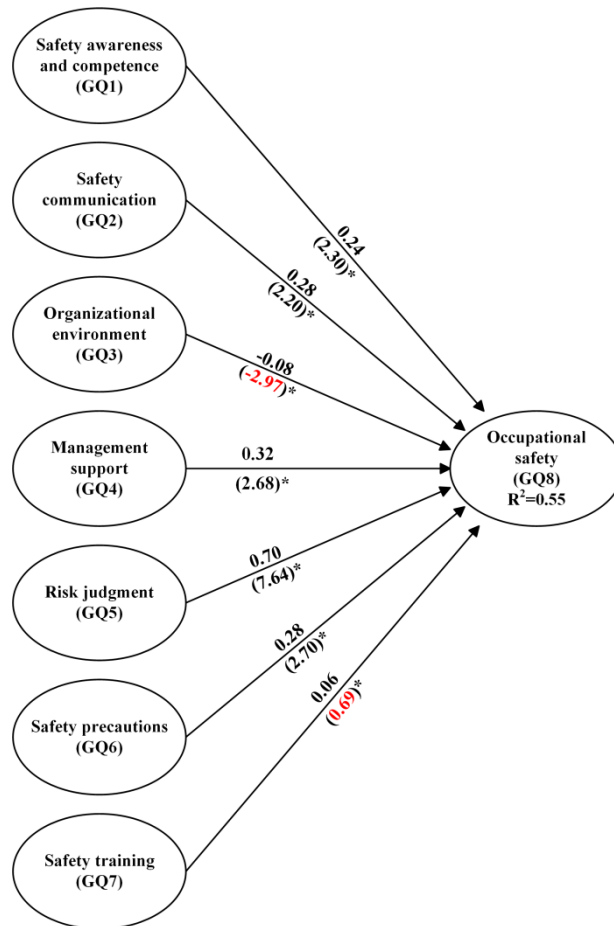


Figure 2. Structural model

Goodness-of-fit measures of structural models were performed using a software package LISREL 8.80. The values of the most significant indicators are shown in Table 6. Based on the obtained results the values of the FIT indicator were analyzed, according to

which the model satisfactorily or unsatisfactorily fits the initial data (by comparing the obtained values with recommended values).

RMSE indicator (Root Mean Square Error of Approximation) is based on the approximate error that occurs due to the expected degree of freedom in the studied population. The lower the value of RMSEA indicator, the greater the correspondence, in other words, the better the fitting of the model to the input data. The acceptable congruence is below 0.10 [54].

GFI (Goodness-of-Fit Index) determines whether the model is more applicable compared to the situation when there is no model. This indicator belongs to the range [0,1] where 0 denotes poor, and 1 signifies perfect matching. Acceptable values are the ones greater than 0.8 [55].

Indicators AGFI (Adjusted Goodness-of-Fit Index), CFI (Comparative Fit Index), IFI (Incremental Fit Index), NFI (normed Fit Index), NNFI (Non-normed Fit Index) and RFI (Relative Fit Index) indicate whether the considered model shows a solid increase in correspondence. Indicator values AGFI, CFI, IFI, NFI, RFI, NNFI are considered acceptable if they are greater than 0.9.

Parsimony of the proposed model is regarded based on the average value of chi-square ( $\chi^2 / \text{d.f.}$ ). Fitting of data is considered satisfactory if the value is greater than 1 and smaller than 3. Also, the process confirms that the data are representative [42, 55].

Table 6. Summary of FIT values (Structural model)

Fit indicators	Values of FIT indicators	Recommended values
Chi-Square ( $\chi^2$ )	645.89	-
Degree of freedom (d.f.)	302	-
Relative Chi-Square ( $\chi^2 / \text{d.f.}$ )	2.14	< 3.0
Root Mean Square Error of Approximation (RMSEA)	0.086	0.08 – 0.10
Goodness-of-Fit Index (GFI)	0.94	> 0.9
Adjusted Goodness-of-Fit Index (AGFI)	0.92	> 0.9
Normed Fit Index (NFI)	0.91	> 0.9
Non-Normed Fit Index (NNFI)	0.92	> 0.9
Comparative Fit Index (CFI)	0.93	> 0.9
Incremental Fit Index (IFI)	0.93	> 0.9
Relative Fit Index (RFI)	0.93	> 0.9

## 5. DISCUSSION

Based on the results shown in Table 1 it can be seen that out of the 1544 respondents who correctly completed the questionnaire, 44.8% were female and 55.2% male. The majority of subjects graduated from high school (67.9%), while on the other hand there is the smallest number of subjects who graduated from university (3.4%). These data are consistent with the data that 70.0% of production workers and only 5.7% of managers participated in the survey. Slightly more than half of respondents (52.7%) is found in the most productive age group from 30 to 44 years of age, while only 3.1% of the most experienced staff was over 55 years of age. Out of the total number of surveyed employees, 61.0% have been working for less than 5 years in the company where they are currently employed. These results indicate a pronounced fluctuation of the labor force. In addition, this is also a consequence of the investment, i.e. a large number of new companies in Serbia. The largest number of the

participants in this study (43.5%) were employed in companies having 51 - 100 employees, while the smallest number of them (13.2%) was employed in large companies that possess more than 301 employees. The survey was conducted in such a way that the companies in which the survey of the employees was carried out belong to the leading economic sectors in the territory of the Republic of Serbia.

The results of the descriptive statistics presented in Table 2 show that the mean value of the questions worst assessed by the respondents was 2.30, while the mean value of the best assessed item was 4.56. It is obvious that the employees have an expressed negative attitude towards a number of issues belonging to particular groups (Organizational environment - GQ3, Risk judgment - GQ5 and Occupational safety - GQ8). On the other hand, respondents positively assessed the questions from the group Safety awareness and competence - GQ1. The standard deviation in responses ranged from 0.702 to 1.399 and such a high value points to different perceptions of safety among the workers who work or do not work in the production sector, i.e. managers.

Reliability and validity of the measurement scale was determined based on the estimates of the interconsistency of the instrument used to collect data by means of the Cronbach alpha test. Based on the results shown in Table 3 (values of Cronbach alpha coefficients for all 8 groups of questions are higher than the recommended value of 0.7), it can be concluded that there is an internal consistency of all 8 groups of the control model.

In order to apply factor analysis, the testing of the adequacy of sampling was performed using KMO and Bartlett test of sphericity. The value of KMO indicator of the tested sample was 0.822. Bartlett test of sphericity indicates significance ( $\chi^2 = 3639,764$ ,  $p < 0.000$ ), meaning that there are important correlations among the items within the measuring instrument (the majority of the correlation values is around, or above 0.50) (Table 4). Based on these indicators it is evident that the subjected data are suitable for the application of factor analysis.

By applying Exploratory Factor Analysis (Table 5) 8 factors were extracted (a group of questions): Factor 1 - Safety awareness and competence, Factor 2 - Safety communication, Factor 3 - Organizational environment, Factor 4 - Management support, Factor 5 - Risk judgment, factor 6 - Safety precautions, factor 7 - Safety training and factor 8 - Occupational safety. These results indicate the correctness of the formation of the conceptual model.

The results of the structural analysis of the model of occupational safety are shown in Figure 2 and Table 6. Firstly, it is necessary to consider the Root Mean Square Error of Approximation (RMSEA) of the structural model which has a value of 0.086, indicating that, based on this indicator, there is a favorable congruence with the proposed model. Goodness-of-Fit Index (GFI) also shows good correspondence of the model, because the resulting value of this indicator is 0.94. Based on the obtained values of RMSE and GFI indicators, it can be concluded that there is an absolute coincidence with the proposed model. The obtained values of the indicators of the structural model AGFI = 0.92; NFI = 0.91; NNFI = 0.92; CFI = 0.93; IFI = 0.93 and = 0.93 RFI, whose values are deemed acceptable above 0.90, indicate that the models show a solid increase of concurrency. Parsimony of the proposed model is measured based on the relative value of chi-square ( $\chi^2 / \text{d.f.}$ ) which equals 2.14, belonging to the recommended value of 1 to 3, which confirms that the initial data are truly representative. Based on the presented indicators of fitting of the structural model, the model can be characterized as absolutely appropriate. The general conclusion is that all 23 variables can in a reliable and valid way describe the formed 8 groups of variables based on the conceptual model, which is shown in Figure 1.

The structural model with the results of the hypotheses testing is shown in Figure 2. The results indicate that five out of seven hypotheses were confirmed, acceptable and statistically significant (H1, H2, H4, H5 and H6). Within these hypotheses, the regression coefficients ( $\beta$ -path coefficients) have positive values, and t-test values are higher than the recommended value of 1.96. The following results were obtained for the afore mentioned hypotheses: H1 ( $\beta = 0.24$ ;  $t = 2.30$ ;  $p < 0.05$ ); H2 ( $\beta = 0.28$ ;  $t = 2.20$ ;  $p < 0.05$ ); H4 ( $\beta = 0.32$ ;  $t = 2.68$ ;  $p < 0.05$ ); H5 ( $\beta = 0.70$ ;  $t = 7.64$ ;  $p < 0.05$ ); H6 ( $\beta = 0.28$ ;  $t = 2.70$ ;  $p < 0.05$ ). Hypothesis H7 (Safety training has positive impact on occupational safety) was confirmed, but it is neither acceptable, nor statistically significant, because the value of t-test was less than recommended 1.96 ( $\beta = 0.06$ ;  $t = 0.69$ ;  $p < 0.05$ ). The absence of statistical significance with this hypothesis can be explained by the fact that employees consider safety training as very important, but they are not the most appropriate for their jobs. Finally, hypothesis H3 (Organizational environment has a positive effect on occupational safety) was not confirmed, and it is neither acceptable nor statistically significant ( $\beta = -0.08$ ;  $t = -2.97$ ;  $p < 0.05$ ). The explanation to the question why, according to the opinion of respondents, organizational environment does not affect occupational safety, may most likely be found in the fact that there is a high unemployment rate in Serbia. Therefore, workers are forced to do their job even in poor organizational conditions, all for fear of losing their jobs.

The coefficient of determination ( $R^2$ ) indicates that the influences of the latent predictors GQ1, GQ2, GQ3, GQ4, GQ5, GQ6 and GQ7 on the latent endogenous variable GQ8 may be calculated with 55% of the variance.

## 6. CONCLUSION

The analysis of occupational safety factors in manufacturing companies, as an important segment of their strategic development, points to certain conclusions. Occupational safety in manufacturing companies can be described in a reliable way by means of 23 questions (variables), arranged in 8 groups (latent variables), which represents the suggested conceptual model. The study found that all the variables describe the formed groups in a reliable and valid way. The analysis of the structural model found satisfactory coincidence, that is, good fitting of the initial data. By testing the hypothesis based on the conceptual model, the final conclusion is derived at. Safety Awareness and Competence, Safety Communication, Management Support, Risk Judgment and Safety Precautions show positive impact on occupational safety in manufacturing companies. In order to improve the level of safety of workers at workplaces, we need to introduce adequate safety trainings. Finally, in order to ensure a high-level occupational safety, it is necessary to enhance the organizational environment. Hence, work injuries could be reduced to a very minimum, or ideally be completely eliminated, thus creating preconditions for the intermittent strategic development of a company.

## REFERENCES

1. Grabowski, M., Ayyalasomayajula, P., Merrick, J., Harrald, J.R., Roberts, K. (2007). Leading indicators of safety in virtual organizations. *Safety Science*, 45, 1013–1043.

2. Reiman, T., Pietikäinen, E. (2012). Leading indicators of system safety-monitoring and driving the organizational safety potential. *Safety Science*, 50, 1993–2000.
3. Sheehan, C., Donohue, R., Shea, T., Cooper, B., De Cieri, H. (2016). Leading and lagging indicators of occupational health and safety: The moderating role of safety leadership. *Accident Analysis and Prevention*, 92, 130–138.
4. Yorio, P.L., Willmer, D.R., Moore, S.M. (2015). Health and safety management systems through a multilevel and strategic management perspective: Theoretical and empirical considerations. *Safety Science*, 72, 221–228.
5. Fang, D., Wu, H. (2013) Development of a Safety Culture Interaction (SCI) model for construction projects. *Safety Science* 57, 138–149.
6. Biggs, H.C., Biggs, S.E. (2013) Interlocked projects in safety competency and safety effectiveness indicators in the construction sector. *Safety Science* 52, 37–42.
7. Bowen, D.E., Ostroff, C. (2004). Understanding HRM-Firm performance linkages: the role of the ‘strength’ of the HRM system. *Academy of Management Review*, 29(2), 203–221.
8. Hayes, B.E., Perander, J., Smecko, T., Trask, J. (1998). Measuring Perceptions of Workplace Safety: Development and Validation of the Work Safety Scale. *Journal of Safety Research*, 29(3), 145–161.
9. Okun, A.H., Guerin, R.J., Schulte, P.A. (2016). Foundational workplace safety and health competencies for the emerging workforce. *Journal of Safety Research*, 59, 43–51.
10. Kontogianni, St., Moussiopoulos, N. (2017). Investigation of the occupational health and safety conditions in Hellenic solid waste management facilities and assessment of the in-situ hazard level. *Safety Science*, 96, 192–197.
11. Sønderstrup-Andersen, H.H.K., Bach, E. (2017). Managing preventive occupational health and safety activities in Danish enterprises during a period of financial crisis. *Safety Science*, <http://dx.doi.org/10.1016/j.ssci.2017.03.022>
12. Niskanen, T., Louhelainen, K., Hirvonen, M.L. (2016). A systems thinking approach of occupational safety and health applied in the micro-, meso- and macro-levels: A Finnish survey. *Safety Science*, 82, 212–227.
13. Leveson, N.G. (2005). Safety in integrated systems health engineering and management. In: *NASA Ames Integrated System Health Engineering and Management Forum (ISHEM)*, Napa.
14. Lay, A.M., Saunders, R., Lifshen, M., Breslin, F.C., LaMontagne, A.D., Tompa, E., Smith, P.M. (2017). The relationship between occupational health and safety vulnerability and workplace injury. *Safety Science*, 94, 85–93.
15. Kwon, O-J., Kim, Y-S. (2013). An analysis of safeness of work environment in Korean manufacturing: The “safety climate” perspective. *Safety Science*, 53, 233–239.
16. Arezes, P.M., Miguel, A.S. (2008). Risk perception and safety behaviour: A study in an occupational environment. *Safety Science*, 46(6), 900–907.

17. Sorensen, O.H., Hasle, P., Bach, E. (2007). Working in small enterprises – Is there a special risk? *Safety Science*, 45(10), 1044-1059.
18. Cohen, A. (1977). Factors in successful occupational safety programs. *Journal of Safety Research*, 9, 168-178.
19. Simonds, R.H., Shafai-Sahrai, Y. (1977). Factors apparently affecting injury frequency in eleven matched pairs of companies. *Journal of Safety Research*, 9, 120-127.
20. Smith, M.J., Cohen, H.H., Cohen, A. (1978). Characteristics of a successful safety program. *Journal of Safety Research*, 10, 5–15.
21. Geldart, S., Smith, C.A., Shannon, H.S., Lohfeld, L. (2010). Organizational practices and workplace health and safety: A cross-sectional study in manufacturing companies. *Safety Science*, 48(5), 562-569.
22. Amponsah-Tawiah, K., Mensah, J. (2016). Occupational Health and Safety and Organizational Commitment: Evidence from the Ghanaian Mining Industry. *Safety and Health at Work*, 7(3), 225-230.
23. Autenrieth, D.A., Brazile, W.J., Sandfort, D.R., Douphrate, D.I., Román-Muñiz, I.N., Reynolds, S.J. (2016). The associations between occupational health and safety management system programming level and prior injury and illness rates in the U.S. dairy industry. *Safety Science*, 84, 108–116.
24. Steenkamp, R., Van Schoor, A. (2002). *The quest for quality of work life. A TQM approach*. Cape Town (South Africa): Juta.
25. Hsu, S.H., Lee, C.C., Wu, M.C., Takano, K. (2007). Exploring cross-cultural differences in safety climate of oil refinery plants in Japan and Taiwan. *Proceedings of the International Conference on Business and Information*, Tokyo, Japan, 11-13.
26. Yule, S., Flin, R., Murdy, A. (2007). The role of management and safety climate in preventing risk-taking at work. *International Journal of Risk Assessment and Management*, 7(2), 137-151.
27. Ali, H., Abdullah, A.C.N., Subramaniam, C. (2009). Management practice in safety culture and its influence on workplace injury: An industrial study in Malaysia. *Disaster Prevention and Management: An International Journal*, 18(5), 470-477.
28. Tchiehe, D.N., Gauthier, F. (2017). Classification of risk acceptability and risk tolerability factors in occupational health and safety. *Safety Science*, 92, 138–147.
29. Woodruff, J.M. (2005). Consequence and likelihood in risk estimation: a matter of balance in UK health and safety risk assessment practice. *Safety Science*, 43(5–6), 345–353.
30. Sheehan, C., Donohue, R., Shea, T., Cooper, B., De Cieri, H. (2016). Leading and lagging indicators of occupational health and safety: The moderating role of safety leadership. *Accident Analysis and Prevention*, 92, 130–138.
31. Gopang, M.A., Nebhwani, M., Khatri, A., Marri, H.B. (2017). An assessment of occupational health and safety measures and performance of SMEs: An empirical investigation. *Safety Science*, 93, 127–133.

32. Fernández-Muñiz, B., Montes-Peon, J.M., Vazquez-Ordas, C.J. (2009). Relation between occupational safety management and firm performance. *Safety Science*, 47(7), 980–991.
33. Heinrich, H.W. (1931). *Industrial Accidents Prevention: A Scientific Approach*. 1<sup>st</sup> ed. Mc Graw Hill Book Company, Inc. New York.
34. Moore, R. (2007). *Selecting the Right Manufacturing Improvement Tools: What Tool? When?* Burlington, MA USA: Elsevier, Butterworth-Heinemann.
35. Misiurek, K., Misiurek, B. (2017). Methodology of improving occupational safety in the construction industry on the basis of the TWI program. *Safety Science*, 92, 225–231.
36. Milijić, N., Mihajlović, I., Štrbac, N., Živković, Ž. (2013). Developing a Questionnaire for Measuring Safety Climate in the Workplace in Serbia. *International Journal of Occupational Safety and Ergonomics*, 19(4), 631–645.
37. Milijić, N., Mihajlović, I., Nikolić, Dj., Živković, Ž. (2014). Multicriteria analysis of safety climate measurements at workplaces in production industries in Serbia. *International Journal of Industrial Ergonomics*, 44(4), 510-519.
38. Zohar, D. (1980). Safety climate in industrial organizations: theoretical and applied implications. *Journal of Applied Psychology* 60(1), 96 – 102.
39. Lin, S.H., Tang, W.J., Miao, J.Y., Wang, Y.M., Wang, P.X. (2008). Safety climate measurement at workplace in China: A validity and reliability assessment. *Safety Science*, 46, 1037-1046.
40. Zohar, D., Luria, G. (2005). A multilevel model of safety climate: Cross-level relationship between organization and group-level climates. *Journal of Applied Psychology*, 90(4), 616 – 628.
41. Hsu, S.H., Lee, C.C., Wu, M.C., Takano, K. (2008). A cross-cultural study of organizational factors on safety: Japanese vs. Taiwanese oil refinery plants. *Accident Analysis and Prevention* 40, 24–34.
42. Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L. (2006). *Multivariate Data Analysis*, 6th Edition, Pearson Prentice Hall, Upper Saddle River, NJ.
43. McDonald, R. P. (1999). *Test theory: A unified treatment*. Mahwah, NJ: Lawrence Erlbaum.
44. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297–334.
45. Allen, M.J., Yen, W.M. (2002). *Introduction to Measurement Theory*. Long Grove, IL: Waveland Press.
46. Kupermintz, H. (2003). Lee J. Cronbach's contributions to educational psychology. In B.J. Zimmerman and D.H. Schunk (Eds.). *Uducational psychology: A century of contributions*, pp. 289-302. Mahwah, NJ, US: Erlbaum.
47. Nunnally, JM. (1994). *Psychometric Theory*, third ed. McGraw-Hill, New York.

48. Dziuban, C.D., Shirkey, E.C. (1974). When is a correlation matrix appropriate for factor analysis? Some decision rules. *Psychological Bulletin*, 81 (6), 358–361.
49. Kaiser, H.F. (1974). An index of factorial simplicity. *Psychometrika*, 39, 31–36.
50. Cerny, C.A., Kaiser, H.F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate Behavioral Research*, 12 (1), 43-47.
51. Tobias, S., Carlson, J.E. (1969). Brief report: Bartlett's test of sphericity and chance findings in factor analysis. *Multivariate Behavioral Research*, 4 (3), 375–377.
52. Stewart, D.W. (1981). The Application and Misapplication of Factor Analysis in Marketing Research. *Journal of Marketing Research*, 18(1), 51–62.
53. Hogarty, K.Y., Hines, C.V., Kromrey, J.D., Ferron, J.M., Mumford, K.R. (2005). The quality of factor solutions in exploratory factor analysis: the influence of sample size, communality and overdetermination. *Educational Psychological Measurement*, 65(2), 202–226.
54. Bentler, P.M., Bonett, D.G. (1980). Significance Tests and Goodness of Fit in the Analysis of Covariance Structures. *Psychological Bulletin*, 88(3), 588-606.
55. Molina, L.M. (2007). Relationship between quality management practices and knowledge transfer. *Journal of Operations Management*, 25, 682-701.



## **PARTICIPATION RATIONALES IN ENVIRONMENTAL MANAGEMENT**

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**Abstract:** Decision-making situations in environmental management are characteristically complex and cross-disciplinary. Watershed management planning, rural land-use planning, natural resource planning of state forests, and locating water-power plants or mining sites are examples of processes with potentially multiple environmental impacts. Rather than being of purely technical nature, these strategic planning tasks represent societally widely relevant and therefore participatory decision problems. While inclusiveness is one cornerstone of sustainability in green economy, participation is not a monolith but a concept whose operationalization requires deliberate choices from governments and companies that are responsible for environmental management processes. For that purpose, one needs to understand the different rationales that frame participation practices and methodological choices. According to the **normative rationale**, participation has intrinsic value as it makes decision making more democratic. Thus participation is seen as a goal in itself rather than a means to reach a goal, and participation is primarily regarded as a process of empowerment that supports individual and social learning and perceived legitimacy among citizens. According to the **substantive rationale**, in turn, participation is expected to produce better outcomes from an overall societal point of view. This happens via improving the overall understanding of the decision problem through systematic incorporation of multiple perspectives. The **instrumental rationale** assumes that participation can improve relations and the mutual understanding among stakeholders, and thereby facilitates implementation of strategies and programmes, and therefore prevents conflicts. With this view, the planning organization uses participation as a tool or a strategy to reach acceptance for initial plans. The above three participation rationales are not mutually exclusive as they may all motivate the planning organization and inform participation procedures. For informed and constructive participation processes in environmental management, the underlying participation rationale(s) need to be transparently communicated to the stakeholders so that they know from the very beginning where they are participating and what purpose(s) their contribution serves. The plenary lecture will give examples of the different participation rationales from the field of strategic forest planning. The rationales are linked with the theory of rational decision-making, bounded rationality, and communicative rationality as well as utility theoretical, systemic, and deliberative approaches. The final outcome of the contemplation is a multi-level systematization of participation practices that originate from different rationales and science-philosophical premises.

**Keywords:** human science, nature science, multimethodology, realism, relativism

## Conference papers:

### STRATEGIC SUPPLY CHAIN PLANNING

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**Abstract:** The paper analyzes strategic planning of supply chains of contemporary companies. Strategic planning process is viewed in context of its relationship with other planning levels. Typical goals and tasks of strategic supply chain planning are formalized. Key methods of strategic modeling including heuristic, simulation, and mathematical programming are analyzed in terms of their strengths and weaknesses. Author proposes basic classification of models and formalizes structure of a typical supply chain model. Systematic overview of popular mathematical and business software in the research area is provided. It is highlighted that presented in the paper systemized results of analysis of strategic supply chain planning domain were used in developing corresponding methodological principles and strategy for a number of leading international companies.

**Keywords:** Strategic Planning, Supply Chain Optimization

#### 1. INTRODUCTION

Contemporary market leaders continue their global and regional expansion that makes material, information and financial flows in their supply chains more complicated. In order to be competitive they have to have strategic vision of goals and development direction of their supply chains for several years ahead. At the same time in practice it is not rare when the process of strategic supply chain planning is not formalized at such companies. Analysis of supply chain efficiency is done sporadically, takes a lot of time, is not accurate and often is at too high level without consideration of the complex influence of the supply chain infrastructure.

In recent decades specialized methods and technologies [1-3,5] were built for modeling complex supply chains respecting purchasing, production, distribution, financial and other constraints. One of the application areas for these methods and technologies is informational support of strategic supply chain planning process. Since many varying methods and approaches exist in this area there is a need for their systematization.

In the article typical goals and tasks of strategic supply chain planning are formalized, key methods of strategic modeling and also popular mathematical and business software for this are systemized. The author provides his conclusions and recommendations at the end of the article.

## 2. EXPERIMENTAL AND RESULTS

### 2.1 STRATEGIC PLANNING GOALS AND TASKS

In order to better understand goal of strategic planning let's analyze in detail the place of the process and interactions with other levels depicted on the Figure 1.

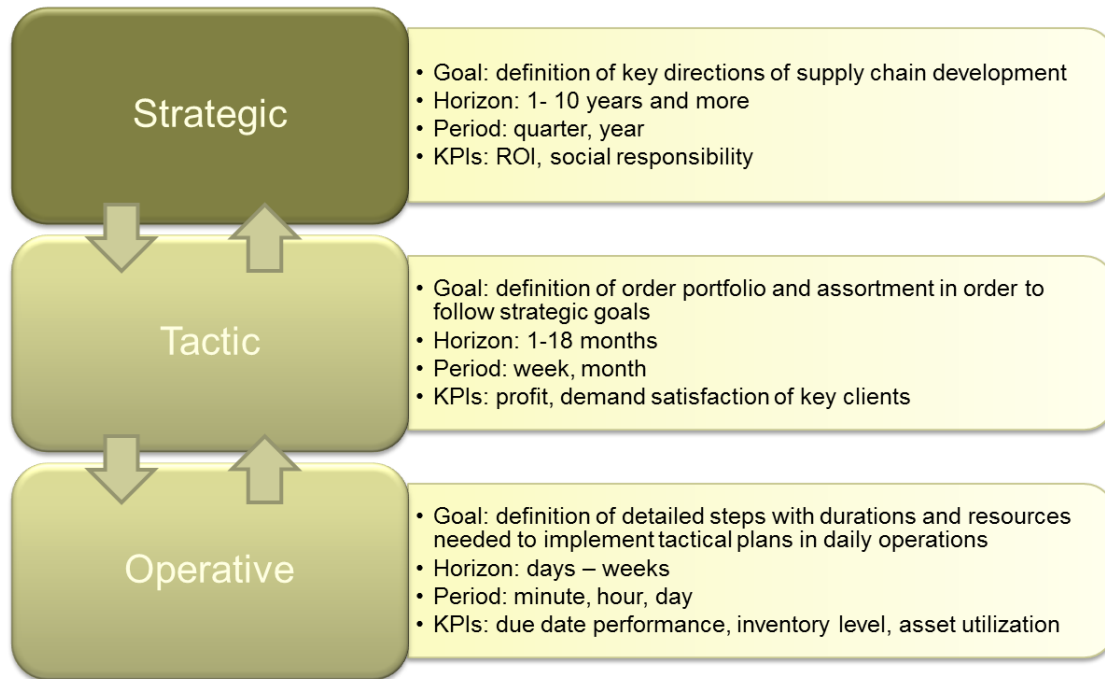


Figure 1. Planning levels

Strategic planning is a tool of top management for defining the most effective directions of business development which support growth and prosperity of a company.

Operative planning is a tool for daily management of supply chain. Companies which work with short order fulfilment cycles update their operative plans almost continuously although daily planning is more typical.

Tactical planning is required for connection of strategic planning and operative planning. It is a connection chain and conductor of company management policy to the detailed levels of planning on the one hand and feedback about real status of supply chain on the other hand.

Let's analyze typical tasks/decisions during strategic planning of supply chain.

Table 1. Typical tasks of strategic supply chain planning

<p><b>Purchasing</b></p> <ul style="list-style-type: none"> <li>• source definition for raw materials and components</li> <li>• inventory level definition for raw material and components</li> <li>• definition of the most appropriate period for improvements</li> </ul>	<p><b>Production</b></p> <ul style="list-style-type: none"> <li>• definition of locations for new production units</li> <li>• identification of unprofitable production units</li> <li>• definition of necessity for new production lines or change in production assortment</li> <li>• strategy development for production outsourcing</li> <li>• definition of the most appropriate period for improvements</li> </ul>
<p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>• localization of new regional warehouses and distribution centers</li> <li>• efficiency evaluation of current warehouse chain</li> <li>• distribution of service zones among warehouses/distribution centers of the company</li> <li>• strategy definition for warehouse network after merge or acquisition;</li> <li>• inventory level definition in supply chain</li> <li>• definition of the most appropriate period for improvements</li> </ul>	<p><b>Transportation</b></p> <ul style="list-style-type: none"> <li>• transportation mode definition for sales and purchasing regions</li> <li>• ratio definition of own and rented transport</li> <li>• evaluation of the necessity for unification of the transport</li> <li>• definition of the most appropriate period for improvements</li> </ul>
<p><b>Finance</b></p> <ul style="list-style-type: none"> <li>• evaluation of investment program (optimization of investment project portfolio)</li> <li>• source definition for finance resources and options for allocations of finance resources</li> <li>• transfer pricing</li> <li>• definition of the most appropriate period for improvements</li> </ul>	<p><b>Sales</b></p> <ul style="list-style-type: none"> <li>• product mix definition for sales regions;</li> <li>• price policy evaluation</li> <li>• priority evaluation for sales</li> <li>• definition of the most appropriate period for improvements</li> </ul>

Quite often these tasks are competitive. In the scope of strategic planning it is required to find the most effective strategy of supply chain development taking into account capabilities and constraints of external and internal environments.

## 2.2 KEY METHODS FOR STRATEGIC PLANNING

As any planning, strategic planning starts from modeling. One of the definitions of model is as follows. Model is a system which serves as a means for obtaining information about other system; it is simplified view of the real device and/or its processes and appearances.

Thus supply chain model is simplified view of a real supply chain which consists of:

- supply chain objects, including production, warehouses, markets, external suppliers;
- links, which connect the objects;
- transformational/transferring processes and resources (production, transportation, etc.);
- product and financial flows;
- parameters and constraints of the model.

Modeling process consists of the following key steps: supply chain model creation, model optimization and interpretation of the results (see Figure 2).

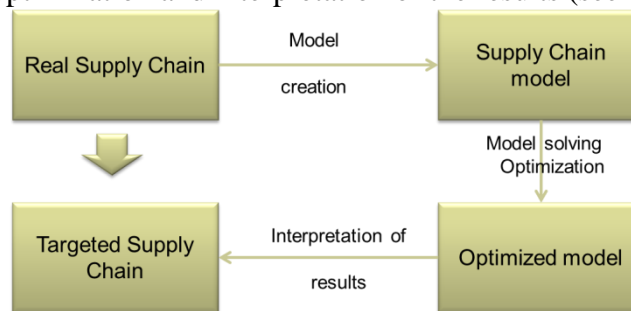


Figure 2. Modeling process

Model optimization is finding the best solution taking into account existing constraints and applying optimization objectives: net profit optimization, revenue optimization and so on. The appropriate algorithm of optimization/balancing is chosen based on the type of the model.

Let us analyze in detail typical types of models. The base classification of models is represented on the Figure 3.

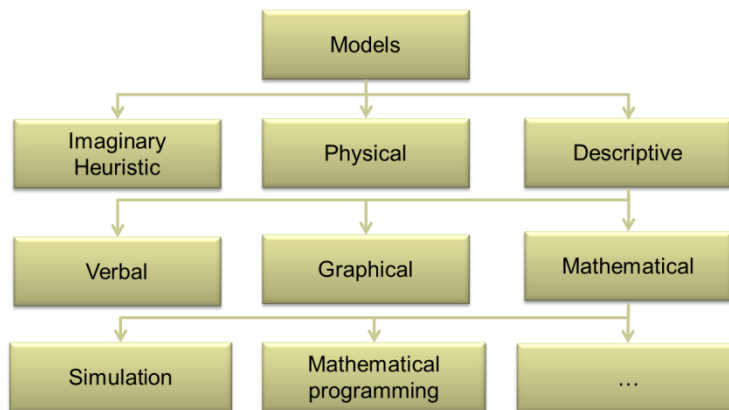


Figure 3. Basic classification of models

### 2.2.1 Heuristic models

The most widespread models are imaginary or heuristic models. They always precede all other types of models. Heuristic methods are logical approaches and methodical rules of scientific research and innovation creativity which could achieve the target in case of incomplete initial information and absence of clear program for solution process management [6].

In case of complex supply chains, the complexity of material flows leads to the fact that quite often the problem is too simplified and it causes unrealistic and low qualitative strategic plan. That is why the imaginary models are usually formalized in descriptive or physical models. The most perspective descriptive models regarding obtaining optimal results are mathematical models. Today the most widespread types of mathematical models in the area of strategic planning are simulation and mathematical programming ones [1,2,5].

### 2.2.2 Simulation

Today one of the most widespread methods for research of complex economic systems is simulation [5,7]. Simulation model is a description of the surveyed system using adequate algorithms of system functioning under influence of external and internal disturbances. There are three main simulation methods: system dynamics, discrete event modeling, and agent based modeling.

Simulation modeling usually is used when dependencies among elements of the modeled systems so complicated and undefined that it is not possible to formalize them in analytical models. Thus, simulation is used by researchers when analytical models could not be built or they are not acceptable (because of the complexity) [7].

The dynamic processes of the original system are simulated by an algorithm in abstract model using the same ratio for duration, logical and time sequences as in original system. The simulation has a lot of advantages in solving many problems but it is worth mentioning its disadvantages [7]:

- absence of well-structured principles of building simulation models which requires special development for every particular case of model building;
- methodological difficulties of finding optimal solutions;
- high requirements on hardware for simulation;
- difficulties of analysis and understanding of the results achieved during simulation;
- high time and effort consumption especially in search of optimal trajectory of the surveyed system.

### 2.2.3 Mathematical programming

Mathematical programming has been for many years successfully used in industrial production, agriculture, logistics, healthcare system [1,2,8,9].

The methods of linear and mixed integer programming are the most popular tools for modeling of economical systems.

Mathematical model of any linear or mixed integer programming problem includes: objective function, which optimal value (minimum or maximum) is required to find; constraints in the form of system of linear equations or inequalities; requirements on variables for non-negativity.

Key features of these methods: determinism; dynamism; optimality.

These methods are the most popular in practice of the organization of regular strategic planning process.

## 2.3 MATHEMATICAL PROGRAM TOOLS

Today, there are a large number of research tools, professional development tools and business applications for the optimal modeling of supply chains of companies [1,3,4].

The examples of popular platforms for the development of mathematical models of supply chains are shown in Table 2.

Table 2. Popular program platforms for developing mathematical models

<b>Simulation</b>	<b>Mathematical programming</b>
AnyLogic	IBM ILOG Optimization Suite
Arena	C++ Constraint Programming
Matlab Simulink	Matlab Optimization Toolbox

Using the abovementioned tools suggests a choice in favor of development of own solutions for strategic supply chain modeling. Development of own solution requires attracting and retaining a team of specialists with a high scientific and technical expertise. Quite often during development of own solutions created model is highly specialized and its adaptation to changes, its scaling are time-consuming.

Today, the most popular solutions on the market are specialized business applications which are based on the methods of mathematical programming [1]. Table 3 shows the results of a survey of popular business applications for strategic supply chain planning.

Table 3. Popular business applications for strategic supply chain modeling

Vendor	Product
AspenTech	Distribution Plan Optimizer
JDA Software	Supply Chain Strategist
Infor	Network Design
Llamasoft	Supply Chain Guru
OMP	Supply Chain Network Design
Oracle	Strategic Network Optimization
Quintiq	Supply Chain Designer
River Logic	Enterprise Optimizer

These applications are specialized. They were originally created for supply chain optimization and they are best for regular process of strategic planning at company. They don't require deep mathematical modeling knowledge from personnel of a company where the solution is implemented. The main part of work in the area of creating and setting up the solution is done by specialists then the users use more simple for understanding databases in order to update the model and to scale it. These solutions usually have powerful visualization capabilities for planning result analysis and scenario comparison. Implementation of specialized business applications can drastically improve and simultaneously simplify the process of strategic planning [1,2].

In conclusion, let us consider the comparative analysis of the traditional practice of strategic planning without using specialized program tool and strategic planning based on the methods of mathematical modeling (see. Table 4).

Table 4. Comparative analysis of modelling approaches

Traditional practice of strategic planning without using specialized program tool	Strategic planning based on methods of mathematical modeling
<p><b>Suboptimal solutions</b></p> <ul style="list-style-type: none"> <li>- Unrealistic plans because the model doesn't take into account all key constraints</li> <li>- Absence of optimization through the whole supply chain</li> </ul>	<p><b>Guaranteed optimal solutions</b></p> <ul style="list-style-type: none"> <li>- Optimization of objective parameter(s) of supply chain taking into account constraints and business rules</li> </ul>
<p><b>Static planning process</b></p> <ul style="list-style-type: none"> <li>- Lost up to 80% of time in scenario analysis</li> <li>- Not formalized process</li> <li>- Absence of monitoring of supply chain development</li> <li>- Absence of scalability</li> </ul>	<p><b>Dynamic planning process</b></p> <ul style="list-style-type: none"> <li>- Plan analysis in several minutes, complex scenario analysis</li> <li>- Regular and formalized process of strategic supply chain monitoring</li> <li>- Powerful reporting capabilities</li> <li>- Scalability without need to rewrite the model</li> </ul>

### 3. CONCLUSIONS AND DISCUSSION

Presented in the paper systemized results of analysis of strategic supply chain planning domain were used in developing corresponding methodological principles and strategy for a number of leading international companies including SABMiller, SUEK, Baltika, Russian Post, and others.

Based on this practical experience it could be concluded that implementation of mathematical program tools for supply chain modeling systemizes and greatly increases the effectiveness of the strategic planning process at a company.

In most cases, the typical problems of strategic planning could be solved using one of the described business applications. In the case of non-standard unique problems it is recommended to research and create own specialized program tool based on one of the many development platforms.

In conclusion, it should be emphasized that the development of a strategic model of the supply chain is largely an art, so the success of its implementation largely depends on the creativity and experience of the team, rather than the applied modeling tool.

### REFERENCES

1. Stadtler H. Supply Chain Management and Advanced Planning. Third Edition. Springer, Berlin. 2004
2. Shapiro J. Modeling the Supply Chain. 2<sup>nd</sup> Edition. Cengage Learning, US. 2006.
3. Buecker A. Optimization and Decision Support Design Guide Using IBM ILOG Optimization Decision Manager. IBM, US. 2010.



4. Venkataraman P. Applied Optimization with MATLAB Programming. 2nd Edition. Wiley, US. 2009.
5. Karpov U. Simulation modeling of systems. Introduction in modeling with AnyLogic 5. BHV-Peterburg, Saint Petersburg. 2006 (in Russian).
6. Mikhelkevich V., Radomsky V. Basics of scientific and technical creativity. Fenix, Rostov on Don (in Russian). 2004.
7. Shimko P. Optimal management of economic systems. Business-press, SP. 2004 (in Russian).
8. Taha H. Operations Research: An Introduction. 9th issue. Prentice Hall, India. 2013.
9. Kambo N.S. Mathematical programming techniques. Affiliated East-West Press. 1984.

## **EXPLORING THE INFLUENCE OF ONLINE SOCIAL NETWORKS ON PURCHASE INTENTION**

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**Abstract:** Use of the online social networks (OSN) in persons' life has expanded hugely in recent years and has had a deep effect on the buying behavior for many consumers. Purchase intention is the possibility and willingness of consumer to buy a particular good or service in future. This study investigates the impact of online social networks' use on purchase intention. Using a multiple mediation model, this research explored also the mediational role of perceived trust in the OSN' use – purchase intention relationship.

Total 350 Algerian users out of 300 completed the questionnaire that contained three sections. Section I contained 6 direct questions for data collection regarding user behavior in OSN. Section II contained 19 different statements related to ONS use, perceived trust and purchase intention. Section III contained 5 questions about demographics of the participants. The data was analyzed using structural equation modeling (SEM). SEM technique is used for concurrent assessment of both reliability and validity. As the conceptual model is relatively complex, a partial least squares (PLS) approach was employed using the Smart PLS software. The results of this research highlight that the OSN is an important tool for information search stage, which influence the level and direction of purchase intention. The study found also that there is no mediation role of perceived trust in the OSN' use – purchase intention relationship. The findings offer insight into consumers' behavior in brand communities and into the prospects of social media being a viable sales and communication channel to companies.

**Keywords:** Online Social Networks, Purchase intention, Perceived Trust, SEM technique, Mediation effect

### **1. INTRODUCTION**

In recent years, a new phenomenon has appeared in Algeria and throughout the world. This is the growing popularity of social networks on the web that have pushed the marketing traditional models established for more than a century. Marketing literature shows that with the development of web technologies and the great success of web platforms such as Facebook, Twitter or YouTube, a new form of strategies evolved over the last few years. The emergence of the social web enabled to use Web 2.0 to facilitate the social activities that gave rise to a new concept "social E-commerce". Internet users can indeed influence adoption of political ideas, and even of behavior, as well as to contribute to making fruitful or to annihilate the marketing efforts [1]. This exchange Person-to-person information has an impact on consumers' decision-making. It is in this sense that the study of the influence of digital social networks on consumer behavior has become an important research area for academics and professionals [2].

Marketers of consumer goods and services have an understandably strong interest to predict the purchase behavior of customers. In turn, these predictions contribute to market forecasts and related generalizations for both existing and new products. In its simplest form, predicting purchases rests on the stage preceding actual purchase, and is referred to as “intention to purchase”. According to various theories of buyer behavior, purchase intention helps predict subsequent purchase. [3]

In this study, we propose to examine the impact of the online social networks on the consumer behavior especially the intention to buy a product or service. We propose also the application of a Sobel test to examine the mediation effect of trust between the relationship (OSN’ use and Purchase intention).

The study is based on a sample of 350 Algerian users of Social platforms. The research uses structural equation modeling (SEM) to analyze and confirm the conceptual model proposed in the research. SEM technique is also used for concurrent assessment of both reliability and validity [4]. Then a partial least squares (PLS) approach was employed using the Smart PLS software.

## **2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT**

### **2.1. PURCHASE INTENTION**

The intention-purchase relationship has attracted a number of empirical studies highlighting significant inconsistencies between purchase intention and purchase behavior. Nonetheless, most studies do report a significant and positive relationship between intention and behavior, though with varying strengths of association. [3]

Yoo et al. point out that purchase intention means consumer tendency to purchase a product. It is crucial to recognize customers’ purchase intentions, because of a customer’s behavior can usually be predicted by his or her intention. Wu et al. also propose that purchase intention is a conjunction of consumers’ concentration on buying a product and the likelihood of buying. [5]. Also, consumer with intentions to buy certain product will exhibit higher actual buying rates than those customers who demonstrate that they have no intention of buying. [6]

### **2.2. ONLINE SOCIAL NETWORK**

According to the researchers Yang et al., the term ‘Social Network’ existed far before the internet came into picture. However, it got popular due to the advent of software programs that resulted in launching of the very popular social networking websites such as Facebook, MySpace and LinkedIn. [7]

Regarding to the Oxford Online Dictionary, social networks are all the social network interaction as well as the personal relationships of the individual. Traditional social network study can date back about half a century, focusing on interpersonal interactions in small groups due to the difficulty in obtaining large data sets [8].

There rather exist numerous similar terms such as social networking service, social networking site, or social network site [9]. Table 1 provides some selected terms and corresponding definitions.

Table 1. Selected terms and definitions with respect to online social networks [9]

Term	Author	Definition
Online social network	Schneider et al.	“OSNs form online communities among people with common interests, activities, backgrounds, and/or friendships. Most OSNs are Web-based and allow users to upload profiles (text, images, and videos) and interact with others in numerous ways”
Social networking service	Adamic and Adar	“Social networking services gather information on users’ social contacts, construct a large interconnected social network, and reveal to users how they are connected to others in the network”
Social network site	Boyd and Ellison	“We define social network sites as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system”

Social networking sites are tools that provide people with the ability to collaborate and communicate with one another online. They facilitate the creation and sharing of knowledge, information, media, ideas, opinions and insights, and allow people to actively participate in the media itself. There are lots of OSN sites, each present something different or same to its members. There are many classifications for distinguishing the online social communities. The main criteria for classification are taken from human interaction with each other in an offline environment. [2]

### 2.3. IMPACT OF ONLINE SOCIAL NETWORKS ON PURCHASE INTENTION

In OSNs, consumers could be influenced by comments or opinions posted before they make a purchase decision. User clicking the “like” button, replying or sharing posts could imply that they have read information from the post and supported the contents about the products or services. Thus, consumer's intention is critical to predict usage behavior. [10]

Purchase intentions in social commerce contexts refer to the customers' intentions to engage in online purchases from e-vendors on OSNs. Intentions are the determinants of behavior and defined as “the strength of one's intentions to perform a specific behavior”. [11] Accordingly, the increase in customers' knowledge toward a product facilitates the decision making process and enhances purchase intentions. Given the context of social commerce, user-generated contents, such as reviews, offer diagnostic value for consumers in their purchase decision processes and increases sales for e-vendors. Information seeking could enhance the individuals' knowledge about the product and e-vendors as well as their skills in using the features of the platform. The intention to purchase can be classified as one of the components of consumer’s cognitive behavior on how an individual intends to buy a specific product or service. Zhou suggests that variables such as customers' trust in buying a particular brand can be used to measure the intention to purchase of consumer. The trust factor can

include the customer's interest as part of the overall decision-making process in determining the intention of buyers. [12]

## 2.4. PERCEIVED TRUST

Trust or perceived trust in information source has been the subject of several behavioral research ([11]; [13]; [14]; [15]). Trust and search for information are in fact closely linked. For Baier trust is the belief that others will, so far as they can, look after our interests, that they will not take advantage or harm us. Therefore, trust involves personal vulnerability caused by uncertainty about the future behavior of others, we cannot be sure, but we believe that they will be benign and act consequently in a way which may possible put us at risk [13]. Frisou points out that in consumer behavior theory the customer develops purchasing strategies to dispel the anxiety that uncertainty gives rise to [14]. In online contexts, trust is based on beliefs in the trustworthiness of an exchange party and the characteristics of competence, integrity, and benevolence [16]. Given the context of social commerce, uncertainty is usually higher due to the high level of user-generated contents and the lack of face-to-face interactions [15]. Park and Kim examine the direct effect of trust on purchase intentions and word-of-mouth intentions on social commerce platforms. Seven social commerce characteristics are identified as the key antecedents of trust: reputation, size, information quality, transaction safety, communication, economic feasibility, and word-of-mouth referrals. [17]

Based on the literature review, it can be concluded that the hypotheses presented in the conceptual model (figure 1) are as follows:

**H<sub>1</sub>**. OSN' use has a positive and significant effect on purchase intention.

**H<sub>2</sub>**. Perceived trust acts as mediator between OSN' use and purchase intention.

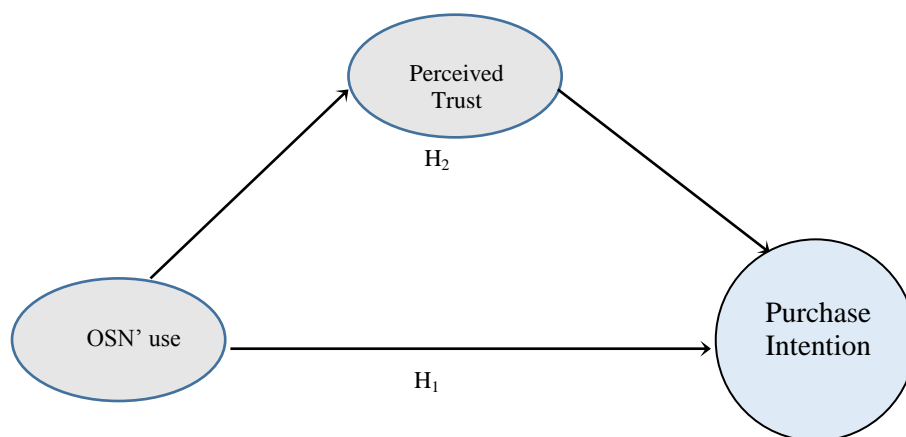


Figure 1. Conceptual Model

### **3. METHODOLOGY**

#### **3.1. MEASUREMENT INSTRUMENT**

Questionnaires are developed to evaluate the relationships among different kinds of OSN-use, perceived trust, and purchase intention. We use multi-item scales to test the constructs in our model according to collected data. Each construct is designed by adapting and modifying existing scales to accommodate the research construct. The questionnaire that contained three sections. Section I contained 2 direct questions for data collection regarding user behavior in OSN. Section II contained 19 different statements related to ONS use (adapted from the study of Abdennadher [18]), perceived trust (adapted from the study of Notebeart et al. [19]) and purchase intention which was adapted from the study of Sweeney and Swait [20]. Section III contained 5 questions about demographics of the participants.

The questionnaire was an instrument with a 5-point Likert scale. By elimination of some items and that for accurate the questionnaire with the study scope, the final set of 13 items was examined by an academic experienced in questionnaire design. After, it was subsequently piloted with 20 persons among OSN users to ensure that the questions and response formats were clear. Minor modifications were made based on feedback from the pilot study.

#### **3.2. SAMPLE AND DATA COLLECTION**

Testing the suggested research hypotheses was accomplished through a convenience sample survey from different states in Algeria. The respondents filled up the questionnaire within the months of March–April, 2016. Total of 350 questionnaires were received out of which 300 were found to be completely and accurately filled, the rest 50 were discarded due to incomplete information. Respondents were the OSN users. The detailed sample characteristics are shown in Table 2.

Table 2. Sample profile

		Frequency	Percent
Gender	Male	116	38.7
	Female	184	61.3
Age	Less than 18	9	3
	18-25	177	59
	25-40	102	34
	40-55	10	3.3
	55-65	2	0.7
	More than 65 years	0	0
Income	Less than 15000 DA	55	18.3
	15000-25000	35	11.7
	25000-40000	37	12.3
	More than 40000 DA	52	17.3
	Without income	121	40.3
Functions	Student	177	59
	Employee	112	37.3
	Merchant	5	1.7
	Pensioner	1	0.3
	Others	5	1.7
Education	Primary education	1	0.3
	Middle education	25	8.3
	High education	274	91.3

#### 4. DATA ANALYSIS AND FINDINGS

After the analysis of the data with Sphinx V5, the result of our research has shown that all the sample (100%) know and use online social networks.

From the analysis of the data presented in figure 2 we can conclude that Facebook.com is used by (46%) of the respondents, followed by You tube with 22.7%, on the third place we have Twitter with 15.8 % of the responses. The less used online social networks by respondents are Linked In with 7.6%.

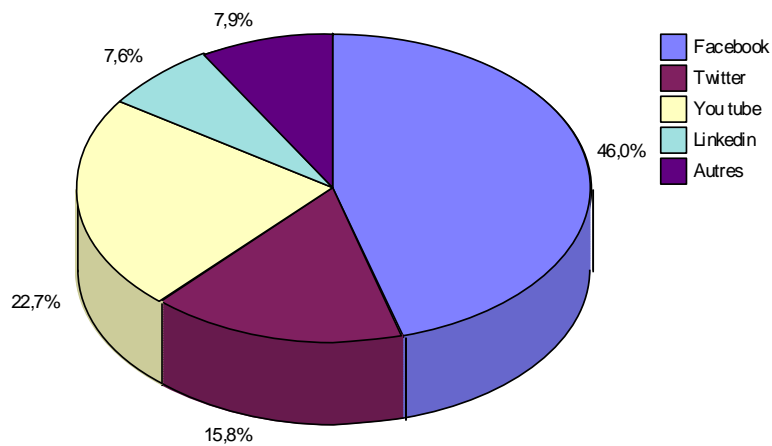


Figure 2. Online social networks' usage

In the following question, respondents were asked how much time they spend on social media platforms. The reason is to examine whether the time of exposure to information via online social networks.

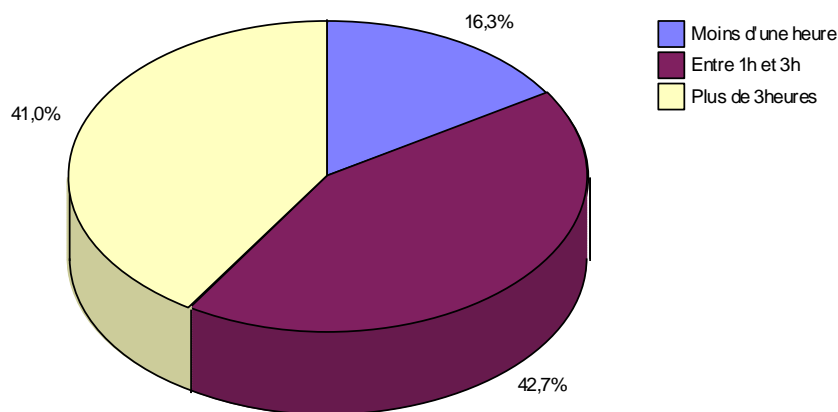


Figure 3. Time Spent



As it is seen in figure 3, there is a sudden drop in between 1-3 hours (42.7%) and more than 3 hours (41%) usage in social networks sites per day while few respondents (16.3%) spend less than 1 hour.

The study used also a structural equation modeling (SEM) to test the conceptual model. SEM is a second generation multivariate data analysis method that is often used in marketing research because it can test theoretically supported linear and additive causal models [21]. It is also useful for concurrent assessment of both reliability and validity [4]. Then a partial least squares (PLS) approach was employed using the Smart PLS software.

#### 4.1. SCALE VALIDITY AND RELIABILITY

To evaluate the construct validity of each latent construct, a confirmatory factor analysis (CFA) was conducted by investigating the convergent validity and discriminant validity. Convergent validity is tested by examining the factor loadings and the average variance extracted (AVE) which should be greater than 0.50 for both [22]. Discriminant validity has been assessed using the square root of AVE which should exceed the construct correlations with all other constructs. The constructs' internal consistency can be measured for all scales through Cronbach's  $\alpha$  as well as a measure of composite reliability (CR) and should exceed the recommended threshold criterion of 0.70 for both [21].

The data presented in Table 3 and Figure 2 show that all items had significant loadings onto the respective latent constructs with values varying between 0.751 and 0.873 and the AVE for all exceeded the recommended level of 0.50 [23]. CR and Cronbach's  $\alpha$  of all the latent variables are greater than the acceptable limit of 0.60.

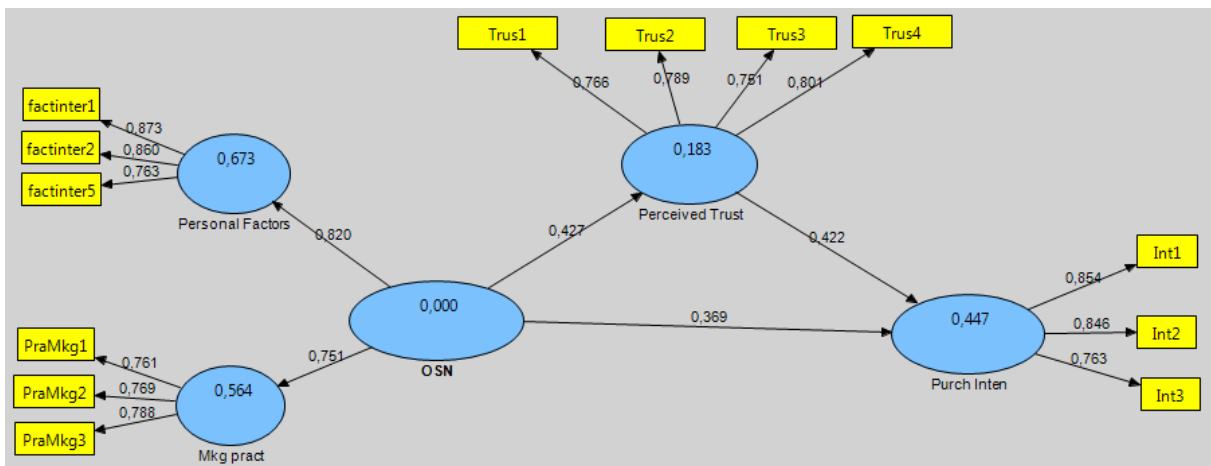


Figure 3. Structural and measure Model with application of PLS algorithm

Table 3. Measurement model summary

	AVE	Composite Reliability	R Square	Cronbachs Alpha	Communality
Marketing Efforts	0,5972	0,8164	0,5644	0,6629	0,5972
OSN	0,6020	0,8000	0,0000	0,6991	0,4020
Perceived Trust	0,6040	0,8591	0,1827	0,7816	0,6040
Personal Factors	0,6950	0,8720	0,6731	0,7784	0,6950
Purchase Intention	0,6760	0,8620	0,4471	0,7605	0,6760

Table 4 illustrates the values of the square root of the AVE are all greater than the inter-construct correlations. Thus, the measurement model reflects good construct validity and reliability.

Table 4. Measurement model summary

Constructs	Mkg pract	Perceived Trust	Personal Factors	Purch Inten
Mkg pract	<b>0.7728</b>			
Perceived Trust	0.3798	<b>0.7771</b>		
Personal Factors	0.2390	0.2987	<b>0.8336</b>	
Purchase Intention	0.4646	0.5793	0.4045	<b>0.8221</b>

Note: a Diagonal elements are squared AVE; off-diagonal elements are the correlation between constructs.

## 4.2. STRUCTURAL MODEL ANALYSIS

### 4.2.1. Model assessment

SEM is a comprehensive statistical technique for examining relations between observed and latent variables. To evaluate the model within Smart PLS software, we must used the goodness of fit (GoF) index which is calculated by the geometric mean of the average communality and the average  $R^2$  (for endogenous constructs) [24]. The  $R^2$  is the coefficient of determination, it refers to the exploratory power of the predictor variable(s) on the respective construct.

In the present study, the calculated value of communality =0.59 and  $R^2=0.37$ . For the model, a GoF value is 0.47, which indicates that a good global model fit with the data collected.

### 4.2.1. Hypotheses testing

Bootstrapping with 2000 resample was done to derive t-values for significance testing of the structural path [21]. Standardized path coefficients ( $\beta$ ), t-statistics, and associated significance levels for all relationships in the study model are presented in Figure 3. Using a

two-tailed t-test with a significance level of 1%, the path coefficient will be significant if the t-value is larger than 1.96 [21]. The results indicated that OSN' use ( $\beta=0.369$ ;  $p<0.01$ ) has a positive and significant effect on purchase intention. Therefore,  $H_1$  was supported. Moreover, the study found that the OSN' use directly influences Intention purchase ( $\beta=0.369$ ,  $p < 0.01$ ) and Perceived trust ( $\beta=0.427$ ,  $p < 0.01$ ), and Perceived trust directly influences Intention purchase ( $\beta= 0.422$ ,  $p < 0.01$ ). The indirect effect is statistically significant (Sobel test = 3.342,  $p < .001$ ) (see Figure 5), indicating that Perceived trust exerts a mediating effect, thus supporting  $H_2$ .

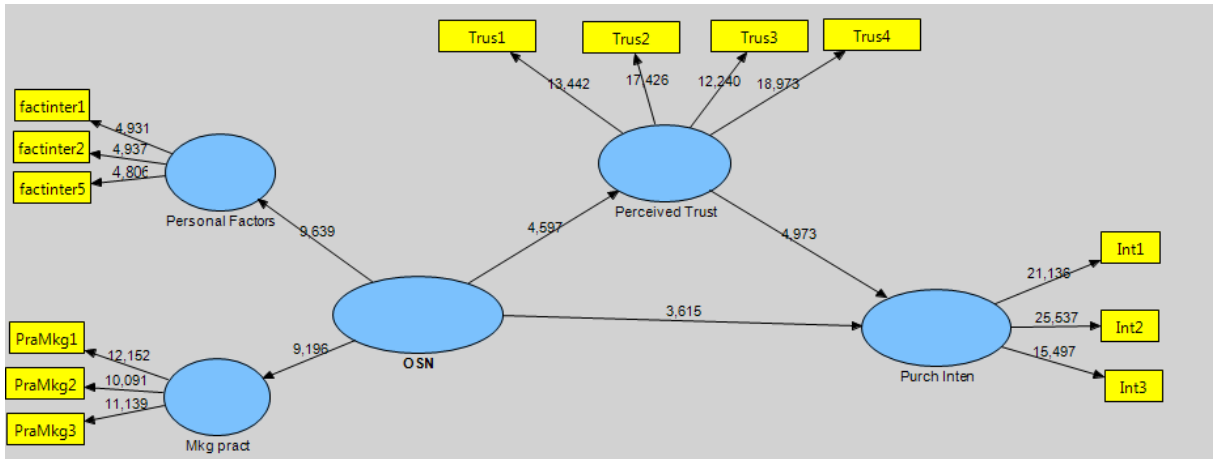


Figure 4. Impact of OSN' use on purchase intention (Application of PLS algorithm)

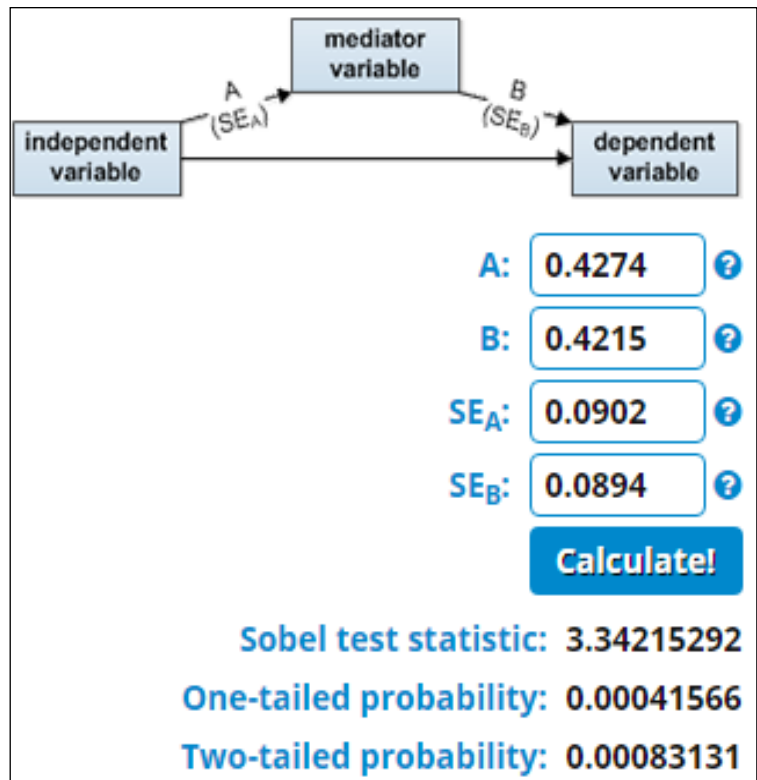


Figure 5. Sobel Test [25]

## 5. DISCUSSION AND MANAGERIAL IMPLICATIONS

The purpose of the study was to examine the impact of comments and marketing efforts on the online social platforms. The present study examined also the trust in this comments and posts and explain the mentioned relationships. SEM technique was then applied to test the model with a 2000 subsamples bootstrapping procedure using the Smart PLS software.

The results indicate that there is an effect of using the social platforms on users purchase intentions. This effect is mediating by trust as it perceived by users.

This research provides valuable insights for online social networks usage by indicating social media is an important determinant of purchase intention among others marketing tools.

The findings of this study suggest that creating a positive word of mouth in social platforms may be a significant consideration for firms to increase consumers' purchase intentions for the products or services. As a result, this study suggests that retailers develop effective marketing strategies emphasizing the positive issues in the product to satisfy the values of potential consumers. In addition, this research shows the significant mediating role of perceived trust on the relationship between OSN' use and purchase intention and hence. Trust is the key construct that explains customer intention to buy, when using comments in OSN. Social commerce and online social platforms designers are able to increase customers' trust by enhancing the characteristic of the platforms, including: reputation, size, information quality, transaction safety, communications, economic feasibility, and word-of mouth-referrals [11].

**There are several boundaries of current study that should to address in near future. The data were collected only among small sample size and with convenience method therefore these findings cannot be generalized to the entire Algerian OSN' users. Also, this research has been conducted in limited region (some states in Algeria).**

## REFERENCES

1. M. Teixeira, L'émergence De Réseaux Sociaux Sur Le Web Comme Nouveaux Outils De Marketing, (The Emergence Of Online Social Networks As New Marketing Tools), Phd. Thesis, Ottawa University, Canada, 2009.
2. A. Graa, Abdelhak S. and Baraka H., "The impact of Online Social Network' usage on the purchase decision process: Quantitative and Qualitative study", Proceedings IISES, 2nd Business and Management Conference, Madrid, Spain, October 6-9, 2015, pp. 57-65.
3. E. Tirtiroglu and M. Elbeck, Qualifying purchase intentions using queueing theory, Journal of applied Quantitative methods; 3 (2008) 2, pp. 167-178.
4. W.W. Chin, The partial least squares approach to structural equation modelling, In: Marcoulides, G.A. (Ed.), Modern Business Research Methods. Lawrence Erlbaum Associates, Mahwah, NJ, 1998, 295–336.

5. C-L. Hsu, , Chen, M-C., Kikuchi, K., Ippei, M., Elucidating the determinants of purchase intention toward social shopping sites: A comparative study of Taiwan and Japan, *Telematics and Informatics* (2016),  
doi: <http://dx.doi.org/10.1016/j.tele.2016.04.016>
6. M. Brown, Buying or browsing? An exploration of shopping orientations and online purchase intention, *European Journal of Marketing*, 37(2003) (11/12), pp. 1666-1684.
7. B. Ghania; Mirza A. A., Mirza N. S., Role of Social Media and Social Networks in Consumer Decision Making: A Case of the Garment Sector, *International Journal of multidisciplinary sciences and engineering*, 5(2014), pp. 1-9.
8. S. Wasserman and Faust K. - *Social network analysis: methods and applications*. Cambridge, Cambridge University Press, 1994, 825 p.
9. J. Heidemann, ; Klier, M. and Probst, F. , «Online social networks: A survey of a global phenomenon». *Computer Networks*. 56 (2012). pp. 3866–3878.
10. A. Zolait, The nature and components of perceived behavioural control as an element of theory of planned behaviour, *Behaviour & Information Technology*, 2014.
11. N. Hajlia, J. Simsb , A. H. Zadehc, M.-O. Richardd, «A social commerce investigation of the role of trust in a social networking site on purchase intentions», *Journal of Business Research*, 71 (2017), pp. 133–141.
12. I.S. Imhmed.Mohmed, N. Binti Azizan, M. Zalisham Jali, «The Impact of Trust and Past Experience on Intention to Purchase in E-Commerce», *International Journal of Engineering Research and Development*, 7, 10 (July 2013), pp. 28-35
13. A. Baier, «Trust and Antitrust», *Ethics*, 96 (1986), pp. 231-60.
14. P.E. Pichon, Perception et réduction du risque lors de l'achat de produits alimentaires en grande distribution : Facteurs d'influence et rôle de la confiance, (Perception and reduction of risk when purchasing food products in mass retail: Influence factors and the role of trust), Phd. Thesis, Toulouse University, France, 2006.
15. N. Hajli, LIN, X., FEATHERMAN, M.S., WANG, Y. Social word of mouth: how trust develops in the market. *International journal of market research*, 56 (2014) 5, pp.673–689.
16. R. Connolly, « The Influence of Technical Skill on Consumer Trust in On-Line Shopping in Ireland » *International Journal of Business and Information*, Volume 2, Number 1, June 2007, pp. 102–118.
17. C. Park, and Y. Kim,. A framework of dynamic CRM: Linking marketing with information strategy. *Business Process Management Journal*, 9(2003) 5, PP. 652-671.
18. J. Abdennadher, «L'influence Du Bouche A Oreille Electronique (E-WOM) Sur Le Comportement Du Consommateur »(Impacy of electronique word of mouth (E-WOM) on consumer behavior) , Phd. thesis, Strasbourg university, 2014.

19. J. F. Notebeart et al., Quelles Stratégies Pour Le Musées Sur Internet ? Entre Click And Mortar Et Mortar And Click, *Revue management et avenir*, 2011, 44(4),147-164.
20. J.C. Sweeney and Swait J., The Effects Of Brand Credibility On Customer Loyalty , *journal of retailing and consumer services*, 15 (2008)3, pp. 179-193.
21. K.K. Wong, Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS, *Marketing Bulletin* 24 (2013), pp. 1-32.
22. C. P. Lin and C. G. Ding, Evaluating group difference in gender during the formation of relationship quality and loyalty in ISP service, *Journal of organizational and end user computing*, 18 (2006) 2, 38-62.
23. R. Bagozzi and Y. Yi, On the Evaluation of Structural Equation Models, *Journal of the Academy of Marketing Science*, 16 (1988)1, pp. 74-94.
24. J. Henseler and M. Sarstedt, Goodness-of-fit indices for partial least squares path modeling» *Computational Statistics*, 28 (2013) 2, 565-580.
25. Sobel Test, available on:  
<http://www.danielsoper.com/statcalc/calculator.aspx?id=31> Accessed 12/04/2017

## **ERGONOMIC MULTIVARIATE MODELLING OF LIBYAN DRIVERS ACCOMODATION IN PASSENGER CARS**

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**Abstract:** Ergonomic adaptation results in better users` accommodation and their better performances when executing certain tasks. Driving can cause large number of musculoskeletal disorders while almost all drivers feel repetitive driving injuries. Knowing the fact that the road traffic accidents are the number one killer in Libya, this survey is conducted on the sample consisted of 300 Libyan passenger car drivers, as one of the first in the field. Eight basic anthropometric dimensions, plus weight, were collected for each participant, namely standing height, sitting height, lower leg length, upper leg length, shoulder width, hip breadth, arm length, eye sitting height and foot length. Since the variation on anthropometric characteristics is explained with large number of variables, multivariate modeling techniques such as factor analysis could be used to reduce these variables in form of components that lead to results with desired precision. Accordingly, results of this research showed that while designing interior space of ergonomic passenger car adapted for Libyan drivers, critical anthropometric measurements and weight take 4-dimensional space (since they are grouped in 4 factors - length dimensions, width dimensions, sitting height dimensions and arm length). Dimensions influence contributions in each factor are determined with Principal Components Analysis (PCA). Results of this paper are expected to be useful for Libyan ministries and regulatory bodies in a way such that drivers accommodate more adequately in passenger cars. Using findings of this survey might lead to less strenuous postures of Libyan drivers, which consequently will improve their safety.

**Keywords:** Libyan drivers, anthropometric measurements, multivariate modeling, Principal Components Analysis, ergonomic adaptation.

### **1. INTRODUCTION**

Ergonomic adaptation results in better users` accommodation and their better performances, especially comfort, productivity and safety, when executing certain tasks [16]. The variability of human dimensions affects design significantly it is much stronger influencing factor then the hardware from which the product is constructed [13]. Therefore, anthropometric measures collections, together with ergonomic principles application are essential and required to design products in aim to fulfill better accommodation and adequate performances [2, 9]. Moreover, any ergonomic criteria related to the workplace design and modeling should take into account the anthropometric criteria [6].

Drivers` dimensions/anthropometric characteristics influence the sitting posture in driving and human interaction with controllers, which further defines interior space of passenger car that will enable driver to perform various functions and movements [16]. Accordingly, it necessary to take into consideration the large variation in dimensions from

person to person and from population to population. Anthropometric measurements also depend on gender, race, age, occupation, nationality, and nutritional characteristics [3, 16]. Since the variation on anthropometric characteristics is explained with large number of variables, multivariate technique could be used to reduce these variables in form of components [15].

Multivariate analysis has been found as more effective approach in the case of multidimensional data, while percentile approach is more applicable in the case of small number of dimensions and unique nationality [5]. Knowing the fact that the road traffic accidents are the number one killer in Libya, this survey is conducted on the sample consisted of 300 Libyan passenger car drivers, as one of the first in the field. Certain anthropometric dimensions, plus weight, will be collected for each participant, namely standing height, sitting height, lower leg length, upper leg length, shoulder width, hip breadth, arm length, eye sitting height and foot length. Since the variation on anthropometric characteristics is explained with large number of variables, multivariate modeling technique - factor analysis will be used to reduce these variables in form of components that lead to results with desired precision. It is expected that results of this research will show critical anthropometric measurements for designing interior space of ergonomic passenger car adapted for Libyan drivers.

Results of this paper are expected to be useful for Libyan ministries and regulatory bodies in a way such that drivers accommodate more adequately in passenger cars. Using findings of this survey might lead to less strenuous postures of Libyan drivers, which consequently will improve their safety.

## 2. PREVIOUS RESEARCH

Factor analysis (FA) and Principle Component Analysis (PCA) as statistical tools are useful to analyze the structure of correlation among large number of variables by defining them as sets of variables which are strongly interrelated known as components or factors [4]. PCA with Varimax rotation method of and Kaiser Normalization, are applied on anthropometric data to evaluate the design and comfort of truck seats in papers [3,5,15]. There were four factors extracted in survey [3], namely: 1) variables of length segments, 2) variables weight and volume characteristics of drivers, 3) variables of height of segments and 4) variables of hand length and foot breadth. Another truck driver anthropometric study [5] included sample of 1950 truck drivers and collection of 35 anthropometric dimensions and also has found that the multivariate accommodation model (MAM) is an effective approach in design. Authors in [5] claim that 5th - 95th percentile approach could be criticized for the decrease in accommodation when there is more than one dimension involved in design. Authors in study [11] used SAS software and found that 12 sets of dimensions were reduced. They also discovered the fact that male truck drivers have increased width and girth across 25 years through comparison of their and earlier studies [11]. Authors in [12] proposed Anthropometric Range Metric (ARM) approach for assessing the variation of 24 body measures for nine different nationalities populations. Authors in [8] have also used multivariate modeling techniques - stepwise, linear regression and artificial neural network on data collected on seat-interface pressure measures, anthropometric characteristics, demographic information, and perceptions of seat appearance, while survey [14] has found a difference in preferred driving posture between two different nationalities- Koreans and Caucasian. Such studies lead to conclusion that the work place design depends on



anthropometric characteristics of users and that nationalities have significant effect on workplace design and modeling due to the differences in anthropometric characteristics [14]. A survey by Klarin et al. given in [7] adopts methodology based on fact that in a range of anthropometric measurements of equal total lengths, each measurement has segments of different lengths, because people with same leg length have different upper and lower leg length. According to that fact, the passenger car interior space design should accommodate extreme measurements in a manner that anthropometric measurements behave as mechanical mechanisms [7]. In the same context for Serbian drivers, authors have found that the hip width in sitting position has a significant effect on seat width, while the shoulder width affects the hand control and car width, add to that the shoulder width had high variation for the same population, which gives an indication that male drivers shoulder width is greater than shoulder width of female drivers for this population [7]. Moreover, the use of modern anthropometry data for interior modeling is recommended, since there are significant differences in seat dimensions compared to ISO 8566-5 (1995) standard [1]. Klarin et al. in [6] have also pointed out that there is a difference in the angle of foot controls (towards the space reach of driver toe and heel) from 70° to 62.5°. Such differences justify the need for continual evaluation of interior vehicle space design and modeling, with different approaches usage in aim to quantify and determine the parameters related to the interior vehicle space modeling [6].

### 3. RESEARCH METHODOLOGY

There were selected 300 Libyan participants who have driving license randomly and 9 anthropometric dimensions and weight were measured. The participants were all male with average age of 35 years (descriptive statistics is given in Table 1) .The static anthropometric method was applied. Nine basic anthropometric dimensions, plus weight (kg), were collected for each participant, namely standing height (mm), sitting height (mm), lower leg length (mm), upper leg length (mm), shoulder width (mm), hip breadth (mm), arm length (mm), and eye sitting height (mm), foot length (mm). Tools and equipment used in the anthropometric measurements of Libyan drivers were an anthropometer, steel tape, beam caliper, sliding calipers, and other instruments including stool for seated measurements and weighing scale.

Table 1. Descriptive statistics on the sample of Lybian drivers

Dimension	Minimum	Maximum	Mean	Standard deviation
Weight (kg)	44	125	82.91	14.149
Standing height (mm)	1483	1970	1746.23	71.326
Sitting Height(mm)	730	990	858.82	46.467
Lower leg length (mm)	350	700	557.15	41.604
Upper leg length (mm)	420	730	556.62	43.617
Shoulder width (mm)	360	640	471.77	48.107
Hip breadth (mm)	220	570	363.79	63.343
Arm length (mm)	400	890	628.19	85.348
Eye sitting height (mm)	640	880	753.17	44.455
Foot length (mm)	245	300	275.50	10.029

FA was used as a data reduction tool to determine the groups of factors. Several assumptions as proposed in [4] are required to be fulfilled for data set in order to apply FA. They are: (1) the observation included in the sample size should be at least five times the number of variables as a general rule. In addition larger samples are required probably well over 100 [10, 4] (2) the Measure of Sampling Adequacy (MSA) should be greater than or equal to 0.5, and the ratio of observations to the number of variables should be at least 5:1 as a general rule, but for more acceptable sample size would have 10:1, and (3) factor loading which is the correlation of variable and the factor should be at least 0.3 for sample size of 250.

#### 4. RESULTS AND DISSCUSION

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett’s test are shown in Table 2. It indicates the ratio of MSA is 0.718 which meets the criteria of FA, as well as sample size with ratio of 30:1. The generated correlation matrix is shown in Table 3. Eigenvalues diagram – scree plot is shown in Figure 1. Four factors have eigenvalues greater than 1. The cumulative variance is 71.889, and total explained variance in Table (4) illustrating the extracted factors and their loadings.

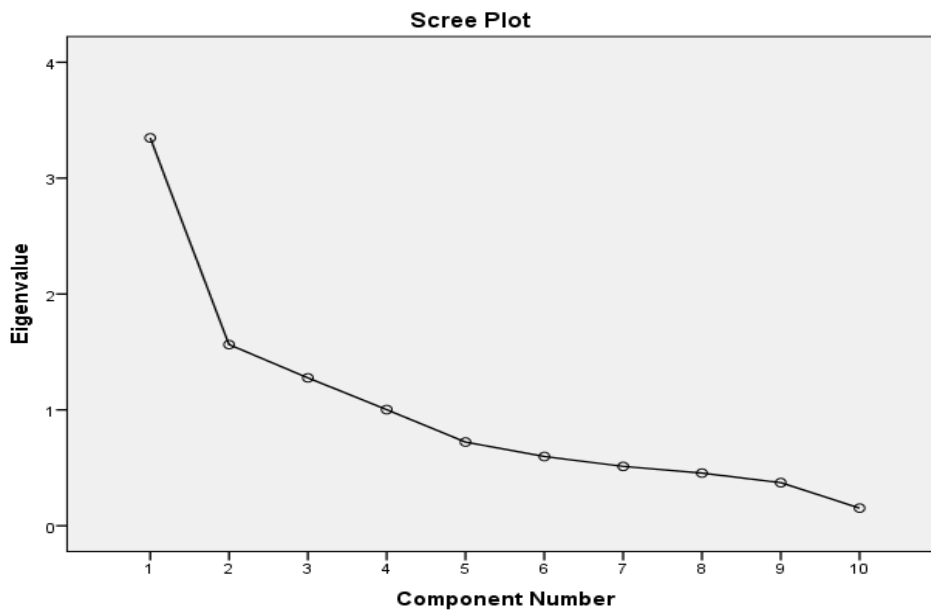


Figure 1. Eigenvalues Diagram

Table 2. KMO and Bartlett’s Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.718
Bartlett's Test of Sphericity	Approx. Chi-Square	963.111
	df	45
	Sig.	.000

Table 3. Correlation Matrix

Correlation matrix	Weight	Standing height	Sitting height	Lower leg length	Upper leg length	Shoulder width	Hip breadth	Arm length	Eye sitting height	Foot length
Weight	1.000	.206	.210	.327	.234	.503	.422	.063	.237	.338
Standing height	.206	1.000	.441	.436	.331	.161	.111	.167	.341	.377
Sitting height	.210	.441	1.000	.238	.130	.184	.140	.204	.836	.191
Lower leg length	.327	.436	.238	1.000	.347	.294	.247	.224	.203	.347
Upper leg length	.234	.331	.130	.347	1.000	.301	.186	.125	.125	.271
Shoulder width	.503	.161	.184	.294	.301	1.000	.594	.187	.195	.103
Hip breadth	.422	.111	.140	.247	.186	.594	1.000	.253	.165	.060
Arm length	.063	.167	.204	.224	.125	.187	.253	1.000	.177	-.006
Eye sitting height	.237	.341	.836	.203	.125	.195	.165	.177	1.000	.214
Foot length	.338	.377	.191	.347	.271	.103	.060	-.006	.214	1.000

The rotated matrix is given in Table 5, while Table 6 summarizes highest loadings for each factor. First factor includes four components that have the highest loading factor, namely lower leg length with factor loading 0.711, standing height with factor loading 0.690, foot length with factor loading 0.688 and upper leg length with factor loading 0.670. Similarly the second factor includes three anthropometric measurements - shoulder width with factor loading 0.843, hip breadth with factor loading 0.821, and the weight with factor loading 0.719. The third factor includes sitting height with factor loading 0.933 and eye sitting height with factor loading 0.928. The fourth factor includes only arm length with factor loading 0.858. Rotated solution (Varimax rotation) is given in Table 5.

Table 4. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.347	33.472	33.472	3.347	33.472	33.472	2.068	20.684	20.684
2	1.563	15.633	49.104	1.563	15.633	49.104	2.043	20.432	41.115
3	1.276	12.763	61.867	1.276	12.763	61.867	1.978	19.778	60.894
4	1.002	10.022	71.889	1.002	10.022	71.889	1.099	10.995	71.889
5	.722	7.222	79.110						
6	.597	5.975	85.085						
7	.512	5.125	90.210						
8	.455	4.546	94.756						
9	.372	3.720	98.476						
10	.152	1.524	100.000						

Extraction Method: Principal Component Analysis.

Table 5. Rotated Component Matrix

	Component			
	1	2	3	4
Lower leg length	<b>.711</b>	.227	.091	.183
standing height	<b>.690</b>	-.032	.393	.101
Foot length	<b>.688</b>	.063	.161	-.388
Upper leg length	<b>.670</b>	.204	-.066	.127
Shoulder width	.147	<b>.843</b>	.073	.110
Hip breadth	.039	<b>.821</b>	.053	.232
weight	.291	<b>.719</b>	.159	-.279
Sitting height	.150	.085	<b>.933</b>	.089
Eye sitting height	.096	.138	<b>.928</b>	.030
Arm length	.157	.130	.138	<b>.858</b>

## 5. CONCLUSION

Main motivation factor for conducting this survey is the fact that the road traffic accidents are the number one killer in Libya. Accordingly, this survey is as one of the first in

the field, since data of Libyan drivers have not been found in available literature. Results of this research showed that while designing interior space of ergonomic passenger car adapted for Libyan drivers, critical anthropometric measurements and weight take 4-dimensional space, since they are grouped in 4 factors - length dimensions, width dimensions, sitting height dimensions and arm length.

Results of this paper are expected to be useful for Libyan ministries and regulatory bodies in a way such that drivers accommodate more adequately in passenger cars. Using findings of this survey might lead to less strenuous postures of Libyan drivers, which consequently will improve their safety.

## REFERENCES

1. Brkić, VK Spasojević, M. M. Klarin, and A. Dj Brkić. "Ergonomic design of crane cabin interior: The path to improved safety." *Safety science* 73, (2015): 43-51.
2. Chung., Sung-Jae., and Min-Yong Park. "Three dimensional analysis of a driver passenger vehicle interface." *Human Factors and Ergonomics in Manufacturing & Service Industries* 14, no. 3, (2004): 269-284.
3. Fatollahzadeh, Kianoush. "A laboratory vehicle mock-up research work on truck driver's selected seat position and posture: A mathematical model approach with respect to anthropometry, body landmark locations and discomfort." PhD diss., KTH, 2006.
4. Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, R. L., *Multivariate data analysis*, Upper Saddle River, NJ: Pearson Prentice Hall, Sydney, 2006.
5. Guan., Jinhua., et al. "US truck driver anthropometric study and multivariate anthropometric models for cab designs." *Human factors* 54.5 (2012): 849-871.
6. Klarin, M. M., et al. "Determination of passenger car interior space for foot controls accommodation." *Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering* 223.12 (2009): 1529-1547.
7. Klarin, M. M., et al. "Determining the width of the optimal space needed to accommodate the drivers of passenger vehicles using the analogy of anthropometric measurement dynamics and mechanical mechanisms." *Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering* 225.4 (2011): 425-440.
8. Kolich, Mike., N. Seal, and S. Taboun. "Automobile seat comfort prediction: statistical model vs. artificial neural network." *Applied ergonomics* 35.3 (2004): 275-284.
9. Lin, Ro-Ting., and Chang-Chuan Chan. "Effectiveness of workstation design on reducing musculoskeletal risk factors and symptoms among semiconductor fabrication room workers." *International Journal of Industrial Ergonomics* 37.1 (2007): 35-42.

10. MacCallum, Robert C., et al. "Sample size in factor analysis." *Psychological methods* 4.1 (1999): 84.
11. Nadadur, Gopal. *Anthropometry-based Sustainable Design for Multiple Global Populations*. Diss. The Pennsylvania State University, 2012.
12. Nadadur, G., and M. B. Parkinson. "Designing for multiple global user populations: increasing resource allocation efficiency for greater sustainability." *Work* 41.Supplement 1 (2012): 2109-2116.
13. Parkinson, Matthew B., et al. "Optimizing truck cab layout for driver accommodation." *Journal of Mechanical Design* 129.11 (2007): 1110-1117.
14. Park, Se Jin., et al. "Comfortable driving postures for Koreans." *International journal of industrial ergonomics* 26.4 (2000): 489-497.
15. Spasojević-Brkić, Vesna, et al. "Crane operators' anthropomeasures factors identification." *Journal of Applied Engineering Science* 12.2 (2014): 159-164
16. Spasojević-Brkić, Vesna K., et al. "Designing interior space for drivers of passenger vehicle." *Tehnika* 69.2 (2014): 317-325.

## SWOT ANALYSIS OF LOGISTICS SYSTEM IN COMPANY OF THE PAPER PRODUCTION

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**Abstract:** The research, that was conducted in the company of the paper production, related to a project of centralization of the warehouse with the rationalization of activities and processes which are taking place in the transport system. Within the same project it was done SWOT analysis of those systems, which was outlined in this paper and it refers to the research of the method and methodology of work that applied in the logistics sector with special emphasis on internal transport, transshipment activity, receiving system, storage and dispatch of finished products of company. The aim of the paper is to show the current state of the logistics system of the company with a focus on the weaknesses that occur and possibilities of their solving. Through a given analysis we showed a number of deficiencies of which we can mention insufficient use of rail mode of transport in the framework of internal transport, damage of the goods, non-selective approach, traffic congestion within the company and others. Based on all these indicators of SWOT analysis it was conducted critical analysis of the logistics systems of transport and storage of finished products of Natron Hayat company, and based on this we gave some recommendations for cost savings, better organization of work and functioning of those subsystems.

**Keywords:** SWOT analysis, warehouse, transport, manufacturing plant

### 1. UVOD

Skladišni sistem kao dio logistike je skoro neizostavan u svim dijelovima lanca snabdijevanja, a posebno kada je riječ o kompanijama koje se bave proizvodnom djelatnošću. Cilj je operacije koje se izvršavaju u skladišnom i sistemu unutrašnjeg transporta svesti na minimum i na taj način izvršiti redukovanje samih troškova. Istraživanje koje je izvršeno u ovom radu odnosi se na kompaniju za proizvodnju papira koja svoje proizvode izvozi u preko 40 zemalja svijeta. Da bi se moglo upravljati sopstvenim performansama kompanije, vršiti njihovo mjerenje i praćenje, te izvršavanje korektivnih akcija, jedan od osnovnih preduslova je dekompozicija logističkog sistema. Kroz ovo istraživanje izvršena je dekompozicija skladišnog i sistema unutrašnjeg transporta s ciljem utvrđivanja kritičnih mjesta poslovanja u logističkom sistemu. Nakon izvršene dekompozicije urađena je SWOT analiza skladišnog sistema sa osvrtom na unutrašnji transport, koja je prikazana u ovom radu. U trenutnom funkcionisanju decentralizovanog sistema skladištenja gdje svaki proizvodni pogon ima sopstveno skladište uočen je niz negativnih efekata kao što je nagomilavanje robe, neselektivni pristup skladišnim jedinicama, veliki troškovi goriva, oštećenje gotovih

proizvoda itd. Nakon toga urađen je i projekat prelaska sa decentralizovanog na centralizovani sistem skladištenja koji umnogome može doprineti ostvarivanju određenih ušteda.

## 2. SWOT ANALIZA

SWOT analizu su kreirali istraživači Univerziteta Stanford u okviru projekta, koji je imao za cilj utvrditi šta je s korporativnim planiranjem krenulo pogrešnim smjerom, kao i kreirati novi sistem za menadžment promjene. Ono što je dobro u sadašnjosti nazvali su zadovoljavajućim (Satisfactory), dobro u budućnosti nazvali su prilikom (Opportunity), loše u sadašnjosti - krivnjom (Fault), a loše u budućnost - prijetnjom (Threat). Akronim je glasio S-O-F-T. On je kasnije promijenjen u SWOT [4].

Najjednostavnija metoda za analizu okruženja je SWOT analiza. Navedena analiza je kvalitativna analitička metoda koja kroz 4 faktora nastoji prikazati snage, slabosti, prilike i prijetnje, određene pojave ili situacije u predmetu analize. Osnovna ideja SWOT analize prema [5, 6] jeste utvrđivanje internih snaga i slabosti, kao i eksternih pretnji i mogućnosti. Na taj način ostvaruje se kontinuiran napredak i razvoj, a samim tim i konkurentska prednost. Može se prema [2] koristiti kada je potrebno napraviti strategiju razvoja kompanije ili analizirati konkurente i pozicije na tržištu. Poželjno je da SWOT analizu izvrše menadžeri organizacije koji je dobro poznaju, ali u saradnji sa spoljnim konsultantima (koji imaju specijalne analitičke vještine i nezavisno gledanje) zbog objektivnosti. Time što se okruženje analizira kroz detaljan spisak povoljnih i nepovoljnih faktora stimuliše se istraživački napor i obezbeđuje realnost u definisanju strategija [5]. SWOT analiza je brza, jednostavna i prema [3] može se prilagoditi kao instrument za identifikaciju faktora koji utiču na aktivnosti organizacije i daju rješenja za izradu buduću strategije. Na osnovu svih navedenih pokazatelja iz SWOT analize izvršiće se „kritična analiza“ rada logističkih podsistema transporta i skladištenja gotovih proizvoda kompanije Natron Hayat, te na osnovu toga dati određene preporuke za uštede, bolju organizaciju rada i funkcionisanje navedenih podsistema. Kritična analiza logističkog toka baziraće se na sagledavanju trenutnog stanja unutar kompanije sa aspekta podsistema logistike transporta i skladištenja gotovih proizvoda, ukazivanje na određene nedostatke pa do preporuka za unapređenje postojećih podsistema. Kroz pripreme za ovaj rad odrađena su istraživanja o načinu i metodologiji rada koja se primjenjuju u sektoru logistike sa posebnim aspektom na unutrašnji transport, pretovarne aktivnosti, sistemom prijema, skladištenja i otpreme gotovih proizvoda kompanije.

Pitanja prilikom istraživanja su se bazirala pretežno na: način skladištenja, način kontrole ulaza i izlaza gotovih proizvoda, metodologije koje se koriste u kontroli skladišnih zaliha, uslovima rada u skladištu, problemima koji se pojavljuju prilikom rada u skladištu, njihovim mišljenjima i idejama o prevazilaženju problema, njihovim mišljenjima i idejama o unapređenju skladišnih aktivnosti, statističkim podacima vezanim za transport i.

### 2.1. SNAGA

U ovom dijelu SWOT analize određuju se jake tačke koje kompanija ima i na kojima se temelji uspješan rad i funkcionisanje logističkih podsistema. Neke od tački su snažan i uvezan proizvodni proces, ljudski resursi, primjena barcod tehnologije u jednom dijelu skladištenja, priključak na drum i željeznicu, postojeća transportno-pretovarna sredstva.

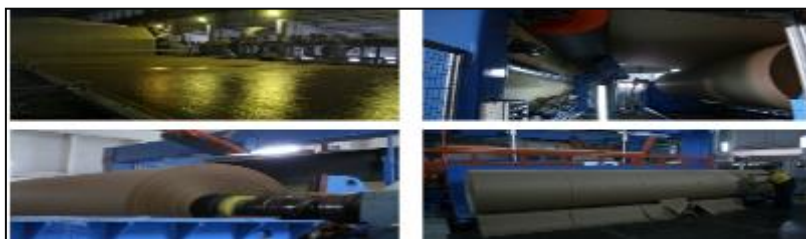


### 2.1.1. Snažan i uvezan proizvodni proces

Da bi se što slikovitije opisao sistem funkcionisanja proizvodnih procesa koji prema [1] predstavlja dio proizvodnog sistema, a obuhvata sve što se dešava sa predmetom rada između njegovog ulaska u proizvodni proces i izlaska iz tog procesa, sa kojim se ovaj rad bavi, neophodno je izvršiti lociranje postrojenja. Navedena postrojenja unutar kompanije su ravnomjerno i planski raspoređena. Papir mašina PM1, Papir mašina PM3, proizvodni pogon Konfekcija kao i buduća investicija Papir mašina PM6 su smješteni u jednom zajedničkom objektu sa precizno podjeljenim cjelinama i sa zasebnim sistemom skladištenja gotovih proizvoda. Papir mašina PM4 kao jedna od najvažnijih proizvodnih pogona unutar kompanije čini zasebnu cjelinu sa posebno izdvojenim objektom i sa zasebnim sistemom skladištenja gotovih proizvoda. U ovom radu akcenat će biti na najvažnijim proizvodnim mašinama.

Papir mašina PM<sub>4</sub> - vrši proizvodnju ambalažnog papira od čistog celuloznog drveta, tačnije od vlakana iz bora, smreka i jela što samom papiru daje dodatnu jačinu i kvalitet. Oprema koja je ugrađena u postrojenjima je kupljena od vodećih svjetskih proizvođača. Najvažniji proizvodi Papir mašine PM<sub>4</sub> su clupak-extensible papir, standard kraft. Papir mašina PM<sub>3</sub> - vrši proizvodnju MG papira koji je napravljen od čiste celuloze. Ovaj papir se najčešće koristi u proizvodnji papirne ambalaže, male papirne kese za povrće, peciva, i vrećice za kupovinu. Papir mašina PM<sub>1</sub> - vrši proizvodnju Schrenz, Fluting, Teslainer papira koji se koristi za izradu kartona i kartonske ambalaže. Ova vrsta papira, ključna je u izradi jake ploče/kutije, jer svojim karakteristikama, utiče na čvrstoću i kvalitet kartona.

Proizvodni pogon Konfekcija - vrši proizvodnju različitih dimenzija i oblika vreća i vrećica sa ili bez štampe. Kao sirovinu u većini slučajeva koristi se vlastiti papir iz proizvodnih postrojenja kompanije. Osim navedenih proizvodnih pogona u obzir će se uzeti i buduća investicija kompanije, a to je Papir mašina PM<sub>6</sub> sa svim svojim pratećim parametrima proizvodnje te pretpostavkama o načinu skladištenja gotovih proizvoda navedene mašine. Pored svih navedenih mašina u okviru proizvodnog procesa postoje i dodatna postrojenja kao što su: Kartonaža, Pinčara, Dorada, a čiji logistički sistemi zadovoljavaju proizvodne kapacitete navedenih mašina.



Slika 1. Proizvodni pogon Papir mašine PM<sub>4</sub> [11]

### 2.1.2. Ljudski resursi u skladišnom sistemu kompanije Natron Hayat

Skladištar kao dio skladišnog procesa, obavlja poslove preuzimanja robe u skladištu, njenog skladištenja i izdavanja iz skladišta, te vodi evidenciju robe. Trenutni broj uposlenika u ova tri skladišta iznosi 33 zaposlenika u šta se ubrajaju: vozači viljuškara, pomoćni radnici, glavni skladištari, evidentičari. U skladištima trenutno rade ljudi koji iza sebe imaju dugogodišnje iskustvo u radu na poslovima vođenja skladišta, prijemu i otpremi robe i rukovanju svim transportno pretovarnim sredstvima čiji raspored u sistemu skladištenja je: skladište papir mašine PM<sub>4</sub>: 13 radnika- 3 administratora i 10 vozača, skladište papir

mašine PM<sub>3</sub> & PM<sub>1</sub>: 18 radnika- 3 administratora i 15 vozača sa pomoćnim radnicima, skladište proizvodnog pogona Konfekcije: 2 administratora. Sa formiranjem skladišta papir mašine PM<sub>6</sub> broj zaposlenih radnika će se povećati.

### 2.1.3. Barcod sistem skladištenja (skladište PM4)

Barcod sistem ima višestruku prednost u vođenju skladišta. Trenutno barcod sistem se primjenjuje samo u skladištu papir mašine PM<sub>4</sub>, dok u ostalim skladištima trenutno postoji ideja za uvođenje istog, čime bi se objedinila kompletna cjelina proizvodnog asortimana kompanije. Pošto su planirana nova ulaganja, na pokretanju Papir mašine PM<sub>6</sub>, za očekivati je da će u skladišnom procesu proizvoda sa pomenute mašine biti uveden barcod sistem.

### 2.1.4. Priključak na drum i željeznicu

U sklopu transportno-pretovarnih aktivnosti važno je istaći da još jedna od „Snaga“ kompanije jeste da sva skladišta imaju izlaz na drum i željeznicu što im daje mogućnost otpreme proizvoda drumskim i željezničkim saobraćajem. Na slici 2 prikazani su izlazi skladišta prema željeznici i drumu na osnovu čega se mogu uočiti navedene mogućnosti skladišta.



Slika 2. Prikaz priključka postojećih skladišta drumu i željeznici

Za dobro funkcionisanje cjelokupnog sistema neophodna je dobra komunikacija sa svim cjelinama u distributivnom lancu. Svi unutar tog lanca imaju dobru komunikaciju i koordinaciju počevši od procesa proizvodnje, skladišta gotovih proizvoda pa sve do prodaje i komunikacije sa krajnim korisnicima.

### 2.1.5. Transportno pretovarna sredstva kompanije Natron Hayat

U pretovarnim procesima i industrijskom transportu koriste se sredstva cikličnog dejstva, u šta spadaju: vučni traktor sa prikolicom, kamion mercedes BENZ, viljuškari sлагаči nosivosti do 2 [t] kao i željeznički vagon sa improvizovanim vučnim vozilom (Loko traktor) sa pogonom na SUS motor. Osim pretovarnih sredstava koristi se i pokretna rampa za horizontalni način utovara kamiona. Ukupan broj viljuškara koji se koriste za obavljanje pretovarnih zadataka iznosi pet od kojih su četiri viljuškara koji u sklopu mehanizma za podizanje imaju zahvatni uređaj u obliku kašike, a jedan u obliku viljuška. Tu su još i dva vučna traktora od kojih jedan služi za vuču prikolice u unutrašnjem drumskom saobraćaju, a drugi za vuču i pomjeranje vagona prilikom utovara kao i za unutrašnji željeznički saobraćaj. Jedna od osnovnih funkcija kamiona BENZ je snabdijevanje proizvodnih pogona sa gotovim

proizvodima iz skladišta PM<sub>3</sub>-PM<sub>1</sub> koji koriste bobine kao sirovine za izradu dodatnih proizvoda. Takođe, kamion služi i za transport bobina u tzv. carinsko skladište u situacijama kada su skladišni kapaciteti skladišta PM<sub>3</sub>-PM<sub>1</sub> popunjeni. Navedeni proizvodni pogoni su planski povezani saobraćajnim mrežama što im dozvoljava mogućnost distribucije finalnih proizvoda drumskim i željezničkim transportom. Industrijski transport ima značajnu ulogu u zadovoljavanju transportnih potreba u proizvodnji kako u proizvodnom procesu, tako i u međupogonskom i spoljnjem transportu. Strukturu industrijskog transporta čini: industrijski – željeznički i drumski transport unutar kompanije koga čine vlastiti vozni park, jednošinske željeznice, razne žičare, skladišni sistemi, pretovarna mehanizacija, oprema. Drumski i željeznički mreža je jedan od temeljnih elemenata unutrašnjeg saobraćaja. U sklopu cjelokupnog unutrašnjeg transporta, trenutno drumski transport preovladava, a kao razlog tome je postojeća mehanizacija i postojeći ljudski resursi koje kompanija trenutno posjeduje. Željeznički transport se pretežno koristi prilikom utovara i pripreme otpreme gotovih proizvoda iz kruga kompanije kao i premještanja proizvoda iz skladišta papir mašine PM<sub>4</sub> u carinsko skladište. Važno je istaći da su svi proizvodni pogoni povezani željezničkom i drumskom mrežom što omogućava utovar i transport gotovih proizvoda kao i njihovo snabdijevanje sirovinama i ostalim repromaterijalima. Kada su u pitanju transportna sredstva za obavljanje unutrašnjeg transporta trenutno pored navedenog kamiona skladišta imaju na raspolaganju: vučni traktor sa prikolicom, loko traktor za vuču vagona kao i jedan vagon serije S. Ova vozila imaju funkciju obavljanja unutrašnjeg transporta u kompaniji. U sklopu tih aktivnosti pomenuta sredstva vrše: snabdijevanja drugih proizvodnih pogona proizvodima papir mašina u cilju dorade i izrade završnih proizvoda, vrše premještanje gotovih proizvoda radi uskladištenja istih, transport određene količine gotovih proizvoda u carinsko skladište. Loko traktor obavlja isključivo poslove u željezničkom saobraćaju unutar kompanije. Ima funkciju manipulacije svih vagona prilikom utovara odnosno otpreme gotovih proizvoda sa Papir mašine PM<sub>4</sub>. Isto tako služi za transport određene količine gotovih proizvoda iz skladišta papir mašine PM<sub>4</sub> u carinsko skladište u situaciji kada su skladišni kapaciteti puni. Na slici 3 lijevo prikazan je loko traktor u funkciji transporta gotovih proizvoda iz skladišta papir mašine PM<sub>4</sub>. Osim što navedena skladišta imaju priključak na drum i željeznicu oni su takođe međusobno povezani tako da je međusobna komunikacije moguća.



Slika 3. Loko traktor i proces utovara u skladištu PM<sub>1</sub>-PM<sub>3</sub>

U skladištima trenutno pretovarne aktivnosti vrši pet čeonih industrijskih viljuškara sa sjedištem za vozača (slika 3 desno). Svi viljuškari su na SUS motorni pogon od kojih su četiri sa dizel agregatom dok je jedan na plinski pogon. U sistemu otpreme gotovih proizvoda ubraja se još i osam zaposlenika koji vrše obradu pratećih dokumentacija za vozače teretnih vozila to jest fakture za isporučenu robu.

## 2.2. SLABOSTI

Slabosti u SWOT analizi određuju tačke sa stajališta preduzeća, samih korisnika usluga, kao i mišljenja samih zaposlenika koji obavljaju u ovom slučaju logističke funkcije. Nekada slabosti predstavljaju bolan pokazatelj, ali su od važne pomoći u sagledavanju nedostataka cjelokupnog sistema. U sklopu rada odrađeno je istraživanje u kojem su uključeni: glavni skladištari, evidentičari, fakturisti, vozači viljuškara, građevinski inženjeri, elektro inženjeri, osobe iz finansija, kao i lideri u logističkom sektoru. U toku razgovora sa njima došlo se do informacije koje bi se mogle svrstati u slabosti SWOT analize, a one su sledeće: nedovoljan skladišni prostor za odlaganje gotovih proizvoda, slaba preglednost proizvoda u skladištima, neselektivan pristup svakoj skladišnoj jedinici, oštećenje robe u podsystemu skladištenja, izbor lokacije skladišta papir mašine PM<sub>6</sub>, neiskorištenost željezničkog saobraćaja u unutrašnjem transportu, problem parking prostora za drumska vozila u i izvan kompanije, saobraćajno preopterećenje glavnog dijela drumske mreže.

### 2.2.1. Nedovoljan skladišni prostor za odlaganje gotovih proizvoda

Sistem skladištenja, kontrola, upravljanje i praćenje prijema i otpreme gotovih proizvoda odvija se primjenom ABC analize. Za detaljnije pogledati [8, 9, 10]. Jedan od problema sa aspekta logističkih podsystema je skladištenje koje se pojavljuje usljed prekomjerne proizvodnje sa intervalima slabe otpreme/prodaje. U tom slučaju stvara se tzv. „usko grlo“ koje se javlja usred nedostatka skladišnog prostora za odlaganje gotovih proizvoda. Zbog nemogućnosti obustave procesa proizvodnje sami skladištari su primorani tražiti dodatna rješenja, a to je skladištenje proizvoda u privremena i improvizovana skladišta (slika 4). U teoriji ovaj slučaj se može okarakterisati kao stvaranje kalkulativnih zaliha koje nastaju usljed očekivane promjene cijene papira na tržištu.



Slika 4. Prikaz privremenog odlaganja proizvoda izvan skladišnog objekta

### 2.2.2. Slaba preglednost gotovih proizvoda u skladištima

Prema ISO standardu maksimalna visina dizanja, odnosno slaganja bobina u visinu iznosi 5 [m] što dodatno smanjuje kapacitet skladišta. Takođe, propisima je određena širina prolaza između redova (iznosi 3 [m]) što u oba slučaja daje rezultat minimizacije skladišnog prostora u kompaniji. U slučaju kontinuirane proizvodnje i prenapunjenih kapaciteta skladišta dolazi do smanjenja vizuelnog pregleda skladišnog sadržaja što onemogućava kontrolu količine skladišnih zaliha. Osim toga stvaraju se i dodatne poteškoće u radu skladišta koje se mogu okarakterisati kao: zakrčenje staza za kretanje viljuškara i radnika, zatvaranje požarnih puteva, zatvaranje požarnih hidranata, smanjenje bezbjednosti radnika, sužavanje prostora za

manevrisanje viljuškara u skladištu, povećanje ciklusa viljuškara prilikom utovara gotovih proizvoda u transportna sredstva (da bi se došlo do odgovarajuće bobine, neophodno je izvršiti premještanje određene količine proizvoda sve do dolaska odgovarajuće robe i nakon izuzimanja odgovarajuće bobine izvršiti povrat svih bobina na prvobitni položaj), povećanje vremenskog ciklusa otpreme gotovih proizvoda u transportno sredstvo, povećanje potrošnje goriva, ulja, maziva i rezervnih dijelova, povećanje broja radnih sati zaposlenika, povećan broj radnika na bolovanju, otežana kontrola i praćenje prometa u skladištu, mogućnost oštećenja robe i dr.

### 2.2.3. Neselektivni pristup svakoj skladišnoj jedinici

U situaciji kada su skladišni kapaciteti popunjeni dolazi do slabog vizuelnog pregleda svih skladišnih jedinica. Kao rezultat toga javlja se problem prilikom otpreme gotovih proizvoda kao i upravljanjem zalihama. Kod otpreme gotovih proizvoda proces utovara je znatno duži, jer stvara se problem neselektivnog pristupa [7] svakoj skladišnoj jedinici. Česte su situacije kada je za utovar neophodno izvršiti premještanje određenog broja bobina kako bi se došlo do željene. Takođe, stvaraju se poteškoće prilikom utvrđivanja i kontrole stvarnog brojnog stanja zaliha u skladištu.

### 2.2.4. Oštećenje robe u podsistemu skladištenja

U situaciji prekomjerne proizvodnje i maksimalne popunjenosti skladišnog prostora primjenjuje se praksa izdvajanja odnosno privremenog odlaganja proizvoda na privremeno formirane površine sa ciljem spriječavanja zaustavljanja procesa proizvodnje. Važno je napomenuti da samo zaustavljanje i ponovno pokretanje proizvodnje, misleći na Papir mašinu PM<sub>4</sub> iziskuje ogromne gubitke za samu kompaniju. Takvo skladištenje ima dosta negativnih posljedica, a jedan od njih je i oštećenje gotovih proizvoda. Neka od oštećenja koja se javljaju su: fizička oštećenja robe (prilikom premještanja bobina dolazi do prevrtanja, nagnećenja, struganja i drugih vidova oštećenja), oštećenja robe u skladišnim procesima: vlaga (bobine kisnu), zaprljanja bobina (odlagaje na privremena i improvizovana mjesta koja su često prljava i nedekvatna za tu namjenu), oštećenje robe prilikom transporta u improvizovana skladišta (oštećenja prilikom prevrtanja, nagnećenja, kišnjenja, pada sa transportnih sredstava.). U zavisnosti od stepena oštećenja pojedine bobine ne ispunjavaju uslove za utovar i dalju otpremu prema krajnjem korisniku, pa se preusmjeravaju na druge proizvodne mašine radi maksimalnog iskorištenja istih.

### 2.2.5. Skladište Papir mašine PM6

Osim navedenih skladišta koji su u gornjem dijelu rada nabrojani ističe se još jedna slabost koja će se pojaviti u budućem poslovanju kompanije. Pored prednosti koje će donijeti investicija za instaliranje, ugradnju i puštanje u rad Papir mašine PM<sub>6</sub> nameću se određeni tj. dodatni troškovi u smislu formiranja novog skladišta. Otvaranjem novog skladišta pored dodatnog ulaganja u infrastrukturu moraju se uzeti u obzir i troškovi kupovine odnosno nabavke prateće mehanizacije. Osim toga, za normalan rad neophodno je zapošljavanje dodatnog osoblja što dolazi do povećanja fiksnih troškova. Pored ovih troškova stvorila bi se dodatna gužva u kretanju vozila glavnom saobraćajnicom, kao i pronalasku parking prostora.

Pošto se ovim radom preporučuje prelazak sa decentralizovanog na centralizovani način skladištenja gotovih proizvoda, onda ideja o osnivanju novog skladišta za Papir mašinu PM<sub>6</sub> nije potrebna. Formiranjem centralnog skladišta zadovoljili bi se postojeći kapaciteti svih proizvodnih mašina kao i kapacitet Papir mašine PM<sub>6</sub> koja je jedna od narednih investicija kompanije u bliskoj budućnosti. Jedan od prijedloga bi bio da svi fiksni i varijabilni troškovi koji se planiraju uložiti u prateće logističke aktivnosti, a koji bi se odnosili na skladište papir mašine PM<sub>6</sub>, mogli bi se usmjeriti na izgradnju i prateće aktivnosti centralnog skladišta.

#### 2.2.6. Neiskorištenost željezničkog saobraćaja u unutrašnjem transportu kompanije

Kao što se vidi sa slike 5 trenutna željeznička mreža ispunjava uslove za obavljanje unutrašnjeg transporta kompanije i pruža se od samog ulaza u kompaniju preko zone gdje su smještene najbitnije proizvodne cjeline i sve do kraja kompanije uz mogućnost daljeg povezivanja sa drugim cjelinama. Navedena željeznička dionica je u ispravnom stanju i na njoj se obavlja određeni željeznički saobraćaj kao što je: otprema gotovih proizvoda iz skladišta papir mašine PM<sub>4</sub>, doprema drveta i premještaj bobina iz skladišta papir mašine PM<sub>4</sub> u tzv. carinsko skladište.



Slika 5. Željeznička mreža u krugu kompanije

Uočljivi su određeni nedostaci sa aspekta unutrašnjeg saobraćaja, koji se mogu primjetiti kao npr.: nepovezanost skladišnog proizvodnog pogona Konfekcija, skladišta papir mašine PM<sub>3</sub>-PM<sub>1</sub>, skladišnog proizvodnog pogona Kartonaža kao i Papir mašina PM<sub>3</sub> sa željeznicom, tačnije nepostojanje veze između željezničkih kola i skladišta (frontovi za utovar vagona), nedovoljan broj vagona za obavljanje unutrašnjeg transporta (postoji jedan vagon), isprekidana željeznička mreža, neposjedovanje stručnih službi za održavanje željezničke mreže i vozila, neposjedovanje stručnog kadra za rad na željeznici, neiskorištenost postojećih lokomotiva za obavljanje željezničkih aktivnosti, presjecanja željezničke mreže radi instaliranja novih pogona i postrojenja. Trenutno proizvodni pogoni Papir mašine PM<sub>1</sub>, Papir mašine PM<sub>3</sub>, proizvodni pogoni Kartonaža i Konfekcija kao i njihova skladišta nemaju nikakvih aktivnosti koje bi se mogle obavljati preko željezničkog saobraćaja. Jedan od razloga je to što navedeni pogoni nemaju pretovarne rampe koje bi izvršile povezivanje vagona sa navedenim skladištima. Važno je istaći da kompanija posjeduje pored loko traktora i dvije dizel lokomotive koje su trenutno uskladištene i ne obavljaju nikakve aktivnosti. Osim toga, na lokomotivima je neopohodno izvršiti određene popravke, jer su iste pretrpjele određena oštećenja prilikom velike poplave koja je zadesila kompaniju u maju 2014. godine.

#### 2.2.7. Problem parking prostora za drumska vozila u kompaniji i izvan kompanije

U periodu velike otpreme gotovih proizvoda dolazi do velike koncentracije drumskih vozila u krugu kompanije (slika 6). Zbog problema sa nedostatkom prostora za parking pronalaze se alternativna rješenja koja ne ispunjavaju sigurnosne, a ni saobraćajne propise.



Slika 6. Situacija velikog intenziteta otpreme

Na slici 6 se jasno vide parkirana vozila kao i vozila koja su u pokretu. U navedenom slučaju dolazi do problema pronalaska prostora za parikiranje teretnih vozila kao i problem sa pristupom na pretovarne frontove radi utovara proizvoda.



Slika 7. Parking prostor i parkiranje drumskih vozila na nepropisanim mjestima

Na slici 7 lijevo prikazan je parking prostor ispred kompanije gdje se vide parkirana teretna i putnička vozila. U ovakvim slučajevima dešavaju se situacije nekontrolisanog parkiranja u kojima teretna vozila često zauzimaju mjesta za parkiranje vozila zaposlenika usljed čega dolazi do zakrčenja saobraćajnica i pronalaska parking prostora.

Usljed prekomjernog intenziteta kretanja vozila prema skladištu Papir mašine PM<sub>4</sub> i problema sa pronalaskom parking prostora neophodno je pronaći alternativno rješenje i za dostavna vozila koja vrše dostavu sirovina i drugih repromaterijala koja su neophodna za rad kompanije. Takav primjer je prikazan na desnom dijelu slike 7 gdje viljuškar vrši istovar limova i gdje se vidi u pozadini slike veliki broj kamiona koji su se morali pomjeriti radi obezbeđenja prostora za parkiranje dostavnog vozila i prostora za manipulaciju viljuškara.

#### 2.2.8. Saobraćajno preopterećenje glavnog dijela drumske mreže

U periodu najvećeg kretanja drumskih vozila dolazi do velikog opterećenja glavne saobraćajnice u kompaniji. Glavna saobraćajnica se prostire od ulaza kompanije, prolazi pored glavnih proizvodnih pogona i dalje se kreće prema skladištu uglja i drveta. Navedenom saobraćajnicom se kreću: vozila za otpremu gotovih proizvoda, vlastita vozila za vršenje unutrašnjeg drumskog transporta kompanije, vozila trećih lica koja obavljaju određene aktivnosti u kompaniji, dostavna vozila koja dovoze ugalj, drvo kao i ostale repromaterijale za kompaniju. Preveliki intenzitet kretanja drumskih vozila stvara probleme: zagušenja glavne saobraćajnice, oštećenje same dionice, oštećenje podzemne vodovodne, kanalizacijske i

elektro instalacije, utiče na bezbjednosno odnosno sigurnosnu situaciju samih radnika, stvara dodatne troškove sanacije saobraćajnice usljed preopterećenja dionice, prouzrokuje određena kašnjenja i dr.

### **2.3. MOGUĆNOSTI**

Prilikom osmatranja trenutnog stanja u skladištima gotovih proizvoda i načinu unutrašnjeg transporta, uočene su mogućnosti koje se pružaju, a koje bi mogle poslužiti kao prijedlog za pronalazak određenog rješenja problema unutrašnjeg transporta i problema povećanja kapaciteta skladišnog prostora za gotove proizvode kompanije. Prijedlozi za unapređenje su: iskorištenje neupotrebljivih objekata radi formiranja centralnog skladišta gotovih proizvoda, bolja organizacija skladištenja gotovih proizvoda, bolja kontrola skladišnih zaliha, brži i efikasniji proces otpreme, regulisanje unutrašnjeg drumskog saobraćaja radi rasterećenja postojećih dionica, veće iskorištenje unutrašnjeg željezničkog saobraćaja, veća bezbjednost kretanja zaposlenika, značajne uštede na bazi fiksnih i varijabilnih troškova, uređenje parking prostora za drumska vozila, usklađivanje načina ulaska teretnih vozila u krug kompanije. Jedna od mogućnosti odnosno šansi jeste iskorištenje nefunkcionalne zgrade unutar kompanije za formiranje centralnog skladišta. Formiranje jednog skladišta, u kojem će se naći svi proizvodi na jednom mjestu, bitno bi se promjenio kompletan sistem skladištenja gotovih proizvoda kompanije. Sa primjenom ovog načina skladištenja izvršila bi se promjena načina skladišta gotovih proizvoda, to jest prešlo bi se sa decentralizovanog na centralizovani način skladištenja gotovih proizvoda.

### **2.4. PRIJETNJE**

Neke prijetnje koje su moguće da se dese, a koje bi onemogućile implementaciju ovog projekta su: nerazumjevanje poslodavca za idejom, nedostatak sredstava za realizaciju, politička situacija u svijetu, regiji pa i državi, ekonomska nestabilnost na tržištu (ekonomska kriza), slabo poslovanje kompanije, kvar u proizvodnim postrojenjima i dr. Da bi ova ideja zaživjela neophodna su dodatna ulaganja kako u infrastrukturu, tako i u nabavku i instalaciju dodatne opreme.

## **3. ZAKLJUČAK**

Nakon izvršene dekompozicije i SWOT analize koja je prikazana u ovom radu ukazano je na niz nedostataka koji se javljaju u trenutnom poslovanju kompanije. Pored prijedloga za iskorišćenje već postojeće zgrade za centralizaciju skladišnog sistema, preporučuje se mnogo veća upotreba željezničkog transporta, usklađivanje načina ulaska teretnih vozila u krug kompanije, bolja preglednost skladišnih jedinica, redukovanje kretanja transportnih sredstava, preusmjerenje investicionih sredstava za buduće skladište nove proizvodne mašine u sanaciju objekta za centralizaciju skladišta itd. Buduće istraživanje koje sledi nakon izvršene SWOT analize koje je potrebno izvršiti odnosi se na ekonomsku analizu opravdanosti investicionih ulaganja u centralizaciju skladišnog sistema .



## REFERENCE

1. Božičković, Z., Stjepanović, Ž. Upravljanje informacijama u logistici, Univerzitet u Istočnom Sarajevu, Saobraćajni fakultet Doboj (2013)
2. Chen, JiaNi. SWOT analysis of the logistics process of Shun Yue Cement Company Limited (2011)
3. Dana, Boca Gratiela. "SWOT analysis to improve quality management production." *Procedia-Social and Behavioral Sciences* 62 (2012): 319-324.
4. Novičević, M. M., Harvey, M., Autry, C. W., Bond III, E. U. Dual-perspective SWOT: a synthesis of marketing intelligence and planning. *Marketing Intelligence Planning*, 22(1), (2004), 84-94.
5. Pamučar, D. Primena SWOT analize na sistem integralnog transporta Vojske Srbije. *Vojnotehnički glasnik*, 56(2). (2008)
6. Rauch, Peter. "SWOT analyses and SWOT strategy formulation for forest owner cooperations in Austria." *European journal of forest research* 126.3 (2007): 413-420.
7. Stević Ž., Vasiljević M., Đalić N. "Dekompozicija logističkog sistema i simulacioni model skladišnog podsistema kompanije Agromix Doboj" *Saobraćajnice i optimizacija transporta, Doboj*, (2012), str. 229-234
8. Stock, J. R., & Lambert, D. M. *Strategic logistics management* Boston, MA: McGraw-Hill/Irwin (Vol. 4), (2001)
9. Teunter, R. H., Babai, M. Z., & Syntetos, A. A. ABC classification: service levels and inventory costs. *Production and Operations Management*, 19(3), (2010), 343-352.
10. Thomas E., Vollmann, William L., Berry, & Whybark, D. C. (1997). *Manufacturing planning and control systems*. Irwin/McGraw-Hill. (1997)
11. <http://www.natron-hayat.ba/ba/aboutus.php>

## **ENTREPRENEURIAL COST MANAGEMENT: INSTRUMENTAL APPROACH**

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**Abstract:** The aim of this article is to solve the problems of the development of theoretical and methodological concepts of the instrumental approach to entrepreneurial cost management. Key concepts of management theory, organizational theory, systems theory and modern theories of entrepreneurship are used as fundamental research methods. The methodological basis is made up of the system, instrumental, process, functional, resource and project approaches. In the process of research the author used such methods as morphological analysis and synthesis of systems, structural and functional, systemic, comparative and situational analysis. Theoretical results of the research are development of the system of instruments of entrepreneurial cost management and their impact on the efficiency of the activities of production and entrepreneurial structures as well as identifying the parameters and trends of entrepreneurial cost management. An instrumental approach to cost management, which allows to reveal the essence of the system of instruments of entrepreneurial cost management and determine the basic requirements and procedures for its formation, is presented. The procedure of forming the system of instruments of entrepreneurial cost management, aimed at improving the efficiency of production and entrepreneurial structures and ensuring their sustainable development, is justified. The author substantiates the scope of application of entrepreneurial cost management instruments at the level of production and entrepreneurial structures in the process of production of profitable products. He proves that in the current crisis conditions of economic development, when economic outcomes of the activities of production and entrepreneurial structures depend on the right decision, the transition from traditional management to entrepreneurial cost management becomes significantly effective.

**Keywords:** entrepreneurial management, instrumental approach, production and entrepreneurial activities, costs

### **1. INTRODUCTION**

In modern conditions of globalization of markets and increased competition extensive ways to increase profits have already been exhausted. Under these circumstances the need for developing a particular cost management system is becoming obvious for production and entrepreneurial structures. Such system will allow to reduce production costs and, consequently, to acquire competitive advantages, which will ultimately ensure the sustainable development of production and entrepreneurial structures. The effectiveness of cost management system depends on how well it meets the basic characteristics of entrepreneurial activity and to what extent it will have typical entrepreneurial properties.

Entrepreneurial activity should be regarded, on the one hand, as risky activity which is carried out for the purpose of obtaining entrepreneurial profit; on the other hand, it is a

process of transformation costs in the results. Costs have a direct impact on the main indicator of the entrepreneurial structure activities, i.e. profit. In this respect cost management is an integral part of entrepreneurial structure activities, a means of achieving high economic results and ensuring sustainable development.

The study of specific features of entrepreneurial activities helped us to identify features of entrepreneurial cost management which include:

- diversity and relative freedom of choice of approaches to managing costs, flexibility in building the system of instruments;
- high economic interest in effective instruments of cost management; orientation on optimizing costs and minimizing business risks when selecting the instruments;
- riskiness of entrepreneurial cost management, its implementation in conditions of uncertainty, as a consequence – increased responsibility of the subjects, the severity of their needs in risk management in the area of costs, methods and technologies of informed decision making;
- innovation of entrepreneurial cost management, constant search for new concepts and instruments of cost management.

Thus, there is need for an approach which would take into account the above mentioned features of cost management of production and entrepreneurial structures and consider the effect of many factors, each of which forms a special impact on entrepreneurial activities' results.

## **2. THEORETICAL STUDIES**

### **2.1. THE CONCEPT OF "ENTREPRENEURIAL COST MANAGEMENT"**

Review of research on the problems of functioning of entrepreneurial structures conducted by such theoretical economists as I. Schumpeter (2008), J. Keynes (2012), Groth, J. C. and Kinney, M.R. (2014), Mac Nair C. (2006) and such modern Russian economists as V. Kerimov (2013), V. Lebedev (2010), I. Lieberman (2016), L. Popova (2015), M. Trubochkina (2016) and others allowed us to justify the concept of "entrepreneurial cost management". It should be understood as such process of cost management which has certain parameters, basic features of entrepreneurial activities and is focused on ensuring maximum efficiency and sustainable development of the entrepreneurial structure through implementation of basic functions and the use of cost management instruments (Fig. 1).

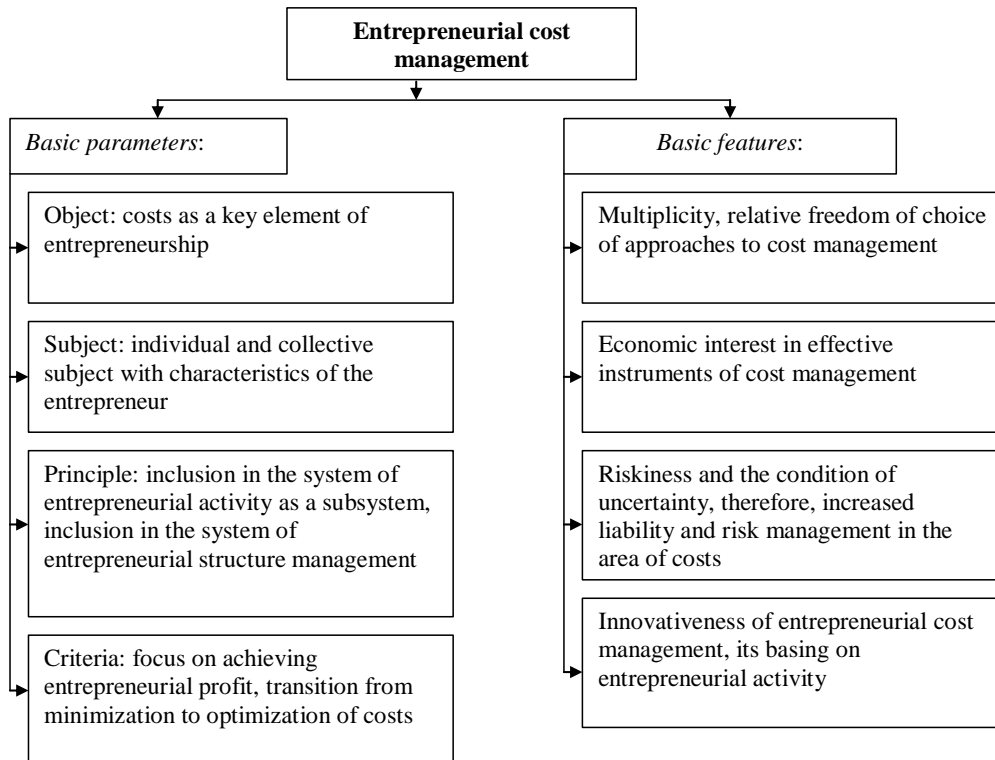


Figure 1 – Basic parameters and features of entrepreneurial cost management

Source: author's research

This concept is based on the traditional interpretation of the essence of cost management as a continuous process of systemic impact on costs for the purpose of ensuring their optimal level, structure and dynamics. It reveals new dimensions in the parameters and specific features of cost management in entrepreneurial structures.

## 2.2.PARAMETERS OF ENTREPRENEURIAL COST MANAGEMENT

Basic parameters of entrepreneurial cost management are characterized by the following indicators:

1. *The object* represents a set of costs which are a key element of entrepreneurship.
2. *The subject*. Firstly, it represents a collective or individual subject which has characteristics of the entrepreneur (innovation and the ability to adapt to new cost management methods, the ability to find adequate cost management instruments, willingness to take risky decisions on cost management and so forth.). Secondly, combining of individual and collective subjects occurs in the process of entrepreneurial cost management.
3. *The basic principle of entrepreneurial cost management* is inclusion in the system of entrepreneurial activity. It means that entrepreneurial cost management has features of entrepreneurial activity and acts as an indispensable element of the system of entrepreneurial structure management.

4. *Criterion* means orientation on achieving entrepreneurial efficiency and, as a result, transition from traditional approaches, aimed at minimizing the costs, to new approaches, aimed at cost optimization.

In addition to the fact that entrepreneurial cost management has all features of any entrepreneurial activity, the introduction of this concept also involves the formation of specific features of the following components: process of cost management; functions, objectives and principles of cost management; system of cost management instruments (Fig. 2). These features can manifest themselves in traditional cost management, but there are more prerequisites for their emergence and strengthening in terms of entrepreneurial structures.

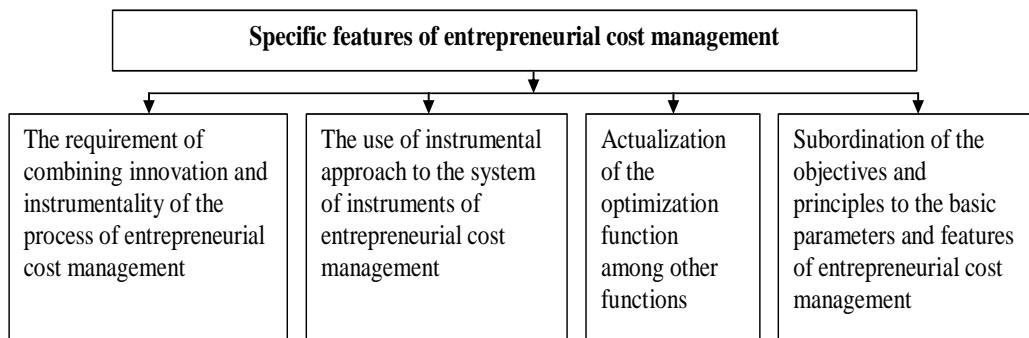


Figure 2 – Specific features of individual elements of entrepreneurial cost management

*Source: author's research*

### 2.3. TRENDS OF ENTREPRENEURIAL COST MANAGEMENT

Evaluation of scientific views on the methods of cost management, as well as research of different areas of entrepreneurship development, revealed the current trends of entrepreneurial cost management:

1. Transition from individual activity elements on accounting and control of costs to the formation of a single cost management system. This trend is reinforced by the active use of the system, process and functional approach with respect to cost management by entrepreneurial structures.

2. Requirement of complexity and consistency leads to the formation and institutionalization of sustainable relationship between entrepreneurial cost management and other sub-systems and business processes throughout all management system of the entrepreneurial structure.

3. Composition of cost management instruments becomes more complicated, diverse and close to the needs of modern economic subjects.

4. Increasing complexity of cost management instruments, the necessity of finding their optimal combinations, the requirement of entrepreneurial structures to meet the criterion of economic efficiency of instruments cause the expansion of methodological approaches.

5. Results obtained from entrepreneurial cost management begin to depend on a whole set of different factors. Among the main are: existence of universal methodological approaches that enable to select the instruments taking into account current objectives of cost

management and specific features of entrepreneurial structures; preparedness of the subjects of entrepreneurial structures to the use of cost management instruments.

The highlighted trends are typical for cost management, but in terms of entrepreneurial structures they are fully realized and manifested in a greater degree.

### 3. METHODOLOGY

#### 3.1. METHODOLOGICAL BASES OF THE INSTRUMENTAL APPROACH TO COST MANAGEMENT

The analysis of the entrepreneurial activity organization shows that the efficiency of all processes and systems of the production and entrepreneurial structure depends on the quality of their instrumental base. The process of entrepreneurial cost management is also carried out with help of instruments which represent a combination of methods and means involved to solve the problems of cost management.

When forming a system of instruments of entrepreneurial cost management it is advisable to use an instrumental approach, the essence of which is to develop rules, standards and algorithms of the use of a set of instruments for achieving certain objectives. Speaking about cost management of the entrepreneurial structure this approach is realized through the directions indicated in Fig. 3. On the one hand, entrepreneurial cost management is an instrument of the management subject for achieving the purposes of functioning and development of the entrepreneurial structure. On the other hand, the subject is endowed with specific specialized instruments for the implementation of cost management functions; requirements, rules, methodical bases of their formation and usage are developed.

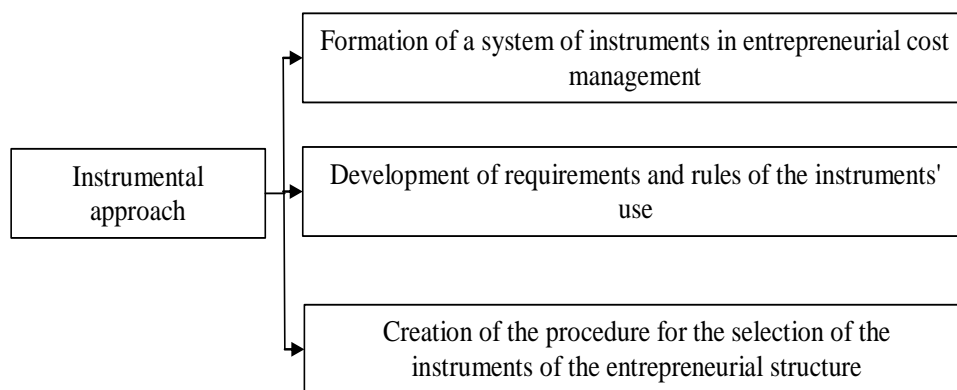


Figure 3 - Directions of implementation of the instrumental approach in entrepreneurial cost management

*Source: author's research*

As it follows from Fig. 4, instrumental approach is the link between the planned and actually received goals and objectives. Thanks to the use of certain instruments in the implementation of cost management functions the entrepreneurial structure achieves the desired result. The main value of the instrumental approach lies in the real implementation of entrepreneurial cost management which is done with help of certain means. It is characterized by the following features: normativity of instruments and algorithmic predetermination of

their choice in the context of decision of clearly defined tasks. These features are consistent with the requirement of technologizing of entrepreneurial process and instrumentality of entrepreneurial cost management.

Based on the theory of instrumental systems within the instrumental approach, we can determine the nature of the system of instruments of entrepreneurial cost management. Under this system we understand a set of interrelated instruments which in terms of their particular and best combination, found by using special techniques, give the desired effect and implement functions and goals set before this system.

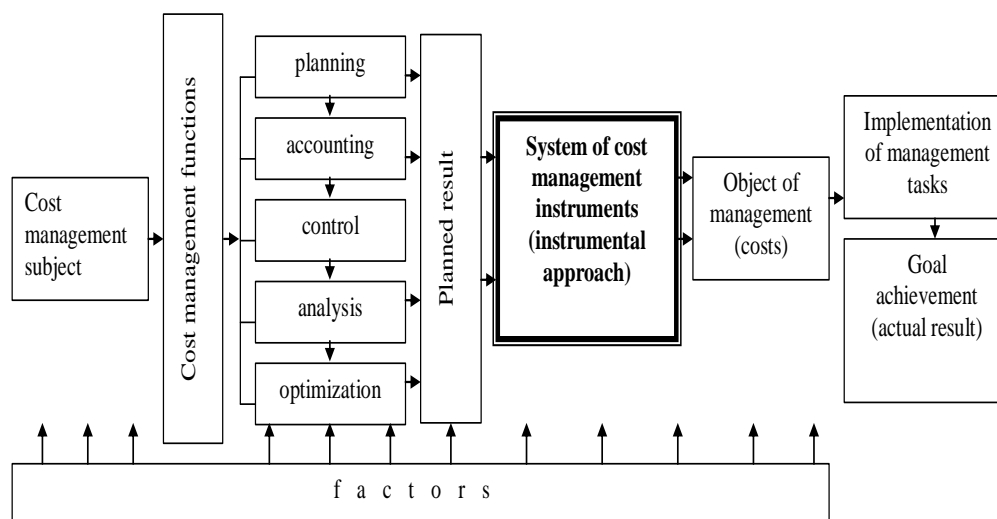


Figure 4 - The role of the instrumental approach in entrepreneurial cost management

Source: author's research

### 3.2. REQUIREMENTS FOR BUILDING INSTRUMENTS OF ENTREPRENEURIAL COST MANAGEMENT

When building a system of instruments of entrepreneurial cost management it is necessary to take into account the following requirements:

1. Instruments should be aimed at achieving the goals of operation and development of the entrepreneurial structure; they should be involved in ensuring the effectiveness (the requirement of feasibility of the system of entrepreneurial cost management instruments).
2. Instruments should be aimed at achieving the goals of the system of entrepreneurial cost management, namely they should provide necessary information on the costs and on this basis search for the management solution in optimizing costs (feasibility requirement).
3. Instruments should allow to implement all cost management functions; they should be selected taking into account precise tasks within each function (integrity requirement).
4. Instruments should be interconnected, and their implementation should be gradual (the requirement of functional sequences and consistency).
5. Instruments should take into account a variety of factors of external and internal environment of the entrepreneurial structure and adapt to them flexibly (the requirement of adaptability and flexibility).

6. The system of instruments of entrepreneurial cost management should not be too difficult to understand and apply. It should contain a sufficient but not excessive amount of instruments (the requirement of optimum quantity of instruments).

## 4. RESULTS AND DISCUSSION

### 4.1. THE PROCEDURE OF DEVELOPMENT OF THE SYSTEM OF ENTREPRENEURIAL COST MANAGEMENT INSTRUMENTS IN ENTREPRENEURIAL STRUCTURES

The condition for the successful application of the system of instruments is availability of the procedure that can help the subjects of entrepreneurial activity to select and combine various cost management instruments. We propose a step by step procedure of formation of the system of instruments of entrepreneurial cost management in production and entrepreneurial structures (Fig. 5).

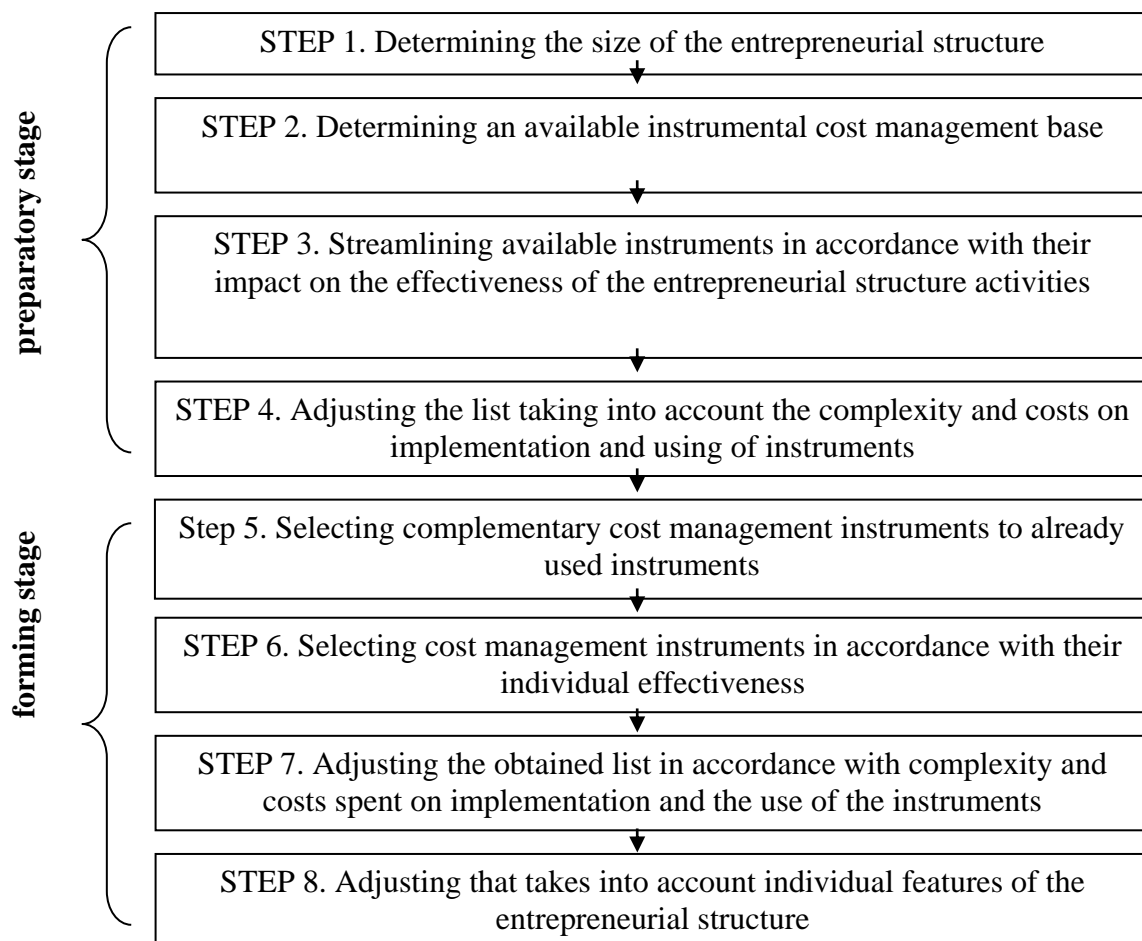


Figure 5. The procedure of formation of the system of entrepreneurial cost management instruments

Source: author's research



The conceptual idea of the procedure is consideration of individually taken instruments and their combinations with effectiveness of production and entrepreneurial structures activity. This is the target function of entrepreneurial cost management.

The procedure is based on the instrumental approach, its basic principles and requirements. One of the main requirements is ensuring the effectiveness of the cost management system through a selection of specific instruments.

Production and entrepreneurial structures should implement systematic control of the system of instruments of entrepreneurial cost management in the form of monitoring of a set of indicators of its effectiveness. The recommended procedure involves elements of such control (steps 3 and 6, as well as steps 4 and 7 in part).

#### 4.2. APPROBATION OF THE SYSTEM OF ENTREPRENEURIAL COST MANAGEMENT INSTRUMENTS

The procedure has been tested in entrepreneurial structures of different sizes, which gave a positive economic effect. For example, introduction of cost management instruments recommended with help of the proposed procedure in OJSC "Omsk" in 2016 led to increased profitability indicators (Table 1). In 2017 the company plans to introduce two more instruments of cost management; the predicted values of profitability indicators calculated on the basis of the effect in 2016 are shown in table 1.

The analysis of the results of approbation of the procedure of formation of the system of entrepreneurial cost management instruments helped to identify strengths and weaknesses of the procedure.

The strong points are: impact on the entrepreneurial structure effectiveness; validity of management decisions on improvement the system of entrepreneurial cost management instruments, taking into account several factors of instruments' selection in justification; taking into account features of entrepreneurship and entrepreneurial cost management, consistency with their main characteristics and features; basing on the instrumental approach, which allowed to formulate and include into the procedure the rules of development of the system of entrepreneurial cost management instruments; clarity and accessibility of the content of all steps for implementation of the procedure, easiness of the procedure development by its users.

Weak points of the procedure include: complexity of some steps' implementation (the subject should have specialized training for its use); data, obtained empirically by means of studying entrepreneurial structures, were laid into the procedure. Errors in data collection could cause data inaccuracy used in the procedure. To clarify the procedure it is advisable to periodically update information on the impact of various cost management instruments on the effectiveness of entrepreneurial structures; objective and insurmountable problems associated with calculation of efficiency, namely complexity of taking into account the impact on the effectiveness of certain entrepreneurial structures.

Table 1. The use of cost management instruments and the dynamics of profitability indicators in OJSC "Omsk"

Year	Instruments	Return on sales ratio,%	Return on assets ratio, %	Return on current assets ratio, %	Return on non-current assets ratio,%
2014	ABC- and XYZ- analysis	9,52	4,52	7,82	6,15
	direct costing				
	operational analysis				
	standard costing				
	Budgeting				
	cost accounting on the place of origin				
	functional and cost analysis				
2015	ABC- and XYZ- analysis	9,54	4,55	7,85	6,25
	direct costing				
	operational analysis				
	standard costing				
	Budgeting				
	cost accounting on the place of origin				
	functional and cost analysis				
2016	ABC- and XYZ- analysis	11,70	5,15	9,12	7,84
	direct costing				
	operational analysis				
	standard costing				
	Budgeting				
	cost accounting on the place of origin				
	functional and cost analysis				
	<b>model of optimal order volume **</b>				
	<b>target costing **</b>				
2017	ABC- and XYZ- analysis	13,86*	5,70*	10,30*	9,40*
	direct costing				
	operational analysis				
	standard costing				
	Budgeting				
	cost accounting on the place of origin				
	functional and cost analysis				
	model of optimal order volume				
	<b>target costing **</b>				
	<b>lean production **</b>				
	<b>resource management systems**</b>				

\* forecast values

\*\* new instruments

Source: author's research

Therefore, the procedure of formation of the system of entrepreneurial cost management instruments is universal and can be used in production and entrepreneurial structures of various sizes. Of course, the features of internal environment of the entrepreneurial structure, as well as the environment in which it operates, require some adjustments of the proposed sequence of instruments' implementation.

## 5. CONCLUSION

Thus, it should be stated that the instrumental approach is the best way to link entrepreneurial cost management to the purpose of functioning and development of entrepreneurial structures, namely, by means of achieving economic results and maintaining competitiveness. It is based on the formation of rules, principles, standards and algorithms of using a set of instruments for achieving certain goals and objectives; the instrumental approach allows to diagnose and analyze information about the costs by means of special system of instruments, which facilitates decision-making on cost management. The use of instrumental approach allows to substantiate the role of entrepreneurial cost management as both instrumental value and means to achieve targeted economic results of entrepreneurial activity. This approach is consistent with other approaches to the organization of entrepreneurial cost management, namely, process, system, structural and functional approaches. The instrumental approach can help to build a system of entrepreneurial cost management instruments. The formation of the system of instruments occurs while taking into account specific requirements and principles, as well as factors of internal and external environment of the entrepreneurial structure. When making a decision on implementation of various instruments of entrepreneurial cost management, one should take into account a logical sequence of their implementation, compatibility of instruments as well as individual features of specific entrepreneurial structures.

## REFERENCES

- Groth J., Kinney M. (2014). Cost management and value creation. *Management decision*, 32 (4).
- Kerimov V. (2013). *Management accounting*, Publishing and Trading Corporation "Dashkov and K °", 416.
- Keynes J. (2012). *General theory of employment, interest and money*, Gelios ARV, 352.
- Lebedev V. (2010). *Cost management in the enterprise*, Publishing house "Business press", 277.
- Lieberman I. (2016). *Cost management*, ICC "MarT", 624.
- Mac Nair C. (2006) *Customer-driven cost management*. *Cost management* (Nov / Dec), 32-38.
- Popova L. (2015). *Cost accounting, costing and budgeting in certain sectors of the production sphere*, *Business and Services*, 448.
- Schumpeter I. (2008). *Theory of economic development (the study of business profits, capital, credit, interest and conjuncture cycle)*: Tr. from English, Directmedia Publishing, 355.
- Trubochkina M. (2016). *Enterprise cost management*, INFRA-M, 218.

## CONSUMER BEHAVIOR IN SPECIFIC TERMS OF SALE

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**Abstract:** The subject of this paper is to show how the consumers, customers and users act while purchasing various products, in relation to their purchasing power. In marketing the unique decision-making process as well as the way in which consumers react when buying various products or during the use of those products/services, has been characterized as the consumer behavior concept. The understanding of the behavior of groups in everyday purchases necessary to meet their basic or periodic needs which can be financially expressed, represents an extremely important activity in marketing decision-making and acting. The main function of marketing in a given context is continuous monitoring and research of consumers' needs, factors that influence their behavior, ie. to comprehend the way consumers/customers/users make a decision on whether to buy a certain product or not. In the professional foreign and domestic literature, different authors have investigated this issue and tried to answer the question why individuals differ from each other when carrying out this process. Understanding the actions of the consumer, is interpreted through the example of Black Friday, one of the latest trends sourced in the United States spreading now in Europe and the rest of the world. The popular trend points to different consumer behavior in purchasing and gives organizations the ability to analyze, adapt and modify their market performance in accordance with the expressed behavior of target groups and by the parties involved in the purchasing process.

**Keywords:** consumers, consumer behavior, marketing concept, decision making process, Black Friday.

### UVOD

Tematika ovog rada je proces razumevanja ponašanja potrošača pri kupovinama, bilo da se radi o svakodnevnom za zadovoljenje egzistencijalnih potreba ili periodičnih i novčano izraženijih. Ponašanje potrošača predstavlja jedinstven proces donošenja odluka i način reagovanja potrošača prilikom kupovine i tokom korišćenja određenih proizvoda. Bitna razlika među potrošačima jeste činjenica da je svaki individua za sebe, odnosno poseduje jedinstvene karakteristike koje se ogledaju u načinu donošenja odluke o kupovini, samom procesu kupovine i potrošnji nakon izvršene kupovine. Mnogi autori su istraživali ovu tematiku i pokušali da daju odgovor na pitanje zašto se pojedinci međusobno razlikuju prilikom obavljanja pomenutog procesa. Može se reći da se ova tematika menjala kroz duge vremenenske epohe. Sve od nastanka ljudskog društva do danas vrši se razmena različite robe. U početku je to bila trampa robe za robu, a danas je to klasičan vid trgovine. Ponašanje potrošača je postala naučna disciplina koja se intezivno izučava kao jedna od grana ekonomije. Naročito je popularna u poslednjih par godina, zbog sve većeg broja otvorenih maloprodajnih objekata i velike potrošnje stanovništva. Veliki trgovinski lanci se otvaraju i šire velikom brzinom. Međusobno se takmiče da pridobiju što veći broj lojalnih kupaca.

Glavna karakteristika današnjih potrošača jeste to što su postali svesni svog uticaja, odnosno da preduzeća prilagođavaju svoja poslovanja upravo njihovim različitim potrebama, ukusima i željama. Što se proizvod ili usluga više približi potrošaču, javiće se tendencija za kupovinom i u budućnosti, tj. manja je verovatnoća dolaska do jednokratne kupovine. Ranije se kupovala samo roba koja je neophodna za život i preživljavanje. Vremenom ova situacija se menja i dobija neke druge oblike. Počinju da se kupuju luksuzna dobra, kao što su nakit, parfemi, kozmetika, odeća i razni ukrasi. Vremenom i takva roba dobija smisao i nailazi na odobravanje, prihvatanje i kupovinu od strane širokih narodnih masa. Naime, osnovna funkcija marketinga u odnosu na pojam ponašanja potrošača jeste stalno praćenje i istraživanje želja potrošača, faktora koji utiču na njihovo ponašanje, odnosno pokušaj razumevanja načina na koji potrošači/kupci donose odluku o kupovini tj. odustaju od kupovine određenog proizvoda ili usluge. Proces neprekidnog učenja i razumevanja vrednosti za potrošače a samim tim i usklađivanje sopstvene ponude, preduzeće stavlja na put visoko pozicioniranog subjekta u tržišnoj utakmici, koje je sebi izgradilo mrežu lojalnih potrošača. U narednim segmentima ovog rada, posebna pažnja će biti posvećena osnovnim pojmovima o ponašanju potrošača, vrstama istih, razlikama između termina kupac, potrošač i korisnik, uticaju eksternih faktora na preferencije i koji načini analize i obuhvata potrošača se javljaju. No treba naglasiti da se stvaranjem potrošačkog društva kupuje čak i roba koja potrošačima nije potrebna, a sve to zbog raznih marketinških pritisaka kao i radi sticanja ugleda u društvu. Najnoviji trend u svetu koji potiče iz Sjedinjenih Američkih Država, a koji se polako širi ka Evropi je popularni „Black Friday“ odnosno Crni Petak. Ovaj trend biće detaljnije objašnjen kao primer iz prakse koji ukazuje na različita ponašanja potrošača pri kupovini.

## **1. PONAŠANJE POTROŠAČA: KONCEPT, PRIRODA, SMISAO I ZNAČAJ**

### **1.1. PONAŠANJE POTROŠAČA: POTROŠAČI NA TRŽIŠTU**

U marketingu, potrošači predstavljaju osnovni tržišni faktor kojem se usmeravaju sve aktivnosti i naponi. Oni čine osnovu definisanja marketing planova, ciljeva i strategija. Marketing orijentacija polazi od potreba, zahteva i očekivanja potrošača, na osnovu kojih se dizajnira i nudi odgovarajuća ponuda koja treba da rezultira satisfakcijom i lojalnošću potrošača. Jedan od osnovnih ciljeva jeste zadovoljenje očekivanja potrošača (Kotler & Keller, 2012). Zbog toga satisfakcija, odnosno dissatisfakcija potrošača direktno utiču na donošenje odluke o kupovini i korišćenju određene ponude, a u dužem vremenskom periodu na izgrađivanje viših nivoa lojalnosti potrošača. Smatra se da je satisfakcija osnovni, ali ne i jedini preduslov lojalnosti potrošača. Osim toga, na lojalnost potrošača utiče i intenzitet satisfakcije, odnosno intenzitet reagovanja potrošača na određenu ponudu.

Ako je prvi korak u marketingu da se prepoznaju potrebe, želje i problemi kupca, onda je očigledno da se mora shvatiti kako i zašto se kupci ponašaju na način na koji to čine, a isto tako šta ih navodi na takvo ponašanje. To nije mali, a ni lak zadatak. Nema lakog i jasnog odgovora na ova pitanja. Umesto toga, razvijene su mnoge teorije, koncepti i modeli da bi objasnili kupca i njegovo ponašanje.

Suština marketinga je u shvatanju načina na koji ljudi misle i ponašaju se u vršenju izbora proizvoda i usluga koji im se nude, a opšti cilj marketinga je da obezbedi zadovoljstvo pojedinaca unutar ekonomskog sistema. Uspešna razmena na savremenom tržištu bazira se na

isporukama vrednosti koje će zadovoljiti očekivanja, zahteve i želje sve probirljivijih potrošača. Ponašanje potrošača je onaj završni čin koji obeležava uspeh ili neuspeh marketing programa preduzeća.

Ponašanje potrošača ne treba shvatiti kao čin kupovine, već kao jedan proces. Proces razmene, u kojem dve ili više organizacija ili ljudi jedni drugima daju i primaju nešto od vrednosti, je integralni deo marketinga. Razmena čini suštinu marketinga. Iako razmena ostaje važan deo ponašanja potrošača, šire stanovište naglašava ceo proces potrošnje, koji obuhvata pitanja koja utiču na potrošače pre, tokom i posle kupovine.

## 1.2. DEFINISANJE PONAŠANJA POTROŠAČA

Ponašanje potrošača se može usko i široko definisati. U **užem** shvatanju pojma, ponašanje potrošača označava ponašanje ljudi pri kupovini i potrošnji roba. U **širem** shvatanju pojma, ponašanje potrošača označava ponašanje „krajnjeg potrošača“ uopšte, kako u kupovini materijalnih tako i nematerijalnih dobara. Time ponašanje potrošača obuhvata i ponašanje npr. Posetilaca kulturnih priredbi, glasača, pacijenata u bolnici ili korisnika javne uprave.

## 1.3. VRSTE POTROŠAČA I TIPOVI ODLUKE O KUPOVINI

Pojam potrošača upotrebljava se da opiše dve vrste potrošačkih jedinica: **ljude** (građane) kao potrošače i **organizacije** (preduzeća, institucije) kao potrošače. Negde u literaturi se nazivaju još i **finalni potrošači** i **poslovni kupci**. Finalni potrošači su osobe koje kupuju proizvode i usluge za ličnu, porodičnu i kućnu upotrebu ili poklon. Organizacije kao potrošači kupuju proizvode i usluge za dalju proizvodnju, obavljanje poslovanja ili preprđaju drugim kupcima i potrošačima. U literaturi se ovi potrošači nazivaju još i poslovni ili industrijski kupci. To su preduzeća iz privrednih i neprivrednih delatnosti, javne, državne (vladine) i druge agencije i institucije (škole, bolnice i dr.) bez obzira da li su profitno ili neprofitno orijentisani. Potrebno je ukazati na razlike između kupca, korisnika i potrošača.

**Kupac** je osoba koja vrši (obavlja) stvarnu kupovinu. Sinonimi za kupca su klijent i mušterija. Kupac se može definisati kao „bilo koja osoba koja na shvatljiv način kupuje određeni proizvod“. To podrazumeva nekog ko ima latentni interes za određenim proizvodima i nameru da iste nabavi, kupi. Kupac je po pravilu anonimna osoba koja je potencijalno voljna i spremna da kupuje. Razlikuju se stvarni i potencijalni kupci. Stvarni kupci su oni koji zaista i kupuju određene proizvode ili usluge. Potencijalni kupci su oni koji bi mogli kupovati određene proizvode i usluge, a to ne čine iz raznih razloga. Zadatak marketinga je da potencijalne prevede u stvarne kupce proizvoda i usluga preduzeća (Maričić, 1996).

**Korisnik** je osoba ili institucija koja povremeno upotrebljava određeni proizvod ili koristi određenu uslugu, bez obzira na to što nije i stvarni kupac. Korisnik obično nije vlasnik robe ili usluge. Najviše korisnika javlja se kod trajnih potrošnih dobara. Za marketing preduzeća je značajno ustanoviti da li korisnik učestvuje ili odlučuje u procesu kupovine proizvoda i usluga. Termin **klijent** pretežno je u upotrebi kada se radi o poslovnom kupcu, dok se termin **mušterija** koristi da označi građane kao kupce proizvoda i usluga na tržištu. Osoba koja obavlja stvarnu kupovinu nije uvek i korisnik kupljenog proizvoda.

**Potrošač** je osoba koja proizvode i usluge upotrebljava za zadovoljenje ličnih i porodičnih potreba. Sinonim za potrošača je konzument, od engleske reči „consumer“. Vrlo često se za potrošača kaže da je to osoba koja stalno donosi odluke o kupovini proizvoda i na taj način zadovoljava svoje potrebe. Potrošači formiraju tržište potrošača, koje je predmet marketing istraživanja. Ovo tržište definiše broj stvarnih i potencijalnih potrošača, njihovu spremnost da kupuju i platežnu sposobnost.

Do sada je najveća pažnja u istraživanju ponašanja kupaca posvećivana **odlukama individualnih potrošača u kupovini na tržištima potrošnih dobara**.

Pri odlučivanju o kupovini, mogu se uočiti četiri osnovna tipa ponašanja potrošača: 1) pravo, racionalno i ekstenzivno odlučivanje, 2) limitirano (ograničeno) odlučivanje, 3) kupovina po navici (rutinsko ponašanje) i 4) impulsivna kupovina.

**Prave, racionalne i ekstenzivne odluke** su takve odluke o kupovini, kod kojih je veoma velika potreba za informacijama, dugo trajanje odlučivanja, a dominantu ulogu igra racionalno (kognitivno) razmišljanje. Takve odluke se donose pri kupovini dugotrajnih potrošnih dobara (npr. Auto, kompjuter).

Kod **limitiranog (ograničenog) odlučivanja o kupovini** potrošač se oslanja na proverene obrasce rešavanja problema i kriterije odlučivanja, koje je stekao kroz iskustvo o kupovini. Ovaj tip odluke za mnoge ljude predstavljaju npr. mesta za odsedanje, kao što su restorani.

Za **kupovinu iz navike** je karakteristično da ne iziskuje neko posebno traganje za informacijama. Potrošač kupuje stalno na istom mestu i na isti način, kupovine su brze i malo rizične, kao kada npr. često navraćamo uveče u lokal na piće.

Kod **impulsivnih kupovina** uključenost potrošača je neznatna. On reaguje spontano i afektivno na određene snažne podsticaje na mestu prodaje.

## 2.ODLUČIVANJE POTROŠAČA O KUPOVINI

### 2.1. UTICAJ SITUACIJE NA PONAŠANJE POTROŠAČA

**Uticaji situacije** su faktori koji u okviru određenog vremena ili mesta, povezani sa sredinom neposredne kupovine, nezavisno od karakteristika potrošača ili proizvoda, utiču na donošenje odluke potrošača. Ključna stvar za marketing je da potrošači reaguju i ponašaju se vrlo različito u zavisnosti od situacije. Razumevanjem posledica uticaja situacije, menadžer marketinga može početi da vrši prilagođavanja kako bi doprineo izazivanju željene reakcije potrošača. Uticaj situacije može da bude manje značajan kada je potrošač veoma lojalan marki i kada je potrošač veoma uključen u kupovinu.

Ponašanje potrošača se odvija unutar četiri široke kategorije ili tipa situacija: situacije komuniciranja, situacije kupovine, situacije upotrebe (korišćenja) i situacije dispozicije (deponovanja).

Uticaj situacije na ponašanje potrošača mogu se grupisati u pet ključnih kategorija:

- fizička sredina,
- društvena sredina,

- vremenska perspektiva,
- definicija zadatka i
- prethodno stanje.

**Fizička sredina (gde potrošači kupuju?)** uključuje sva obeležja situacije koja se mogu osetiti čulima, kao što su rasveta, mirisi, vreme, zvuci, lokacija, dekor, razmeštaj robe u prodajnom objektu, uniforma i ponašanje prodajnog osoblja itd., koji čine fizičku situaciju u kojoj su potrošači izloženi proizvodima, kupuju ih ili ih koriste.

**Društvena okolina** situacije se sastoji od ostalih ljudi koji su prisutni (njihov broj, struktura i akcije) : članovi porodice, prijatelji, ostali potrošači, prodajno osoblje itd. Kupovina je društvena aktivnost za mnoge potrošače i ljudi sa kojima se kupuje mogu imati značajan uticaj na ono što se kupuje i gde se kupuje.

**Vremenska perspektiva (kada kupci kupuju?)** u situaciji uključuje ne samo iznos raspoloživog vremena za potrošače da uče o proizvodu, kupuju ili koriste proizvod nego i vreme u toku dana ili godine (uticaj sezone, nedelje, dana ili sata), protok vremena posle poslednje upotrebe proizvoda, iznos vremena, do dana plaćanja itd.

Četvrti faktor situacije, **definicija zadatka**, opisuje zašto potrošači tragaju za informacijama, kupuju ili koriste proizvod. To je razlog za angažovanje u odlučivanju na pravom mestu. Uobičajena diferencijacija zadatka je između kupovine nečega za ličnu upotrebu i kupovinu nečega za poklon. Na primer, neko može kupiti knjigu sa mekim povezom za sebe, ali sa tvrdim povezom i istim naslovom kao poklon.

Konačno, faktor situacije je i **prethodno stanje** ili određeno raspoloženje ili okolnost koja utiče na potrošača. Potrošač može biti zabrinut ili raspoložen, umoran ili energičan „tvrd“ na novcu ili izlivima osećanja. Kada ste bolesni ili u žurbi, niste raspoloženi da dugo čekate u redu ili da poklonite dovoljno vremena i pažnje koje određena kupovina zaslužuje.

## 2.2. STILOVI PONAŠANJA POTROŠAČA

Svakog dana, svako od nas donosi brojene odluke koje se odnose na svaki aspekt našeg života. Međutim, mi generalno donosimo ove odluke bez ramišljanja o tome kako ih donosimo i šta je uključeno u sam određeni proces odlučivanja. U najopštijem smislu odluka je biranje opcije iz dva ili više alternativnih izbora.

Postoje četiri stila ponašanja potrošača (Kesić, 1999):

**Ekonomski čovek.** U ekonomiji se predpostavlja da je čovek racionalno biće, koje će da oceni sve alternative prema troškovima i dobijenoj vrednosti i odabрати onaj proizvod-udlugu koji mu daje maksimalnu satisfakciju. Pretpostavlja se da će potrošač sa ograničenim kupovinom moći i setom sklonosti i potreba alocirati svoje izdatke na različite proizvode po datoj ceni tako da maksimira korisnost.

**Pasivan čovek.** Sasvim suprotno racionalnom ekonomskom stanovištu potrošača je pasivno stanovište, koje prikazuje potrošača kao u osnovi podređenog služenju sopstevnim interesima i promotivnim naporima prodavaca. Kod pasivnog stanovišta, potrošači se posmatraju kao impulsivni i iracionalni kupci, spreman da doprinese ciljevima prodavaca.



**Model čoveka koji rešava probleme.** Kognitivni model prikazuje potrošača kao nekoga ko rešava probleme razmišljanjem. Po ovom modelu, potrošači se često prikazuju kao neko ko aktivno traga za proizvodima i uslugama koji će da podmiru njegove potrebe i obogate njegov život. Kognitivni model se fokusira na proces kojim potrošači tragaju za i ocenjuju informacije o markama i prodavnicama koje biraju. Po ovom modelu potrošači se posmatraju kao procesi informacija. Obrada informacija dovodi do formiranja preferencija, i konačno, do namera kupovine.

**Model emotivnog čoveka.** Emotivan čovek kupuje iz hira ili da bi zadovoljio trenutno zadovoljstvo u zavisnosti od raspoloženja i emocija. Umesto pažljivog traganja, odmeravanja i ocene alternativa pre kupovine, mnoge od ovih odluka se donose na bazi impulsa, hira, kaprica, ili što smo bili „emotivno vođeni“.

### 2.3. PROCES ODLUČIVANJA POTROŠAČA O KUPOVINI

Modeli procesa odlučivanja prikazuju kako se dobijaju i povezuju informacije da bi se donela odluka. Većina modela se bavi sa pet različitih koraka u procesu odlučivanja, u pristupu rešavanja problema: 1) identifikovanje (prepoznavanje) problema, 2) traženje informacija, 3) ocena alternativa, 4) izbor (odluka o kupovini) i 5) ocena posle kupovine. Potrošač može da donese odluku koristeći različite pristupe, od vrlo rutinskog do ekstenzivnog. U slučaju rutinskog odlučivanja, odluka se donosi brzo i bez mnogo mentalnog napora; percipirano znanje o raspoloživim alternativama je visoko; pobuđena potreba se zadovoljava na uobičajen način- ponovnom kupovinom iste marke proizvoda, preskačući pri tome drugu i treću fazu procesa kupovine. Kada se preduzima ekstenzivan pristup, potrebni su značajno vreme i napor u traganju za informacijama i oceni alternativa i prolaženje kroz ceo proces odlučivanja.

#### 2.3.1. Svesnost potrebe, traženje informacija i ocena alternativa

Proces kupovine počinje sa uočavanjem (prepoznavanjem) potrebe od strane kupca. Potencijalni kupci prepoznaju potrebu kada se suoče sa „problemom“ kao što je umor od posla i potreba za nekim odmorom. Interni i eksterni stimulansi često podstiču nezadovoljstvo potrebe koje će najverovatnije da motivišu potencijalne kupce na kupovinu (npr. putovanje na odmor). Ako potencijalni kupac oseća potrebu da se odmori i oporavi od posla, on može biti motivisan da ode na odmor u destinaciju koja mu nudi mir i opuštanje. Međutim, ako potencijalni kupac oseća potrebu da nešto nauči o Južnoj Americi i upozna se sa novom kulturom (interni stimulans), on može biti motivisan da istražuje Brazil, Peru, Argentinu ili Čile. Obe potrebe se mogu kombinovati sa potrebom da se iskoristi prilika i kupi karta za avio-prevoz uz popust (eksterni stimulans) ili paket aranžman za putovanje. Kada potrošač uoči potrebu, sledeći korak je traženje informacija koje mogu pomoći da se ona zadovolji. To je vitalna aktivnost za potrošača. Informisan potrošač može pribaviti ekvivalentan proizvod ili uslugu po nižoj ceni ili bolji proizvod ili uslugu za istu cenu. Pod pretpostavkom da potrošač preduzme neko traganje, pravi se razlika između dva nivoa. Blaže stanje traganja naziva se *povišena pažnja* (jednostavno traganje za informacijama) ili se može ići na *aktivno traganje za informacijama* (intenzivno i kompleksno traganje za informacijama)

Traganje za informacijama može biti interno i eksterno, aktivno ili pasivno. **Interno traganje** je provera postojećeg znanja o potrebi, ispituje se ranije iskustvo sa proizvodom ili markom koje je već uskladišteno u memoriji. Za proizvode koji se često kupuju, ka što je šampon, na primer, to može biti sasvim dovoljno. Ako interno traganje ne može da ponudi zadovoljavajuće rešenje, potrošač započinje **eksterno traganje** za informacijama: konsultovanje rodbine, prijatelja ili saradnika; proveru nezavisnih izvora informacija; čitanje promotivnih poruka i prodajne literature; pozivanje ili posećivanje prodajnih objekata i ispitivanja marki proizvoda. Ovo je posebno potrebno onda kada nisu dovoljni prošlo iskustvo ili znanje, postoji visok rizik donošenja pogrešne odluke i mali troškovi prikupljanja informacija.

Pre traženja informacija potrošač je poznao samo nekoliko marki datog proizvoda iz **ukupnog seta** raspoloživih marki. Od svih raspoloživih marki proizvoda, potrošač će biti svestan dela njih (**set svesnosti**), i od ovih, on će razmotriti samo nekoliko. Ovih nekoliko koje se razmatraju nazivaju **se relevantan set**, **set za razmatranje**, **set koji se obrađuje**-grupa alternativa koje potrošač stvarno razmatra pre nego što izvrši konačan izbor, ocenjujući ih u osnovi kao prihvatljive. Potencijalni kupac isključuje određene proizvode i njihove tipove iz kupovine. Set proizvoda koji su isključeni iz kupovine nazivaju se neprihvatljivim setom. Neki proizvodi se isključuju iz kupovine zbog toga što su: 1) nepoznati (npr. slabo prisutni u medijima i propagandi), 2) neprihvatljivi (npr. imaju loše osobine), 3) potrošači se prema njima ponašaju indiferentno (jer nemaju neku određenu korist), 4) previđeni (npr. nisu bili jasno pozicionirani na ciljnom tržištu) ili 5) nesposobni (inferiorni) da podmiru potrebe kupca u toj meri kao proizvod koji je bio izabran.

### 2.3.2. Odluka o kupovini

Potrošači obavljaju tri tipa kupovine: probna kupovina, ponovljena kupovina i kupovina sa dugoročnim obavezama. **Probna kupovina** podrazumeva da potrošač prvi put kupuje određeni proizvod u manjoj količini nego obično i da od iskustva u korišćenju zavisi da li će ponovo opredeliti za istu marku proizvoda. **Ponovljena kupovina** je tesno povezana sa konceptom lojalnosti marki, koju većina firmi nastoji da ohrabi, jer doprinosi većem stabilnosti na tržištu. Proba naravno nije uvek izvodljiva, kao što je slučaj kod većine trajnih potrošnih dobara, pa se potrošač obično kreće direktno od ocene da **dugoročnoj obavezi** (kroz kupovinu) bez mogućnosti za stvarnu probu.

### 2.3.3. Ponašanje i zadovoljstvo posle kupovine

Ponašanja posle kupovine mogu da utiču na ponovljene kupovine i šta će kupac reći drugima o proizvodu. Posle kupovine i proba proizvoda, potrošač će doživeti neki nivo zadovoljstva ili nezadovoljstva. Potrošač će se angažovati i u akcijama posle kupovine, koje mogu biti od interesa za proizvođača. Posao proizvođača se ne završava sa prodajom proizvoda, već se nastavlja i u periodu posle kupovine.

Zadovoljstvo ili satisfakcija kupca je funkcija podudarnosti između **očekivanja** potrošača vezanih za proizvod (O) i **uobičajenih mogućnosti proizvoda** (M), tj.  $Z=(O,M)$ . Ako proizvod ispunjava očekivanja, potrošač je zadovoljan; ako ih nadmašuje, potrošač je veoma zadovoljan; ako ih ne ispunjava, potrošač je nezadovoljan.

Svaka nezaklonitost u kognicijama (znanje, stavovi, verovanja, vrednosti) naziva se **disonanca**. Disonanca posle kupovine je psihološka neugodnost ili sumnja koja potiče od saznanja da neizabrana alternativa takođe ima poželjne karakteristike. **Kognitivna disonanca** (naziva se **kajanje kupca** ili **kupčeva griža savesti**) posle kupovine se događa zbog toga što svaka od alternativa koju razmatra potrošač obično ima svojih prednosti i nedostataka. Otuda, kada se konačno donese odluka, odabrana alternativa ima neke nedostatke, dok svaka od odbačenih alternativa poseduje neka atraktivna svojstva. To je **negativni** aspekti **odabranog** proizvoda i pozitivni aspekti odbačenih proizvoda, kreiraju negativnu disonancu potrošaču.

Disonanca se povećava kada se:

- povećava vrednost kupovine,
- povećava relativna atraktivnost neizabrane alternative i
- povećava relativni značaj odluke (kupovina kuće ili kola stvara veću disonancu nego kupovina neke poslastice)

#### 2.3.4. Odstranjivanje proizvoda

Kada potrošač odluči da proizvod nije više za upotrebu, na raspolaganju je nekoliko izbora. Potrošač ga može : 1) zadržati, 2) privremeno odstraniti ili 3) trajno odstraniti. U mnogim slučajevima, nabavlja se novi proizvod iako je stari još uvek u funkciji. Neki od razloga za ovu zamenu odnose se na želju za novim osobinama, promenama u ličnom okruženju (npr. ne slaže se boja aparata za domaćinstvo sa bojom zidova kuhinje), promena uloge osobe ili sopstvenog imidža

### 3. BLACK FRIDAY - CRNI PETAK

#### 3.1. UVOD O PRIMERU IZ PRAKSE I POREKLO TERMINA “BLACK FRIDAY”

Od ranih 2000-tih ovaj dan se smatra kao početak božićne šoping sezone u Americi, najveći maloprodavci na taj dan otvaraju veoma rano i nude širok asortiman robe. Black Friday nije državni praznik, međutim Kalifornija i neke druge američke države usvajaju. Dan nakon “Dana Zahvalnosti” kao praznik za zaposlene u državnoj službi, menjajući ga za neki drugi državni praznik kao što je „Kolumbov dan“. Mnogi radnici koji ne rade u maloprodaji imaju Dan Zahvalnosti i dan nakon toga slobodan a zatim i vikend jer se time povećava broj potencijalnih kupaca. Black Friday je najprometniji šoping dan još od 2005 godine. (Lennon, Johnson, & Lee, 2011). Statistika pokazuje da je 2014. godine 50,9 milijardi dolara je potrošeno tokom 4 dana koje obuhvata groznica Black Friday što je 11 % niže od prethodne godine. Oko 133 miliona američkih građana je kupovalo tokom vikenda koji obuhvata Black Friday 2014. godine.

Ime “Black Friday” je nastalo u Filadelfiji gde je prvobitno korišćen da opiše gužvu u saobraćaju koja je remetila pešake a koja se dešavala odmah nakon Dana Zahvalnosti. Dugi niz godina uobičajno je bilo da se na taj dan prodavnice otvaraju u 6.00 ali krajem 2000-tih mnogi trgovci su počeli da otvaraju u 5.00 ili čak u 4.00. Ovo je dovelo i do novih ekstrema i

to 2011 godine kada je nekoliko maloprodavaca kao što su (Target, Macy's, Best Buy i Bealls) otvorilo tačno u ponoć po prvi put.

U skladu sa temom ovog rada, glavni fokus je kako se potrošači ponašaju na ovaj dan. Često se pominju termini agresivnosti, nervoze, besa, izražene mržnje među potrošačima, žurba, alavost, sebičnost. Uzrok ovakvom ponašanju jeste što veliki prodajni i maloprodajni lanci daju ogromne popuste, te su ljudi zainteresovani za kupovinu proizvoda i usluga po mnogo nižoj ceni. Cena sama po sebi predstavlja vrlo bitan faktor prilikom obavljanja kupovine. Potrošači su izuzetno poneseni niskim cenama, čak u tim trenucima kupuju proizvode koji im nisu krajnje neophodni, ali ih mogu nabavati po nižoj ceni od uobičajene. Prodavci snižavanjem cena privlače ogroman broj kupaca, pogotovo u metropolama kao što je Njujork.

Ovaj dan služi da opiše ogromnu gužvu koja nastaje prilikom kupovine na taj dan. Mnogi radnici koji ne rade u maloprodaji i školi imaju Dan Zahvalnosti i dan nakon toga slobodan a zatim i vikend jer se time povećava broj potencijalnih kupaca.

2012. godine Walmart i nekoliko drugih maloprodavaca su objavili da će otvoriti većinu svojih radnji u 20.00 na Dan Zahvalnosti (osim u državama gdje je rad na Dan Zahvalnosti zabranjen zakonom kao što je Massachusetts gde se i dalje otvara tek u ponoć). 2014. godine trgovinski lanci kao što su JCPanney, Best Buy i Radio Shack su otvoreni u 17.00 na Dan Zahvalnosti dok su trgovinski lanci kao što su Target, Walmart, Belk i Sears otvorene u 18.00 na Dan Zahvalnosti. Sve ovo je dovelo i do štrajka zaposlenih radnika u maloprodaji. Uobičajno je postalo i da kupci kampuju na Dan Zahvalnosti u nastojanju da osiguraju svoje mesto ispred ulaznih vrata i time dobiju bolju šansu za kupovinu. Ovo predstavlja bezbednosni rizik, jer se na ovaj način koriste generatori maloprodavaca, blokira se pristup u trgovinu i požarni put. Neki gradovi pokušali su zakonom da zabrane kampovanje.

Crni petak kao termin se pojavljuje u raznim kontekstima. U 19-tom veku u SAD-u je bio povezan sa finansijskom krizom iz 1869 godine. Najranija upotreba termina Crni petak kao dana koji nastaje nakon Dana Zahvalnosti pojavljuje se 1. Decembra 1961. godine u novinskom izdanju o preduzeću „ The Shortsville Manchester“. Ovaj članak je otkrio Barry Popik i govorio o korišćenju ovog termina od strane policije u Rochesteru- New York. Još jedan novinski članak u kojem se pominje ovaj termin je iz Fildalelfije i to iz novina za odnose sa javnošću 18. Decembra 1961. godine.

U tom novinskom članku piše da je upotreba tog termina među policijom iz Filadelfije postala već uobičajna. Za trgovce širom SAD-a najveći šoping dan su uobičajno dva dana nakon dana zahvalnosti. Rezultat toga su i ogromne saobraćajne gužve i zbog toga su policajci iz Filadelfije ta dva dana nazvali Crni petak i Crna subota. Kako bi se dobio podsticaj za bolje poslovanje, o ovome problemu su trgovci razgovarali sa svojim gradskim predstvanikom Abe S. Rosen jednim od najiskusnijih opštinskih PR rukovodilaca u zemlji. On je preporučio usvajanje pozitivnog pristupa koji će pretvoriti Crni petak i Crnu subotu u Veliki petak i Veliku subotu. Pokušaj da se preimenuje Crni petak je bio neuspešan, i njegovu konačnu upotreba je prikazana u jednoj Filadelfijskoj publikaciji 1966 godine. Januara 1966 godine Crni petak je postao ime kojim je Filadelfijska policija označila dan koji nastaje nakon Dana Zahvalnosti.

***Crni petak zvanično donosi božićnu šoping sezonu u centru grada, i uobičajno donosi ogromne saobraćajne gužve kao i pretrpane trotoare, a prodavnice u centru rada su opkoljene od otvaranja do zatvaranja.***

Termin Crni petak počeo je da se širi oko 1975 i bio je objavljen u dva novinska članka u novembru 1975 godine. Oba su bila objavljena u Filadelfiji. Prvo upućivanje na to je bio članak pod nazivom „Army vs. Navy“ (vojska protiv mornarice) u New York Timesu.

Članci u Associated Pressu iz Pennsylvanije govore o sledećem : Prolazi u tržnim centrima i trgovinama su zakrčni. Pokretne stepenice su non stop pune ljudi. To je prvi dan božićne kupovine i uprkos lošoj ekonomskoj situaciji ovde su ljudi nahrlili u kupovinu. Zbog toga ga vozači autobusa i taksi vozači zovu Crni petak. Menadžer prodaje prodajnog lanca Gibmbels govori za štampu kako je gledala kako saobraćajni policajac bezuspešno pokušava da kontroliše masu. Širenje termina je bilo postepeno, međutim, krajem 1985 godine Filadelfijska štampa je izvestila da trgovci u Sinsitiju i Los Anđelesu nisu još uvek svesni tog termina.

Reklamiranje Crnog petka, često obuhvata i Deda Mraza. Deda mraz se pojavljuje na kraju te praznične parade kao da je već stigao, ili se nalazi iza ugla, zato što je božić uvek sledeći najveći veliki praznik koji dolazi nakon Dana Zahvalnosti. Krajem 19-tog i početkom 20-tog veka mnoge božićne parade i parade za Dan Zahvalnosti su bile sponzorisane od strane velikih robnih kuća. Robne kuće su koristile parade kako bi pokrenule sopstveno reklamiranje. Najzad, postalo je nepisano pravilo da gotovo sve prodavnice koriste velike praznike kako bi se najbolje ispromovisale. Dakle, dan koji nastupa nakon Dana Zahvalnosti je postao dan kada zvanično počinje sezona kupovine. Kasnije, činjenica da je ovo označilo početak sezone kupovine dovelo je do kontroverzi. 1939. godine maloprodavci su želeli da imaju dužu sezonu kupovine, ali niti jedna prodavnica nije htela da prekrši tradiciju i bude ta koja će početi reklamiranje pre Dana Zahvalnosti. Predsednik Franklin D. Roosevelt je pomerio datum Dana Zahvalnosti nedelju dana ranije.

Ovo je dovelo do gneva narodnih masa, jer su mahom morali da promene i svoje planove za odmor. Neki su čak odbili promenu, što je rezultiralo time da američki državljani slave Dan Zahvalnosti u dva odvojena dana. Neki su na tu promenu aludirali da je Franksgivigday. Crni petak je prouzrokovao sledeće:

- prevelike zahteve za radnike, traži se od njih da rade duže, te da rade i na Dan Zahvalnosti;
- zdravstvene i sigurnosne rizike zbog nedovoljnog osoblja koje upravlja masom kupaca;
- prodaja novih proizvoda, koji se proizvode samo zbog Crnog petka.

### 3.2. CRNI PETAK IZ UGLA RAČUNOVODSTVA

Mnogi trgovci su imali prigovor na negativnu upotrebu termina koji se koristi da opiše najvažniji šoping dan u godini. Rane 1980 godine počela je da kruži jedna teorija : a to je da trgovci rade sa finansijskim gubitkom većinu godine (od Januara do Novembra) i da svoj profit ostvare tokom praznične sezone, počevši od dana koji nastupa nakon Dana Zahvalnosti. Kada je ova teorija objavljena i zabeležena u finansijskim evidencijama, zajednička praksa je postala da se koristi crvena boja mastila da pokaže negativne iznose, a crna boja da pokaže pozitivne iznose. Po ovoj teoriji Crni petak je period kada prodavci nemaju više gubitke (crvena boja) nego umesto nje imaju godinu profita (crna boja).

### 3.3. NEDOLIČNO PONAŠANJE POTROŠAČA

Razne studije su sprovedene na temu kupovine na “Black Friday” i najčešće ponašanje koje se uočava kod potrošača je nedolično ponašanje, preovladava agresivnost, nervoza, bes, izražena mržnja među potrošačima, alavost i sebičnost. Potrošački nedolično ponašanje šteti drugim potrošačima a i trgovcima, zaposlenim radnicima, tokom prodaje na “Black Friday”. Autori (Lennon, Johnson, & Lee, 2011) u svom radu “A perfect storm for consumer behavior: Shopping on –Black Friday” sprovedli su istraživanje potencijalnih odnosa između varijabli koje su identifikovane. Obzirom da se razni incidenti dešavaju tokom ovog dana za kupovinu, pomenuti autori su napravili upitnik i pokušali da prikupe informacije o prirodi “Black Friday” promocija, uzroci nedoličnog ponapšanja potrošača, koji su pokretači istog, planiranje kupovine, napor koji potrošači ulažu prilikom kupovine na “Black Friday”.

U svom istraživanju navode da do takozvane “savršene oluje” u kontekstu neprimerenog ponašanja, odnosno stvaranja neprijateljskog okruženja na potrošačko ponašanje deluju:

- 1) **Promocija** – Glavna strategija je ponuda proizvoda po promotivnim cenama, što će dovesti do povećanja prodaje i svakako ostvarivanja profita (u smislu, iznad proseka). Danima pre samog “Black Friday”, pokreću se mnogobrojne promotivne kampanje kojima se privlači pažnja potrošača
- 2) **Dugi redovi čekanja** – Potrošači su u stanju i da po nekoliko časova stoje u redu kako bi došli do željenih proizvoda po jeftinijim cenama, čekajući objekat da se otvori. Kako je u pitanju čekanje u redu, dolazi i do istiskivanja pojedinih potrošača, te se javlja svađa, guranje, udaranje i slično.
- 3) **Nepristojni prodavci** – Prodajno osoblje je prinuđeno da na ovaj dan radi znatno duže, što dovodi do povećane nervoze i pritiska koji čini ogroman broj potrošača
- 4) **Nedovoljna količina robe** – Može se javiti situacija da postoji velika potražnja za određenim proizvodima, te ukoliko potrošači prepoznaju svoju potrebu za datim i razumeju da možda neće moći zbog ovog nedostatka kupiti proizvode, oni se grabe za iste, usled čega najčešće dolazi do fizičkog obračuna.
- 5) **Nagradni kuponi** – U mnogim maloprodajnim lancima, taktika kojom se povećava prodaja jeste mogućnost sticanja nagradnih kupona, koji takođe dovode do nedoličnog ponašanja jer potrošači obično primenom sile dolaze do istih.

Ovo su samo neki od faktora kojima se podstiče nedolično ponašanje potrošača, što dovodi do vrlo ozbiljnih situacija, koje se završavaju povređivanjem drugih ljudi, čak i smrtnim ishodom.

Tabelom broj 2 prikazano je ponašanje potrošača, čiji rezultati su dati kolonom broj dva, a označavaju prosečan odgovor, definisan skalom od jedan do pet. Istraživači su definisali upitnik, i neophodnu skalu od jedan do pet, koja ima sledeće vrednosti.

Tabela 1. Objašnjenje skale, korišćene tokom istraživanja ponašanja potrošača na “Black Friday”

Vrednost na skali	Objašnjenje
1	Izuzetno često
2	Nešto češće
3	Ni često ni retko
4	Nešto ređe
5	Retko

*Izvor: Lennon S., Johnson K., Lee J., “A Perfect Storm for Consumer Misbehavior: Shopping on Black Friday”, Clothing & Textiles Research Journal, 2011, str.6*

Tabela 2: Anketni rezultati ponašanja potrošača na “Black Friday”

Tip ponašanja	Prosečna vrednost
Guranje u redu, prilikom ulaska i u samoj prodavnici	2,03
Svađa sa obezbeđenjem na ulazu u objekat i policijom koja obezbeđuje isti	1,58
Krađa proizvoda u prodavnicama	2,26
Rušenje rafova sa proizvodima	1,74
Guranje zaposlenog prodajnog osoblja	1,38
Uzimanje proizvoda iz tuđih kolica	1,42
Vikanje na zaposleno prodajno osoblje	1,61
Vikanje na druge kupce i prodavce	1,68
Fizička borba sa drugim kupcima/potrošačima	1,20

*Izvor: Lennon S., Johnson K., Lee J., “A Perfect Storm for Consumer Misbehavior: Shopping on Black Friday”, Clothing & Textiles Research Journal, 2011, str.6*

Subjektivni zaključak autora rada, a na osnovu članka autora (Lennon, Johnson, & Lee, 2011) na temu ponašanja potrošača prilikom kupovine na „Black Friday” jeste da su potrošači svesni situacije i sopstvenog ponašanja, ali povučeni atmosferom i željom da utroše što manje novčanih sredstava za kupovinu, pribegavaju nedoličnom i nepriličnom ponašanju. Pre svega kompanije moraju promeniti svoj stav i način funkcionisanja svojih velikoprodajnih i maloprodajnih objekata na ovaj dan. Prodaja iznad uobičajene i ostvarivanje većeg profita,

svakako su nedovoljni razlozi za ugrožavanje života velikog broja kupaca/potrošača, pa i zaposlenog osoblja.

U sledećem delu, opisane su neke od situacija koje su se dogodile upravo na „Black Friday” tokom održavanja prethodnih godina. Kroz date situacije dodatno stičemo mišljenje da je ponašanje potrošača neophodno proučavati, analizirati, istraživati i svoju ponudu i poslovanje upravo njemu prilagođavati. Sa druge strane, kompanije moraju podobno ispitati svoje akcije, jer su one ponekad upravo uzrok nedoličnog ponašanja potrošača. Potrebno je naći balans u ovakvim situacija, gde će sa jedne strane kompanija biti zadovoljna ostvarenim performansama a sa druge potrošači osetiti satisfakciju kupljenim proizvodima i uslugama.

### 3.4. PONAŠANJE POTROŠAČA NA „BLACK FRIDAY”

2006 godine na video kamerama u trgovini Best Buy zabeležen je napad jednog kupca na drugog. Razjareni Walmartovi kupci u Columbusu (Ohio) su brzo preplavili vrata na otvaranju i opholii zaposlene oko gomile izložene robe. Devet kupaca u Kalifornijskom tržnom centru je bilo povređeno, uključujući i jednu stariju ženu koju su morali odvesti u bolnicu jer je gomila pojurila da zgrabi poklon karice koje su bile puštene sa plafona.

U događaju u kojem su padale poklon kartice, marketing prodavnice i operativni tim nije računao na emotivne reakcije, prostor i broj kupaca, a što se pokazalo kroz posledice koje nisu očekivali. 2008. godine gomila od oko skoro 2.000 kupaca u Valley Streamu (New York) je čekala 5.00 sati da se otvori lokalni Walmart. Kako se vreme otvaranja bližilo uznemirenost gomile ljudi je rasla. Kada su se ulazna vrata napokon otvorila manja gomila ljudi je gurnuta napred, razvalila je vrata, te na smrt zgazila 34 godišnju radnicu. Kupci se nisu obazirali na sudbinu žrtve, i nisu zaustavili svoj stampedo kada su drugi zaposleni pokušali da intervenišu i pomognu povređenoj kolegici, žaleći se da su dugo čekali na hladnoći, i da nisu mogli duže da čekaju. Neki kupci koji su započinjali okupljanje čak i oko 21.00 veče pre. Istom prilikom, čak i kada je policija došla i pokušala da pruži pomoć povređenom čoveku kupci su nastavili da se guraju kako bi napravili svoj put do ulaza u radnju. Nekoliko drugih ljudi je pretrpelo lakše povrede uključujući i trudnu ženu koju su morali odvesti u bolnicu. Ovaj incident je prvi zabeležen smrtni slučaj u toku kupovine na Crni petak prema Nacionalnoj službi prodaje. Oni navode sledeće: „ Mi mislimo da se nikada ranije nije desio smrtni slučaj zaposlenog na dan koji nastaje nakon Dana Zahvalnosti“. Istog dana, dvoje ljudi je smrtno upucano tokom svađe u trgovini Toys'R' US u Palm Desert, Kalifornija. Na Crni petak 2010, Medison, žena iz Wisconsinanta je bila uhapšena ispred radnje Toys'R' US nakon što je presekla liniju u redu za čekanje, i pretila drugim kupcima da će pucati ako pokušaju da prigovore. Prodavac na igračkama za veoma malu decu je bio izboden od strane kupca koji je pokušao da ukrade. Žena iz Indiapolisa je bila uhapšena nakon što je izazvala svađu sa drugim Walmartovim kupcima. Ona je bila zamoljena da napusti trgovinu, ali je odbila, nakon čega je usledilo hapšenje.

Čovek iz Floride uhapšen je u Walmartu nakon prijave drugih kupaca da poseduje drogu i oružje, i to tako što je jedan od kupaca čekajući u redu primetio da ovaj nosi pištolj. Posle je otkriveno da je takođe imao dva noža, suzavac i bombu. Čovek iz Buffala, New York, je bio zgažen kada su se vrata Target prodavnice otvorila, a divlji i neukrotivi kupci krenuli unutra. Ovo podseća na Walmartov smrtni slučaj iz 2008. godine.

2011 godine na Crni petak žena iz Kalifornije u trgovini Walmart je upotrebila suzavac i tako uzrokovala lakše povrede drugim kupcima (njih 20) koji su čekali satima da se



vrata trgovine otvore. Jedan od incidenata je nastao i kada su kupci čekali u redu za novi sniženi Xbox 360. Očevidac je rekao da je žena sa dvoje dece postala uznemirena načinom na koji se ljudi guraju u redu. On je rekao da je izvukla suzavac i poprskala druge ljude u redu. Prema izveštajima policije trgovci su izneli i izložili sanduk Xbox 360 a u gomili koja je formirala red za pakovanje jedna žena je takođe izvadila sprej i prskala druge ljude kako bi dobila prednost u redu. U jednoj nesreći ispred Walmartove radnje u San Leandru , Kalifornija, jedan čovek je upucan oko 1.45 ujutru tokom kupovine na Crni petak . 2011. godine Jan Sullivan žena koja stoji na vratima Walmartovove trgovine pozdravlja kupce i želi im dobrodošlicu i srećne praznike, je otpuštena nakon što ju je gurnuo kupac Crnog petka. Sullivan navodi da je pokušala da zaustavi neimenovanu ženu od izlaska kroz vrata gde nije dozvoljeno da se izlazi, te da je ta žena gurnula. Sullivan tvrdi da je dok je padala instiktivno pokušala da zgrabi ženu kako bi ublažila pad. Ova priča je izvor polemike za Walmart, a Sullivan je dobila podršku zajednice, uključujući i novinke natpise, a najmanje dva čoveka su se ponudila da joj pomognu. 2012. godine na Crni petak dve osobe su upucane ispred Walmarta u Tallahassee, Florida, tokom svađe oko parkinga. 2013. godine na Crni petak čovek iz Las Vegasa koji je nosio plazma TV iz prodavnice Target na Dan Zhvalnosti je bio upucan u nogu nakon što je pokušao da se izbori nazad za svoj TV od lopova koji ga je ukrao od njega, a koji ga je držao na nišanu.

U Romeovillu, Ilunois, policajac je pucao u osumnjičenog lopova, koji je vozio auto ukradeno od drugog policajca u okolini Kohl's robne kuće. Osumnjičeni i policajac u autu su imali povredu ramena, a troje ljudi je uhapšeno. U Franklin Mills tržnom centru u Filadelfiji kamerama je zabeležena žestoka svađa. Jedna žena je bačena na pod. Kamerama je takođe zabeležena druga svađa verovatno povezana sa tom koja se dešavala istovremeno.

### 3.5. MALOPRODAJA

Nacionalna Maloprodajna organizacija daje javnosti podatke za svaki praznični šoping vikend, uključujući naravno i vikend koji obuhvata Dan Zahvalnosti. Njihova definicija tog vikenda uključuje: četvrtak, petak, subotu i nedelju. Njihovim istraživanjima je obuhvaćen broj kupaca a ne ljudi. Dužina šoping sezone nije ista svake godine. Datum Crnog petka varira od 23 do 29 Novembra, dok je Badnje Veče uvek 24. Decembra. 2012. godine je bila najduža šoping sezona još od 2007. godine.

#### **U brojkama**

- 249 miliona Amerikanaca je pazarilo na „crni petak“ 2013.
- 61,4 milijarde \$ su potrošili svi kupci
- 413 \$ je u proseku svaki kupac potrošio
- 1,2 milijarde \$ je bio promet u kupovini preko interneta
- 1961. godine je prvi put upotrebljen izraz “crni petak”

#### **Roba koja se najviše kupuje na Crni petak :**

1. Posuđe (Razni lonci, šerpe, tave, kuhinjski pribor. Popusti na ovu robu su i do 70 %)

2. HD Televizori ( Crni petak je poznat po izvrsnoj TV ponudi. Najveći popusti su međutim na niže klase HD Televizora)
3. Laptop računari (Popusti na laptop računare su i do 50 %. Ako ste u potrazi za Applovim laptopom naći će te ga čak 20 % niže kod maloprodavca kao što je Amazon.com, nego u Applovim trgovinama.
4. Tableti
5. Mali kućni aparati (aparati za kafu, mikseri i slično.)
6. Video igrice (Xbox i PlayStation4, Nove igrice su na sniženju od 25% do 35%, a starije video igrice budu na sniženju i do 60% )
7. Oprema za fitnes, ručni satovi i slično.

Tabela 1. Tabela prikaz „Black friday“ po godinama

Godina	Datum	Objavljena istraživanja	Kupci(mil)	Prosečna potrošnja	Ukupna potrošnja	Anketirani potrošači	Prostor za grešku
2013	Novembar 29.	Decembar 1.	249	\$413.02	\$ 61,4 milijarde	4.864	1,7 %
2012	Novembar 23.	Novembar 25.	247	\$423.66	\$ 59,1 milijarde	4.005	1,6 %
2011	Novembar 25.	Novembar 27.	226	\$398.62	\$52,5 milijarde	3.826	1,6 %
2010	Novembar 26.	Novembar 28.	212	\$365.34	\$ 45,0 milijarde	4.306	1,5 %
2009	Novembar 27.	Novembar 29.	195	\$343.31	\$ 41,2 milijarde	4.985	1,4 %
2008	Novembar 28.	Novembar 30.	172	\$372.57	\$ 41,0 milijarde	3.370	1,7 %
2007	Novembar 23.	Novembar 25.	147	\$347.55	\$ 34,6 milijarde	2.395	1,5 %
2006	Novembar 24.	Novembar 26.	140	\$360.15	\$ 34,4 milijarde	3.090	1,5 %

#### 4. ZAKLJUČAK

Zaključak koji se može izneti jeste da je ponašanje potrošača vrlo važan segment u okviru marketinške funkcije. Preferencije, želje, motivi, potrebe, percepcije, stavovi i ostale komponente u velikoj meri odlučuju da li će se potrošači opredeliti za određeni proizvod ili uslugu.

Osnovni marketing koncept ističe da organizacije postoje kako bi zadovoljile potrebe potrošača. Ove potrebe mogu biti zadovoljene samo u stepenu u kome marketing eksperti shvataju ljude ili organizacije, tj. potrošače koji će upotrebljavati proizvode i usluge koje nude i to sprovesti bolje u odnosu na konkurente.

Informacije su potrebne organizacijama kao kupcima, organizacijama kao prodavcima i predstavnicima društvenih nauka.

Praksa je pokazala da se *ponašanje potrošača često poistovećuje sa marketing istraživanjima*. Šta više, ovi pojmovi se koriste kao sinonimi. U središtu istraživanja i jedne i druge discipline nalazi se potrošač, pa se na osnovu toga zaključuje da između njih nema bitne razlike. Međutim pravilnije je istraživanje ponašanja potrošača posmatrati kao specijalizovanu disciplinu u okviru jedne šire aktivnosti – istraživanja tržišta i marketing istraživanja.

Istraživanje ponašanja potrošača je u stvari istraživanje o tome *kako ljudi donose odluke da utroše raspoložive izvore, vreme i napor na kupovinu proizvoda i usluga* za koje veruju da će zadovoljiti njihove potrebe i želje i učiniti ih srećnijim. Sadržinski, ponašanje potrošača uključuje istraživanje šta ljudi kupuju, zašto kupuju, kako i gde kupuju i koliko često kupuju proizvode i usluge. Ovo istraživanje ide i dalje i interesuje se za ocene i stavove koje potrošači formiraju posle kupovine, tj. korišćenjem i konzumiranjem proizvoda i usluga.

Neophodno je istraživati ponašanje potrošača, uočiti karakteristike određenih segmenata, svoju ponudu prilagoditi njihovim krajnjim željama i potrebama. Na osnovu primera kupovine na "Crni petak", ne bi trebalo izazivati ekstremne reakcije kod potrošača snižavanjem cena na nivo bagatele, kako bi se ostvario povećani iznos profita. Ovim vidom kupovine dolazi do svađa, galame, psovki, frustracija, fizičkog obračuna, čak i smrti. Gube se moralne vrednosti. Fenomen "Crnog petka" polako stiže i na naše prostore, obzirom da su neki maloprodajni lanci već uočili značajnost snižavanja cena i povećanog nivo prodaje. Nadam se da će incidenti biti izbegnuti i sprečeno nedolično ponašanje.

## REFERENCE

1. V. Filipović, M. Kostić-Stanković, Marketing menadžment, FON, Beograd, 2009
2. Aker. A, D., Kumar, V. & Day, G. "Marketing Research", Wiley Publishing, Inc.
3. Vukmirović J., Vukmirović D., Marketing istraživanja, BPŠ. 2011
4. Fedor Rocco, Marketinško upravljanje, prošireno izdanje, Školska knjiga, Zagreb 2000. Godine
5. Williams, C. (2010). "Principi menadžmenta". Beograd: Data status.
6. Stanton, W. (2007). Fundamentos De Marketing - 14<sup>a</sup> Edicion . Mc Graw Hill.
7. Kotler, P., & Keller, K. L. (2012). Marketing Management.: Prentice Hall. New Jersey
8. Momčilo Milisavljević, Branko Maričić, Mirjana Gligorijević, Osnovi marketinga, Beograd 2004. Godine
9. Baker, M. J. (2005). Marketing is Marketing - Everywhere. Vikalpa, 1-10.
10. Sigurdsson, V. (2013). Consumer behaviour analysis and ascription of intentionality to the explanation of consumer choice. Marketing Theory, 133-135.
11. Dujarier, M. -A. (2014). The three sociological types of consumer work. Journal of Consumer Culture, 555–571.
12. Maričić, B. (2011). "Ponašanje potrošača".: Savremena administracija. Beograd
13. Lennon, S. J., Johnson, K., & Lee, J. (2011). A perfect storm for consumer misbehavior: Shopping on Black Friday. Clothing & Textiles Research Journal, 29 (2) (119-134).
14. Kesić, T. (2011). "Ponašanje potrošača". Adeco. Zagreb:
15. Grönroos, C. (2006). On defining marketing: finding a new roadmap for marketing. 395–417.

16. Oliver Smith, T. R. ( 1–18). Shopping with violence: Black Friday sales in the British context.
17. J. Aquino, “Transforming social media data into predictive analytics”, in Customer Relationship Management, vol. 16, pp. 38–42, 2012
18. Kotler, P., & Keller, K. L. (2012). Marketing Management. New Jersey: Prentice Hall.

## MARKETING COMBINATORICS FOR MORE SUCCESSFUL BUSINESS

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**Abstract:** Marketing combinatorics covers a number of factors that make a business successful. The change of one element of marketing activities can completely transform business.

What you actually sell, what you have to charge for the product or service, who are your customers, where the product is sold, which is the visual impression of product, positioning of the product and employees who create products are factors that determine the success or failure of the business.

If your product or service is not sold as expected, if the company achieves earnings you desire, then it means that one or more factors combinatorics require changing. This combinatorics must constantly improve and be reviewed in order to achieve the greatest possible sale and highest possible productivity.

**Keywords:** Marketing combinatorics, marketing factors, business

### 1. INTRODUCTION

The main reason for the success of a business lies in its marketing activities. In today's dynamic and competitive economy, marketing is a key tool of any business. No matter what business you do you deal with “marketing combinatorics”. Marketing combinatorics is actually a combination of several elements that are selected depending on the needs of a business and wishes of its customers. All the elements that combine must be in the correct ratio, the correct order for the business and to make their successful combination to make the real change in business.

Marketing combinatorics is a real art, not only science that enables to offer to the current and future customers what they really want. Thus meeting the specific needs of customers. Any successful marketing combinatorics determines the success you achieve in business.

### 2. MARKETING COMBINATORICS - FACTORS FOR BUSINESS GROWTH

Every successful manager who runs a business should have above-average knowledge of modern marketing world. You should be able to combine all marketing activities, skillfully communicate with vendors in all strategic planners and offer added value to consumers. What combination of marketing elements will make and offer the market affect the growth of business you run.

The first element of any business is the product or service they offer. What actually we are creating, what is its purpose and how to satisfy consumer demands are the key issues that lead to marketing success. That is the essence of business that we have. The creation of satisfied customers, meeting their demands creates business growth. Thus you can avoid competition even before they appear.

Price is the second element of the marketing combinatorics. Businesses that have a large market share, reduce costs of production, offering products and services that are with less market price. The establishment of the price is the key to the success of any business. Sometimes it is necessary to reduce the cost of the product or service but retaining the same quality or to reduce a characteristic of the product or service that isn't of great importance and benefit to the consumer. So we are able to reduce costs, keep customers and increase profits.

The third element of marketing is the promotion combinatorics. Promotion is the key link that defines what we offer to the market and to convince consumers why buy the product from us and not from competitors. The promotion starts from marketing strategy. The determination of who our customers are, how to deliver value for them, what benefit the product or service offered, why customer to choose us are questions that answers only successful promotion. Promotion creates unique offer and core business.

The fourth element of marketing combinatorics is the location. The location is critical for customers because this place can get a product or service offered. Changing the location affect both the realized sales and the profits of the business. On the one hand the new location may be more practical and more attractive to consumers, but the other may destroy the business. Because the location is one of the most important issues for any business.

The visual impression of the product or service on the potential buyer is the is the next element that has an impact on business. Consumers first impression of the product or service they receive from the first "visual impression" then making a purchase decision. Decide whether the product or service match the price, how much you want it, you are better than the competition and so on. Every business should consider in which direction would improve his product or service, would make it more appealing, more sought after and sold. Whether consumers will "fell in love at first sight", it depends on you and your business.

The next element of marketing combinatorics is positioning. Positioning refers to the creation of a concept for products and services in the minds of consumers. That positioning refers to the place that product or service occupies in the market and is determined by the preferences of consumers. The position is in direct correlation with the intentions of the business, its opportunities, plans and objectives it wants to achieve. According to Theodore Levitt positioning is the most valuable asset of the business that creates its reputation.

The last element of the overall set of marketing combinatorics are employees. Consumers actually buy products or services from businesses but from the employees themselves. Sellers who are in direct contact with consumers, perhaps because they are the most important factors that determine the success or failure of the business. Who are the people who leave the last impression ? - is the question that many managers deal with.

Receiving quick information for consumers needs today provides with so-called horizontal hierarchy - Management by walking around. Growing number of businesses have already implemented. In this type of hierarchy central place consumer and those with him were in constant contact - retailers and their bosses and even managers who first receive information on customer satisfaction.

Successful marketing is based on precise marketing activities. If a business does not give the desired results in terms of the realization of profits or the creation of loyal customers,

means that marketing combinatorics must continually changing, improving, reviewed and monitored in order to create the greatest possible sale, higher productivity because only in this way we will manage to create business growth.

To get the most from a single market and enable greater business growth is necessary to make the source of the elements of marketing combinatorics. For this it is necessary businesses to make the following tasks:

- To review the entire production line, or service that does the business;
- To define the market acting, by volume of sales, the realized profit, determination of customers and the investment that is necessary.
- Determine the development of production requirements, technology used and getting a new one;
- To evaluate competing bids and determine the difference to them;
- To choose a good position and to determine the location sells it.

### **3. MARKET RESEARCH ON THE SIGNIFICANCE OF THE COMBINATION OF MARKETING FACTOR IN BUSINESS**

To get a clear picture of the needs of potential customers and their taste is quite a difficult task. For this purpose a market research of non-carbonated soft drinks in terms of choice of which depends on the buyers to purchase a new non-carbonated non-alcoholic beverage and determine marketing combinatorics used by businesses.

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The survey was conducted in the first quarter of 2017 in companies producing beverages using a questionnaire.

The survey covered a total of 50 respondents were managers, employees in companies with different things. The survey included respondents from different age groups and different gender.

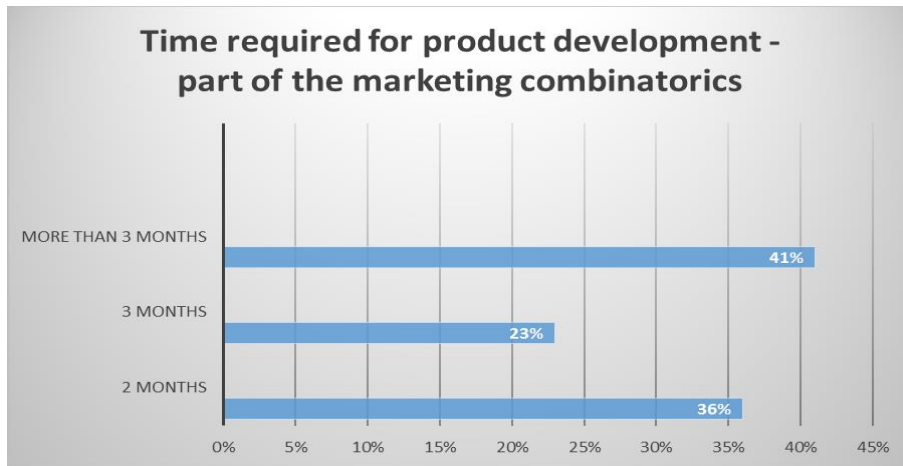


Figure 1. Time required for product development

After a survey of employees and management determined that it takes time to an average of 2 months for most companies, part of 3 months and more months to develop a good concept of a product and create a successful strategy for entering market. Managers believe that the product is the most important element of marketing combinatorics because it creates competitive advantage.

They believe that good design, quality, brand, functionality, packaging, warranty and service are the characteristics that make more than good.

All respondents said that product you pay the most attention, while the price, according to them, is also significant because it is the only factor that creates income, and the rest are costs for companies. The price is the value of the product and is connected directly to the market.

Then follows a period of a continuum of promoting products on which is expected to result in increasing sales. According to the survey the majority of respondents said they pay great attention to promotional items because without them will not be able to place the product on the market no matter how good he is. Most of them said they pay attention to economic propaganda, then the promotional sale of publicity and public relations. Respondents said they do not apply to private sales for this kind of products.

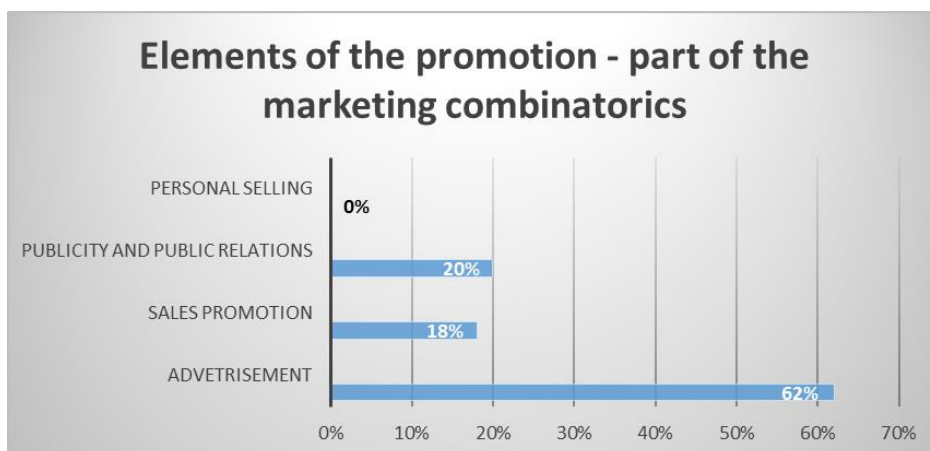


Figure 2. Elemets of the promotion



Managers work towards constantly monitoring the market, consumers, their flavors and the elements of the marketing mix. Companies are continuously working on improving the supply and constantly seeking new customers and new market segments. The products offered anywhere in discounts and markets across the country.

In terms of visual impression that businesses offer to the market constantly modify products in terms of quality improvement, style or package if necessary to attract new customers, in order to increase the quality of the product, its longevity, taste, color, packaging and visual impression that the product leaves the user.

In terms of what is that it has a decisive influence on the buying decision, managers believe that users most important is the quality of the product, then taste, a smaller proportion said that influenced the packaging and maybe she attracts buying the product. According to them the price will a crucial role in the purchase. The offered quality is the most important because they can not find products that are natural based and usually they are of concentrates and artificial colors. This permits better positioning of businesses in the market.

Human capital, ie employees are very significant value creation of the business and they deliver value to the users. Employees are the ones who create products that emotionally bind them create recognizable brands and shipped to customers.



Figure 3. Rang of the components of the marketing combinatorics

The main reason for the rise or decline of business is the success or failure of marketing activities. Any business doesn't use all elements of marketing combinatorics. If the product does not sell as it is expected and meet the needs of users, it means that some of the elements of marketing combinatorics needs changing. Successful business combines marketing factors and puts them in the center of the overall operation. When one business decisions need to analyze and thereby needs to determine the long-term potential of the products or services. To assess the advantages and disadvantages of the product it offers especially the tastes of users. Thus enables changing the position of the market and its improvement over the competition. This achieves the objective of the business, enabling business growth, efficient use of all available resources.

Therefore they should be closely monitored, amended, modified and evaluated.

#### **4. CONCLUSION**

The significance of this research can be seen through the theoretical and practical aspects. Theoretical significance can be seen just by previous research that emphasize the importance marketing combinatorics, which helps and influences the increase in sales.

The immediate application of the data from the analysis allows us to single out certain conclusions - the elements of the marketing combinatorics create real change of business, must be combined according to the activity which deals business, create greater competitiveness, meet the needs of users and enable business growth.

Purpose of business is not just profit. The goal is to create loyal customers. Profit is the result of attracting and retaining customers through the best combination of elements of marketing combinatorics.

#### **REFERENCES :**

1. Kotler. F, Amstrong.G, “Principles of marketing” , Pearson Education, Inc., Upper Saddle River, New Jersey, 2008;
2. Mulins V.Dz., Orvil.C.B., “Marketing Management”, Ars Lamina, 2012;
3. Porter, M. E. (1985). “Competitive Strategy: Creating and Sustaining Superior Performance”, New York, The Free Press;
4. Tracy. B., “Marketing”, Publicher, 2014;

## CUSTOMER ADVOCACY: A STRATEGY FOR REVAMPING E-TAILERS' SERVICES IN INDIA

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**Abstract:** The purpose of present study is to conceptualize and explore the strategic importance of e-advocacy of E-tailers' service offerings. It explores the antecedents of e-satisfaction and e-loyalty for the E-tailers services. This paper reviews the recent analysis of service quality constructs, e-loyalty, and e-satisfaction in order to understand why e-advocacy is going to be a strategic option for E-tailers. A model was developed to assess with antecedent variables for e-advocacy behaviors; the model was tested on 165 e-buyers using confirmatory factor analysis for the construct validity. Further, the effect of latent variables has been assessed by the hypnotized model by multivariate analysis.

E-satisfaction and e-loyalty through service quality constructs provide a way for e-advocacy and loyalty, while customer value has the effect on customer satisfaction but does not relate to customer advocacy for the E-tailers. Also, this paper helps in finding the relationship of satisfaction, e-loyalty and other e-service quality constructs such as convenience, security, and responsiveness. It will help the marketers to devise the strategy to improve the services offered by E-tailers for enhancing the customer loyalty and advocacy. The findings are helpful for E-tailers and marketers to improve its services in India. In addition, the findings of the study contribute and extend theory by identifying the new construct i.e. customer advocacy which will also influence future intention of consumers.

**Keywords:** e-Loyalty, e-Satisfaction, Convenience, security, E-tailer, e-Advocacy

### 1. INTRODUCTION

The e-commerce industry is in the primary stage but it has a huge potential for growth in India. People are encouraged to use the digital payment methods such as debit and credit card payments, internet banking and through E-wallets, also the increased use of E-tailers' mobile apps gives a platform for a better experience of shopping with special discounts and offers. The availability of affordable smartphones and mobile data plans has increased the online sale in the country and now India has about 292 million Smartphone users. Mobile internet user base in India has increased to 371 million in 2016 and user base is expected to annually grow by 50 million till 2019 and likely to more than double by 2020. The current online shoppers in India are in the range of 80-100 million and expected to increase to 175-220 million by 2020. (e.g. e-Marketer, 2016; Mint, 2016; RedSeer Management, 2016; Forrester Research, 2016; Ambit Capital, 2016).

Customers are considered as the firm's most valuable asset, which in turn enhances the need for customer relationship management and which focuses on the need to retain customers and make them advocate for the products offered by E-tailers such as Amazon, flip

kart etc. As the customers use social media to express their views to the wider audience their word of mouth (WOM) can influence the online customers in large. The company establishes their reputation through media exposure, branding, customer WOM or eWOM that transform the ways companies earn a reputation today via social networking sites [16]. Customers are sensitive to a website's capacity to be trustworthy for users because websites stores customers' personal information and also secures the safety of customers' transactions and private information of payment methods because their purchase occur online with no physical exchange of money ( [19], [20], [38] ).

The researcher has contributed as follows in brief:

1. The researcher has developed the model to assess the comprehensive evaluation of service quality constructs for E-tailers which includes the online vis-a-vis offline services.
2. The researcher has also identified a new variable as a sub-dimension of e-loyalty i.e. e-advocacy. E-loyalty and e-advocacy have significant influence with respect to long term relationship for E-tailers image in the market and the Return on Investment (ROI) in the long run.
3. It has been attempted to incorporate most actions from product search to final delivery of product along with post-purchase actions.
4. It is found out the consequent behavior of customer after satisfaction such as post-purchase behavior such as e-loyalty and e-advocacy.

The present study fits the Indian e-commerce industry which shows neither fully online nor fully offline e.g. it includes online payment through credit cards, debit cards, and online banking as well as cash on delivery payments and also the physical delivery of products.

## **2. CONCEPTUAL FRAMEWORK:**

### **2.1 CONVENIENCE, SECURITY, AND SATISFACTION**

#### **2.1.1 Convenience**

Physical aspects such as appearance and convenience of physical facility play a significant role to measure the service quality of retail industry. The physical aspect is a significant factor of retail service quality scale [6]. Customer perception of online convenience with respect to website influences the customer satisfaction [30]. Accessibility, navigation, design, user interface and ease of use were widely studied in previous research to ascertain e- service quality [12, 14, 37, and 38].

*H<sub>1</sub>1: Overall convenience offered by E-retailers has a significant influence on E-satisfaction.*

### 2.1.2 Security

Internet users perceive that security or trustworthiness is a basic service that should be delivered by e-tailer. It is also considered important dimension to know e-service quality in previous studies [36, 37, and 38]. Security and privacy include the extent to which customers feel safe and trust the site while purchasing from E-tailers [36]. Privacy is a degree to which the site is safe and protects customer information [20]. Customer satisfaction is the result of mostly of service quality through expectation can have a significant effect on customers' value judgment and perceptions of overall service quality. Further, a relationship was established among the overall ratings of satisfactions, perceived service quality and purchase intention.

*H<sub>13</sub>: Security offered by E-tailers has a significant influence on E-satisfaction.*

## 2.2 RESPONSIVENESS, CUSTOMER VALUE, AND SATISFACTION

### 2.2.1 Responsiveness

Responsiveness is defined as the concerns to what extent the employees are prepared to provide service. It includes mailing a transaction slip, employees' willingness to help customers and giving prompt service. Responsiveness was widely studied in earlier studies as a construct of service quality and e-service quality [8, 20, and 4]. Personal interaction used to measure the service quality in the retail industry [6]. After the increasing role of technology traditional retail stores started to convert into electronic retail stores so the personal interaction is reduced or absent in e-retail stores. The information availability also has the positive influence on e-service quality [19]. The availability of assistance through telephone or online representatives has a positive influence on the E-rec-S-Qual scale [20]. 20 Responsiveness is used as a dimension for effective handling of problems and return to the site in his e-recovery service quality scale (E-Rec-S-Qual) [20]

*H<sub>12</sub>: Responsiveness by E-tailers has a positive significant impact on E-satisfaction.*

### 2.2.2 Customer Value

Customer value is the satisfaction that customer experiences by taking a given action relative to the cost of that action. Low values reduce satisfaction but did not lead to dissatisfaction. There is a gap between men's value and women's value in each society. Further, a relationship was established among the overall ratings of satisfactions, perceived service quality and purchase intention.

Satisfaction is an overall evaluation of the purchase situation. Emotions developed during consumption experiences leave affective traces which are summed into consumers' satisfaction [18]. Performance is the separate predictor of satisfaction. Perceived performance has both direct and indirect effects on satisfaction. Satisfaction, service quality and perceived value have significant impact on behavioral intentions, further indirect effects of service quality via satisfaction enhanced their impact on behavioral intentions [5].

*H<sub>14</sub>: Customer value by E-tailers has a significant impact on E-satisfaction.*

*H<sub>17</sub>: Customer value by E-tailers has direct significant influence on E-loyalty.*

*H<sub>18</sub>: Customer value by E-tailers has significant influence on E-advocacy.*

## **2.3 E-SATISFACTION, E-LOYALTY, AND E-ADVOCACY**

### **2.3.1 E-advocacy**

E-advocacy has been defined as an enhanced form of market orientation to build deeper customer relationship by earning new levels of trust and commitment and developing mutual dialogue and partnership with customers. It can be enhanced by enabling choice transparency, focusing on customer success, improving marketing control and customer involvement and fostering knowledge creating customer partnership [2]. Customer advocacy incorporates a customer consultant [23] or Trustee advisor role [28] as cited by Christopher Lower and Simon Knox (2006) [2]. Customer advocacy reflects combinations of marketing resources that contributed to voluntary sharing customer specific information, engaging in firms sponsored marketing research activities, word of mouth referrals and increasing levels of proportions of current purchasing activities [21]. Satisfaction precedes and influences the post-purchase attitudes [18].

*H<sub>16</sub>: E-satisfaction by E-tailers has a significant influence on E-advocacy.*

### **2.3.2 E-loyalty**

E-loyalty signal behavioral customer's response. Loyalty is a process, not just an act but also more usefully for practical purposes such as influencing customers both attitudinally and behaviorally [7, 8]. Customer satisfaction for a service chosen online is the same as when it is chosen offline, loyalty to the service provider is higher when the service is chosen online than offline and the relationship between customer service and loyalty is stronger in the online purchase [29]. Customer satisfaction is an antecedent of loyalty; satisfied customers have a higher chance for repeated purchases [7, 19].

*H<sub>15</sub>: E-satisfaction by E-tailers leads to E-loyalty significantly.*

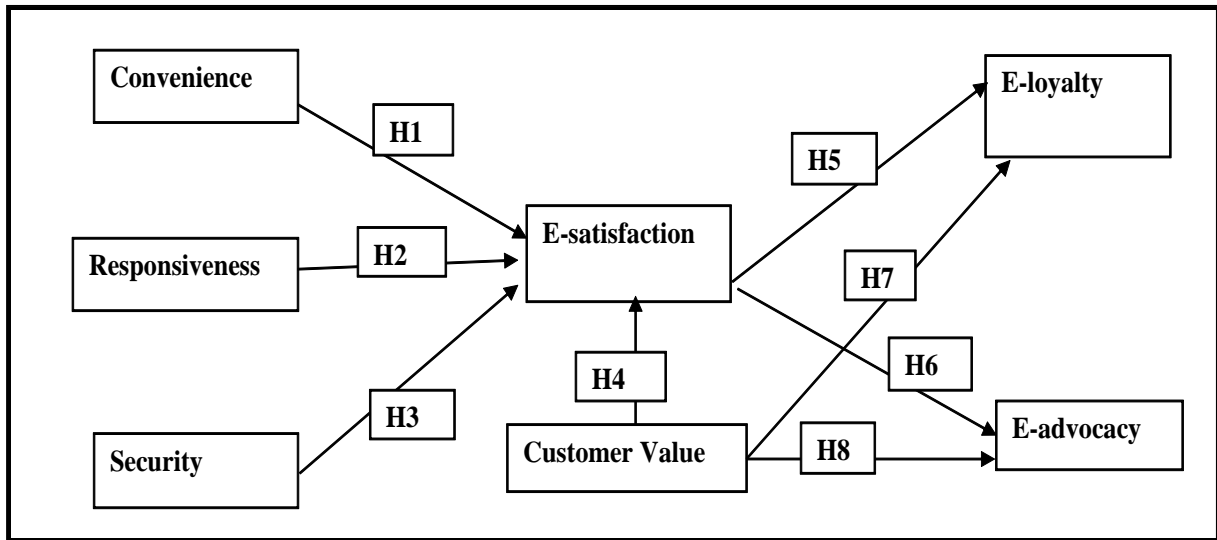


Figure1. Conceptual Framework of Hypothesized Model

### 3. METHODOLOGY

#### 3.1. RESEARCH DESIGN AND SAMPLE

The sample frame of this study consisted of the registered e-buyers of the central University which account approximately 2000, out of them 200 respondents were chosen for the study by non-probability sampling especially convenience sampling technique was used and a structured questionnaire based on the five-point Likert scale was offered. Out of 200 responses, thirty responses were incomplete. Further, 5 responses were dropped as they were outliers by analysis. Finally, we reached the sample of 165 responses, which is acceptable for multivariate research in which the required sample size is 5 to 10 times of variables for 5 to 10 percent margin of error.

Table 1. Constructs, Items, Chronbach Alpha and Factor loadings.

<b>Construct and Item (measured on 5-pt scales, strongly disagree–strongly agree)</b>	<b>Factor Loading</b>
<b>Construct reliability Overall <math>\alpha=0.911</math></b>	
Convenience $\alpha= 0.669$	0.688 0.836 0.495
2. Responsiveness $\alpha= 0.672$	0.761 0.804 0.807 0.744
3. Security $\alpha= 0.723$	0.691 0.791 0.699
4. E-satisfaction $\alpha= 0.713$	0.561 0.638 0.502
5. E-loyalty $\alpha= 0.658$	0.727 0.538 0.815
6. E-advocacy $\alpha= 0.731$	0.507 0.576 0.554 0.798
7. Customer Value $\alpha= 0.618$	0.562 0.661 0.858

### 3.2 SCALE DEVELOPMENT AND PRETEST

The researcher used the four items for e-loyalty and items of e-satisfaction were adapted from previous studies to apply in the present study [24, 18]. The four items of convenience were formulated based on the study of [14]. The items to measure the security and responsiveness were adapted from the previously validated studies where it was used to



measure the only quality of websites [20, 36]. Five items to measure customer advocacy were adapted as per the e-tailer service quality from the earlier studies, where it was used for other subjects such as brand management etc. [2, 18]. All the selected items were processed for factor analysis by principal component analysis with varimax rotation technique and items having a factor loading less than 0.40 and cross loading were dropped, which resulted in the deletion of 6 items. Further 1 item has been deleted after confirmatory factor analysis due to low factor loading leading to a reduced 23 item scale [10, 37]. Final items for study are shown in **Table 1**.

### 3.3 MEASUREMENT ANALYSIS AND VALIDATION

Factor analysis divided the whole scale into seven dimensions namely convenience, responsiveness, security, customer value, customer satisfaction, customer loyalty and customer advocacy. The reliability of the scale was measured by Cronbach's Alpha. The closer the Cronbach Alpha result is to one, the higher the reliability of the study. These constructs have the Cronbach alpha value > 0.6, which are in an acceptable range which is in **Table 1**, which indicates the reliability of constructs. The value of construct mean, Standard Deviation and correlation are given in **Table 2**.

Table 2. Means, Standard deviations, and Correlations

	Mean	Std. Deviation	1	2	3	4	5	6
1. Convenience	3.82	0.70						
2.Responsiveness	3.52	0.75	.462**					
3. Security	3.21	0.84	.306**	.378**				
4. E-satisfaction	3.58	0.80	.614**	.542**	.544**			
5. E-loyalty	3.44	0.77	.466**	.470**	.503**	.648**		
6. E-advocacy	3.54	0.72	.477**	.453**	.504**	.690**	.704**	
7.Customer Value	3.79	0.77	.465**	.505**	.268**	.605**	.486**	.568**

\*\*All correlations are significant at  $p < .01$ (2-tailed).

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value (KMO=.837) was greater than the 0.6 and Bartlett's Test of Sphericity was significant at  $P < 0.01$  ( $P = .000$ ) so the sample size of 165 was adequate and satisfactory for further analysis [10].

### 3.4 TESTING OF THE HYPOTHESIZED MODEL

Goodness-of-fit statistics:  $\chi^2=462.602$ ,  $p=.000$ (i.e.  $p < 0.01$ ),  $df = 198$ ,  $CMIN/DF=2.336$ ,  $CFI= .778$ ,  $GFI=.801$ ,  $RMSEA=.090$ ,  $NFI= .675$ , where: CFA = confirmatory factor analysis; EFA = exploratory factor analysis; CFI = Comparative Fit Index; NFI = Normed Fit Index; RFI = Relative Fit Index; TLI = Tucker-Lewis Index; RMSEA = root mean square error of approximation. The RMSEA value is less than 1.0 and  $CMIN/DF$  is  $< 5$ . The final indices show that the model adequate fit [10].

When the structural model was tested, the results showed that out of the eight hypothesized relationship between the latent constructs, five hypotheses were statistically significant.

The results of structural equation modeling suggested that E-tailers' convenience impacts the overall satisfaction of the customers and is statistically significant (C.R. =2.403, P=.016). So the alternate hypothesis H<sub>1</sub>1: Overall convenience offered by E-retailers has a significant influence on customer satisfaction, is supported.

Responsiveness of E-tailers does not impact significantly on customer satisfaction (C.R. =0.52, P=0.602). So H<sub>1</sub>2: Responsiveness by E-tailers has a positive significant impact on customer satisfaction, has not been supported.

Security of transaction system of E-tailer has a significant impact on customer satisfaction (C.R. =0.415, P=0.003). So H<sub>1</sub>3: Security offered by E-tailers has a significant influence on customer satisfaction, is supported.

Customer value offered by E-tailer has a positive significant impact on customer satisfaction (C.R. = 3.212, P=.001). So the H<sub>1</sub>4: Customer value by E-tailers has a positive significant impact on customer satisfaction, has been supported. Further Customer Value has No significant impact on Customer Satisfaction and Customer Advocacy directly. So the above alternate Hypotheses H<sub>1</sub>7 and H<sub>1</sub>8 have not supported.

Further Customer Satisfaction has a positive significant effect on both Customer loyalty and customer Advocacy (C.R. = 5.091, P=.000; C.R. = 4.783, P=.000), so the both hypotheses H<sub>1</sub>5 and H<sub>1</sub>6 are supported. Moreover, the results of Structural equation modeling are given below in **Table: 3**.

Table: 3. - Hypotheses Testing

Hypothesis	From	To	Standardized Estimate	C.R.	P-Value
H1*	Convenience	E-satisfaction	0.444	2.403	0.016
H2	Responsiveness	E-satisfaction	0.094	0.52	0.603
H3*	Security	E-satisfaction	0.415	3.011	0.003
H4*	Customer Value	E-satisfaction	0.433	3.212	0.001
H5**	E-satisfaction	E-loyalty	0.994	5.091	***
H6**	E-satisfaction	E-advocacy	0.873	4.783	***
H7	Customer Value	E-loyalty	-0.032	-.256	0.798
H8	Customer Value	E-advocacy	0.133	1.083	0.279

\*\* Significant at the P<0.01

\*Significant at P<0.05

#### 4. DISCUSSION

The present study, employing the earlier validated scale such as a WebQual, e-tailQ, and E-QUAL Model, has explored the various dimensions of total service quality of E-tailers. Dimensions of the website service quality in the context of online shopping.

The researcher has also identified new micro-variable i.e. *e-advocacy* as a sub-dimension of *e-loyalty* apart from other constructs such as *Convenience*, *Responsiveness*,

*Security*, and *Customer Value* as consequent variables of *e-satisfaction*. The factor analysis supports the study by adequate loading the items and identification of constructs.

#### 4.1 E-ADVOCACY

It includes the defending of service offered by e-retailer, will say positive things about e-tailer, encouragement of friends and others to do business, and recommendation of E-tailers' to the people. This implies that *e-advocacy* is the basic act in India after being satisfied, through the service offerings, customer discuss and defend about the product and services. It is the consequent form of e-word of mouth (e-WOM) and word of mouth (WOM) about the service offerings. As observed by several other researchers, loyal customers' affect the company's intangible assets, including a recommendation to others, repeat purchases etc. [9, 18]. The role of customer advocacy and e-WOM has studied also by previous researchers in different studies including brand management and the consequent variables of customer satisfaction and e-satisfaction [2, 31, 26, and 28].

#### 4.2 E-LOYALTY

It includes the future purchase behavior, expansion of the range of products to be purchased, and frequency of purchase from e-retailers. *E-loyalty* is an act of being loyal to a particular website or any e-retailer in terms of repeat purchase in various above given forms. As observed by several researchers, *e-loyalty* is consequent to e-satisfaction through the services offered by e-tailer. Loyal customers' affect the company's intangible assets, including a recommendation to others, repeat purchases etc. [11, 18]. Loyalty makes customers more profitable and less price sensitive [22, 32].

#### 4.3 E-SATISFACTION

It includes the satisfaction of customers through financial transactions, other service offered, and overall satisfaction of customers through the service quality of E-tailers. This implies that if the websites offer the different quality of services such as convenience, security etc, the customers are satisfied. And e-satisfaction is directly related to perceived service quality. As observed by several researchers, Customer satisfaction in and antecedent of e-loyalty and consequent of Perceived service quality [39]. Loyal customers' affect the company's intangible assets, including recommendation to others, repeat purchases etc. [9, 18].

### 5. CONCLUSION AND RESEARCH IMPLICATIONS:

As discussed earlier, the new constructs of post-purchase behavior have been introduced i.e. e-advocacy as a separate part of e-loyalty. E-advocacy has been introduced first time in this study though it has been used in other forms such as WOM or e-WOM into other different studies other than e-service quality of e-tailer. A significant contribution of the present study is that it suggests a shorter, refined scale for assessing the e-service quality

constructs of E-tailers functioning in India. The various dimensions of e-service quality have been observed by customers and its relations with the post-purchase behavior of customers.

Also, this paper helps in finding the relationship of e-satisfaction, e-loyalty and other e-service quality constructs such as convenience, security, and responsiveness. It will help the marketers to devise the strategy to improve the services offered by E-tailers for enhancing the customer loyalty and advocacy. The responsiveness which was very important determinants of customer satisfaction has differed now in the era of information technology. And it now changes from “search offline and buy online” to “search online to search offline”. The results of studies related to responsiveness are different from the earlier studies [18, 19].

Security and customer value also have effects on e-satisfaction and the study has a positive influence on e-loyalty and e-advocacy indirectly via e-satisfaction. Further e-satisfaction mediates the e-loyalty. E-satisfaction is an antecedent of loyalty; satisfied customers have a higher chance for repeated purchases similar to previous studies [7, 19].

E-satisfaction also influences e-advocacy which is similar to the post-purchase consumer behavior such as referrals, positive word of mouth etc. done by previous researchers in different studies other than e-retail industry [2, 28].

## **6. LIMITATIONS AND FUTURE RESEARCH:**

The future researcher can work on consumer perception towards these dimensions and it can be studied in the different socio-cultural environment. Further the results of the study are from a particular region that is at a university level. It can be further studied for the Pan India, and also for the tier-1, tier-2, and tier-3 cities. The future researcher can also identify other constructs of E-service quality to measure the e-satisfaction and e-loyalty for E-tailers.

## **REFERENCES:**

1. Barnes, Stuart J., Richard T. Vidgen, *Journal of Electronic Commerce Research*, 3 (3), (2002), 114-27.
2. Christopher Lower Simon Knox, *Journal of Product & Brand Management*, Vol. 15 Iss: 2, (2006), pp.121–129.
3. Christian Grönroos, *European Journal of Marketing*, Vol. 18 Iss 4, (1984), pp. 36-44.
4. Christian Grönroos, Johanna Gummerus, *Managing Service Quality*, Vol. 24 Iss: 3, (2014), pp.206 – 229.
5. Cronin, J. J., Taylor, S. A., *Journal of Marketing* 56(July), (1992), pp. 55-68.
6. Dabholkar, Pratibha, Dayle Thorpe, Joseph Rentz, *Journal of the Academy of Marketing Science*, 24 (winter), (1996), pp. 3-16.
7. Eduardo Torres-Moraga, Arturo Z. Vásquez-Parraga Jorge Zamora-González, (2008, *Journal of Consumer Marketing*, Vol. 25 Iss 5 pp. 302 – 313.

8. Forrester Research, What satisfies financial services consumers: firms that demonstrate customer advocacy overcome mistrust, (2003).
9. Griffin, J. M. and Lemmon, M. L., the Journal of Finance, 57, (2002), pp. 2317–2336.
10. Hair, F, Anderson, R. E ., Tatham, R. L. & Black, W. C., Multivariate data analysis. New Jersey: Prentice Hall, 1998.
11. Jessica Santos, Managing Service Quality: An International Journal, Vol. 13 Iss 3, (2003), pp. 233 – 246.
12. Kaynama, S., & Black, C., Journal of Professional Services Marketing, 21,1, (2000), pp.63-89.
13. Leonard L. Berry et al., Journal of Interactive Marketing 24 (2010) 155–167.
14. Liljander. V., Strandvik. T., International Journal of Service Industry Management 4(2), (1993), pp. 6-28.
15. Mittal, B., Lasser, W. M., Journal of Services Marketing, 12(3), (1998), pp.177–194.
16. Minjeong Kim, Jung Hwan Kim, Sharron J. Lennon; Managing Service Quality: An International Journal, Vol. 16 Iss: 1, (2006), pp.51 – 77.
17. Nitin Seth, S.G. Deshmukh, Prem Vrat, International Journal of Quality & Reliability Management, Vol. 22 Iss 9, (2005), pp. 913-949.
18. Oliver, R. L., New York: McGraw-Hill International, (1997).
19. Parasuraman, A., Zeithaml, V.A., Berry, L.L., Journal of Retailing, Vol. 64 No. 1, (1988), pp. 12-40.
20. Parasuraman, A. Zeithaml, V, Malhotra A, *Journal of Service Research*, 7(3), (2005), pp. 213-233.
21. Russell Lacey, Robert M. Morgan, Journal of Business & Industrial Marketing, Vol. 24 Iss 1, (2008), pp. 3 – 13.
22. Reichheld, F.F., and Schefter, P., Harvard Business Review, Vol. 78 No. 4, (2000), pp. 105-113.
23. Ravi S. Achrol and Philip Kotler, *Journal of Marketing*, Vol. 63, Fundamental Issues and Directions for Marketing, (1999), pp.146-163.
24. Ross H Taplin, Tourism Management , Iss:36, (2013), pp. 238-246.
25. Robert M. Morgan, Shelby D. Hunt, *Journal of Marketing*, Vol. 58, No. 3 (Jul., 1994), pp. 20-38.
26. Ravi S. Achrol, Philip Kotler, *Journal of Marketing*, Vol. 63, (1999), pp.46-163.
27. Reichheld, F.F. and P. Schefter, Harvard Business Review, Vol. 78, No. 4, (2000), pp. 105-113.

28. Sheth, J.N., Sisodia, R and Sharma, A , journal of academy of marketing science, Vol. 28, winter, pp. 55-66.
29. Shankar, Venkatesh, Amy K. Smith, and Arvind Rangaswamy, International Journal of Research in Marketing, 20(2), (2003), pp. 153-75.
30. Szymanski, David M., Richard T. Hise, *Journal of Retailing*, 76 (3), (2000), pp. 309-22.
31. Sharma and Mittal, Asian Journal of management and research. 3(2), (2009), pp. 396-408.
32. Srinivasan, S.S., Anderson, R. and Ponnayolu, K., *Journal of Retailing*, Vol. 78, (2002), pp. 41-50.
33. Szymanski, D.M., and Hise, R.T., *Journal of Retailing*, Vol. 76 No. 3, (2000), pp. 309-22.
34. Trocchia, P.J. and Janda, S., *Journal of Services Marketing*, Vol. 17 No. 3, (2003), pp. 243-53.
35. Thichakorn Visansakon., *Journal of Economics, Business, and Management* (3), 2015.
36. Wolfinbarger, Mary, Mary C. Gilly, *Journal of Retailing*, 79 (3), (2003), pp.183-98.
37. Yoo, B., Donthu, N., *Quarterly Journal of Electronic Commerce*, Vol. 2 No. 1, (2001), pp. 31-46.
38. Zeithaml, V.A., Parasuraman, A., Malhotra, A., *Journal of the Academy of Marketing Science*, Vol. 30 No. 4, (2002), pp. 362-75.
39. Z. Yang, S. Cai, Z. Zhou, N. Zhou, *Information & Management*, 42 (4) (2005), pp. 575-589

## APPLICATION MODEL OF SIX SIGMA METHODOLOGY

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**Abstract:** The paper presents a model of Six Sigma methodology in order to improve the process in an industrial company that will operate in the Republic of Serbia. Model application should provide an adequate solution to the issue of achieving, maintaining and improving the competitiveness of industrial companies, and create conditions for successful operation for market environment.

**Keywords:** Six Sigma Methodology, model, improvement

### 1. UVOD

Model upotrebe Šest Sigma metodologije u industrijskim preduzećima koja posluju na teritoriji R. Srbije predstavlja jedno od mogućih rešenja uspešnijeg poslovanja.

### 2. TEORIJSKA ZASNOVANOST MODELA

U teorijskom smislu model primene metodologije Šest Sigma ( $6\sigma$ ) za unapređenje procesa industrijskog preduzeća se oslanja na sve one postulate koji uslovljavaju poslovnu izvrsnost u svetskim okvirima, ali se zasniva i na potencijalu - mogućnostima domaćih preduzeća da teže takvoj izvrsnosti.

Opšte osnove poslovne izvrsnosti date su principima nagrada za kvalitet:

- Demingove nagrade (Japan)
- Malkolm Boldridž nagrade (SAD)
- EFQM nagrade (EU)

Verzija standarda ISO 9000:2008 podržana je sa osam menadžment principa i četiri mega procesa [1]. Principi upravljanja kvalitetom su obuhvatna i fundamentalna pravila za vođenje i funkcionisanje organizacije, a to su:

1. Organizacija okrenuta kupcu,
2. Liderstvo,
3. Uključenost ljudi,
4. Procesni pristup,
5. Sistemski pristup,

6. Stalno unapređenje,
7. Činjenični pristup odlučivanju,
8. Obostrano koristan odnos sa snabdevačima.

Sistem menadžmenta kvalitetom, a koji je, takođe jedna od osnova modela primene metodologije Šest Sigma ( $6\sigma$ ) za unapređenje procesa industrijskog preduzeća, zasniva se na četiri, standardima ISO 9000 megaprocesa u okviru kojih se definiše sistem upravljanja kvalitetom, a to su:

1. Odgovornost rukovodstva,
2. Upravljanje resursima,
3. Realizacija proizvoda,
4. Merenje, analiza i unapređenje.

Metodologija Šest Sigma, kao ključna teorijska osnova predloženog modela se, kako je prethodno obrazloženo, zasniva na DMAIC metodi i na njenih sledećih pet faza [2]:

1. Definisanje (Define)
2. Merenje (Measure)
3. Analiza (Analyse)
4. Poboljšanje (Improve)
5. Kontrola (Control)

Opšti teoretski model upravljanja procesima u organizaciji, naročito podržan strukturom i zahtevima međunarodnih standarda u području kvaliteta (serija ISO 9000), podrazumeva da se sve aktivnosti u bilo kojoj organizaciji mogu grupisati u tri glavne grupe procesa:

1. Upravljački procesi,
2. Osnovni procesi i
3. Procesni podrške.

U upravljačke procese spadaju planiranje i analiza, upravljanje razvojem, upravljanje resursima (ljudskim i infrastrukturnim) i upravljanje kvalitetom. U osnovne procese spadaju procesi koji opredeljuju svrhu organizacije, odnosno procesi proizvodnje i/ili davanja usluga i procesi na relaciji organizacija - kupci i relaciji organizacija - dobavljači. U procese podrške spadaju finansijsko poslovanje, poslovna administracija, tehničko održavanje i dr.

Na ulazu u procesni model nalaze se zahtevi korisnika, a na izlazu modela nalazi se modul Merenje i analize od kojih se, u svetlu unapređenja posebno izdvajaju analiza performansi procesa i analiza zadovoljstva korisnika. Informacije iz dela analize zadovoljstva



korisnika predstavljaju ulaze u naredni ciklus procesa planiranja radi unapređivanja kvaliteta poslovanja organizacije po principu stalnog poboljšanja.

### 3. METODOLOŠKI OKVIR MODELA

Model Šest Sigma treba da se fokusira na unapređenje efikasnosti poslovanja, da polazi od potrošača i njihovih zahteva, a krajnji rezultat upotrebe metodologije predstavlja unapređenje konkurentnosti poslovnih subjekata.

Model koncepta Šest Sigma sistema podrazumeva sledeće elemente:

- Zadovoljenje zahteva korisnika,
- Delovanje faktora opredeljujućeg dejstva,
- Delovanje faktora usmeravajućeg dejstva,
- Proces upravljanja organizacijom,
- Poslovna strategija,
- Postizanje poslovne izvrsnosti.

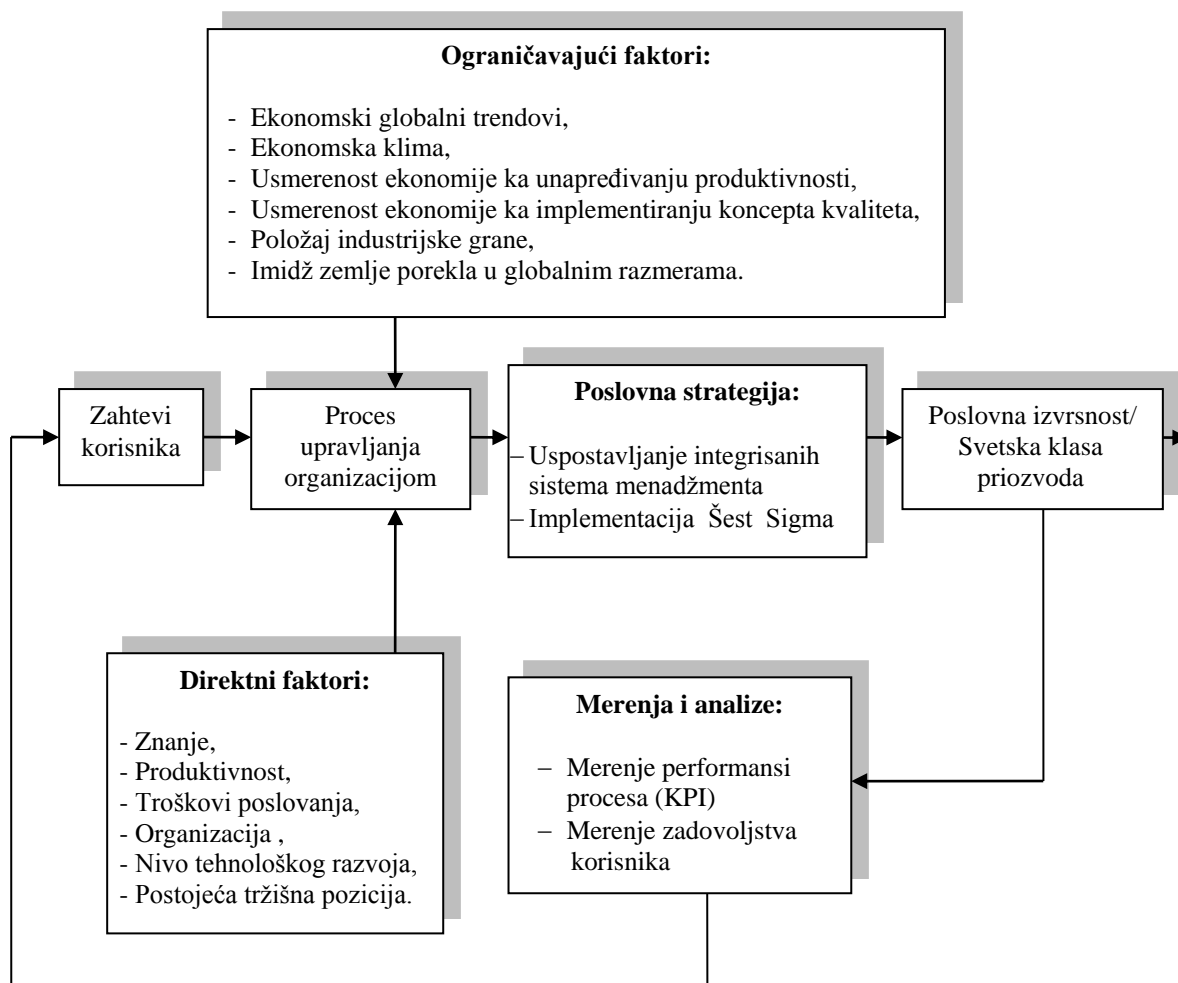
Prilikom realizacije Šest Sigma metodologije, koja se fokusira na unapređenje efikasnosti poslovanja, mora se početi od potrošača, odnosno, korisnika. Kupci, potrošači i korisnici usluga, predstavljaju početnu i završnu tačku bilo koje tržišne aktivnosti. Svaka poslovna organizacija mora svoje delovanje da usmeri ka potrošačima i da u formulisanju svojih poslovnih aktivnosti počne od potreba, želja i zahteva korisnika da bi se zadovoljili navedeni zahtevi kao donja granica, odnosno da bi se prevazišla očekivanja samih korisnika.

Na osnovu prethodno prikazane analize teorijskih osnova, a posebno rezultata koji se odnose na primenu TQM koncepta, međunarodnih ISO standarda koji sugerišu uspostavljanje parcijalnih ili integrisanih sistema menadžmenta (IMS), metodoloških postavki Šest Sigma ( $6\sigma$ ) koncepta i provedenih empirijskih istraživanja bilo je moguće razviti Model primene metodologije Šest Sigma ( $6\sigma$ ) za unapređenje procesa industrijskog preduzeća.

Grafički prikaz Modela primene metodologije Šest Sigma ( $6\sigma$ ) za unapređenje procesa industrijskog preduzeća osnove (ŠS model)<sup>1</sup> je dat na slici 1:

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<sup>1</sup> Šest Sigma model



Slika 1. Model primene metodologije Šest Sigma (6σ) za unapređenje procesa industrijskog preduzeća osnove (ŠS model) [3]

Polazeći od potreba, želja i zahteva korisnika, u odnosu na delovanje dve identifikovane grupe faktora (faktori opredeljujućeg i usmeravajućeg dejstva), organizacija postiže poslovnu izvrsnost na osnovu primene Integrisanih menadžment sistema i Šest Sigma metodologije zasnovanih na principu stalnog poboljšanja procesa u organizaciji i podizanju nivoa efikasnosti i efektivnosti sistema menadžmenta.

Radi stalnog unapređenja kvaliteta poslovanja potrebna su merenja, analize i unapređivanje procesa, proizvoda i usluga. Posebna pažnja mora se posvetiti modulu Merenje i analize koji, u sklopu dejstva faktora direktnog dejstva i ograničavajućih faktora na ukupnu poslovnu izvrsnost, gde se, kako je istraživanjima dokazano, posebno izdvajaju analiza performansi procesa i analiza zadovoljstva korisnika.

#### ***Faktori direktnog dejstva***

Unapređivanje produktivnosti poslovanja predstavlja osnovni parametar uspešnosti organizacije i ono podrazumeva stvaranje uslova za unapređivanje produktivnosti znanja, kao

posledicu toga i produktivnosti rada. Unapređenje kvaliteta omogućava unapređenje produktivnosti poslovanja i obrnuto.

Unapređenje produktivnosti poslovanja snižava troškove poslovanja, što stvara uslove za kreiranje prodajnih cena na nižem nivou, što opet omogućava povećanje prodaje na tržištu, formiranje većeg bruto prihoda i mase profita. Time se stiče uslov za investiranje u nove tehnologije, proizvodne programe, konkretne proizvode i usluge, što utiče na unapređenje kvaliteta poslovanja.

Unapređenje produktivnosti poslovanja zahteva i unapređenje organizacione strukture preduzeća. Organizaciona struktura preduzeća mora da grabi napred za informacijama kako na vertikalnom, tako i na horizontalnom nivou.

Brzi tehnološki razvoj zahteva od organizacija da, paralelno sa unapređivanjem produktivnosti znanja, inoviraju i svoju tehnološku osnovu, prevashodno misleći na primenu informacionih tehnologija kao preduslova za uspešno poslovanje i postizanje poslovne izvrsnosti.

Postojeća tržišna pozicija predstavlja osnovu za dalji tržišni razvoj i stvaranje konkurentne pozicije. Na tržištu deluju proizvođači koji se bore da pridobiju što više potrošača za sebe i da servisiraju njihove potrebe, čime definišu svoju tržišnu poziciju.

#### ***Faktori ograničavajućeg dejstva***

Razvoj tehnologije i homogenizacija zahteva potrošača su jedni od trendova koji određuju okvire savremenog poslovanja. Sem njih postoji još nekoliko trendova koji uobličavaju savremeno poslovanje kao što su:

- Sve veći značaj uslužnog sektora,
- Rast neprofitnog sektora,
- Menjanje svetske ekonomije,
- Zahtevi za značajnu društvenu odgovornost u poslovanju.

Globalni ekonomski trendovi menjaju se i razvijaju, tako da preduzeća moraju da imaju aktivan i pozitivan odnos prema njima.

Ekonomska klima predstavlja uslove na tržištu u kojima se obavlja poslovna aktivnost. Ti uslovi mogu biti veoma povoljni, povoljni, nepovoljni i veoma nepovoljni. U svakom slučaju, preduzeće se nalazi pod značajnim uticajem promena koje se dešavaju u ekonomskoj klimi, pa mora posvetiti pažnju ovim faktorima.

Postizanje poslovne izvrsnosti preduzeća se može postići jedino na osnovu kontinualnog unapređivanja kvaliteta poslovanja organizacije koje je zasnovano na produktivnosti rada i znanja svakog pojedinca zaposlenog u organizaciji.

Orijentacija ekonomije ka implementiranju koncepta kvaliteta je u tesnoj vezi sa orijentacijom društva ka unapređenju produktivnosti. Naime, u društvu je potrebno stvoriti preduslove za implementaciju osnovnih načela unapređenja kvaliteta, koji će se kasnije opredmetiti u konkretnoj primeni različitih oblika unapređenja kvaliteta u organizacijama.

Pozicija industrijske grane važna je zbog ograničenja i šansi na koje nailazi preduzeće koje pripada datoj grani. Važni činioci su:

- Kolika je ukupna veličina tržišta date industrijske grane (veličina potencijalne prodaje, broj potrošača),
- Da li postoji sezonski uticaj na obavljanje poslovanja u grani,
- Koji trendovi utiču na poslovanje u grani (kamatna stopa, državna regulativa i dr.),
- Kakva je dugoročna pozicija industrijske grane.

Imidž zemlje porekla je od izuzetnog značaja za sva preduzeća koja svoju egzistenciju usmeravaju ka internacionalizaciji poslovanja. Imidž zemlje jeste kompletna predstava o proizvodima iz određene zemlje koja je zasnovana na kombinaciji opažanja o prednostima i nedostacima u domenu proizvodnje i marketinga. Sam imidž zemlje porekla podložan je promenama tokom vremena.

#### **4. ZAKLJUČAK**

Model, koji je predstavljen u ovom radu, je originalan i može poslužiti kao dobra osnova za unapređenje poslovnih procesa u industrijskim preduzećima koja rade u našoj zemlji, jer on integriše tehničke, organizacione i etičke aspekte poslovanja u multifunkcionalan koncept.

#### **REFERENCE**

1. Srpski standard SRPS ISO 9001:2008 Sistemi menadžmenta kvalitetom – Zahtevi. Institut za standardizaciju Srbije, Beograd, 2008.
2. ISO 13053-1:2011, Quantitative methods in process improvement Six Sigma Part 1: DMAIC methodology. International Organization for Standardization, Geneva, 2010.
3. S. Spasojević, Model primene Šest Sigma ( $6\sigma$ ) metodologije u funkciji unapređenja procesa industrijskog preduzeća, Doktorska disertacija, Fakultet tehničkih nauka Novi Sad, 2013, pp. 177-182

## MULTICRITERIA ANALYSIS OF ACCIDENTS IN UNDERGROUND PRODUCTION SYSTEMS

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**Abstract:** The mine accident represents every manifestation of source of danger with and without human sacrifice, which leads to damage of mining facilities or interruption of production. In the world as well as in our country the accidents in underground production systems occur often. Accordingly, this paper analyzes the most important types of accidents in order to define measures for their prevention and the appropriate criteria for their ranking. AHP method is used for the ranking of the accidents. The obtained result identifies the most serious types of accidents in underground production systems, with the aim of creating a base for help in the future design and operation of the mine, especially in the part concerning the prevention and protection measures for these adverse effects.

**Keywords:** Accidents, Underground Production System, AHP

### 1. INTRODUCTION

The technological process of underground mining implies the set of the operations that are interconnected and coordinated in time and space. These operations include the researches, opening up, development, excavation, transport, haulage, processing, then the ventilation, drainage, supply and shipment of raw materials, transportation of employees, etc.

Contemporary mine is a complex production system for excavation and processing of useful mineral raw materials.

Underground mining is by its nature the bearer of potential accident hazard. Accidents and individual injuries in an underground production systems can be due to a number of influencing factors [1].

In solving the real problems of work safety and security in the mine, it is necessary to analyze in detail the most important natural and technical-technological factors and assess possible negative effects on the functioning of the technological process and the emergence of potential hazards for employees. In this way it is possible to completely eliminate or reduce the level of risk.

The requirement to reduce the number of accidents in underground production systems represents an increase in overall safety in the mines, and improve the level of safety and health of employees.

In fact, the prevention of accidents in underground mines is a very complex process that requires a lot of effort and expertise. However, mines that regularly carry out preventive measures realized many benefits and advantages compared to other mines where they do not pay great attention to such measures. For this reason, this paper puts the focus on the most often types of accidents in underground production systems. The aim is to identify the most important types of accidents and to carry out their ranking in accordance to defined criteria.

## 2. ACCIDENTS IN UNDERGROUND PRODUCTION SYSTEMS

The various accidents occur in underground mining that have more or less negative consequences for the mine and employees.

Accidents in mines represent each event of source of danger, with or without casualties, which lead to damage of mining facilities or interruption of production.

Mining disasters are accidents with two or more perished miners.

According to the source, the accidents that have serious consequences on the underground production system can be divided into five groups, as follows:

- **Large scale rock demolishing and rock bursts (Alternative A1)** – these are usually mining disasters that occur suddenly when the large scale rock fracture and demolition occur with a large number of victims.
- **Sludge and water breakthroughs (Alternative A2)** – sudden filling of underground excavations by water, sludge and other materials, whereby a equipment is covered, with or without the victims.
- **The explosion of the explosive mixture gas and air or mixture of air and coal dust, and non-controlled explosion of explosive (Alternative A3)** – this is the mine disaster with extensive destruction, and a large number of victims. It is characteristic for coal mines with a methane – methane mines.
- **Mine endogenous or exogenous fires (Alternative A4)** – phenomena that are often characteristic of the coal mines. Fire occurs for various reasons, such as self-combustion of coal in the old works. It can lead to interruption of production, and toxic and noxious gases may threaten the lives of miners.
- **Toxic and noxious gases breakthroughs from their collectors (Alternative A5)** – this is also characteristic of the coal mines. Toxic and noxious gases (methane, CO, CO<sub>2</sub>, etc.) that are under great pressure in their natural collectors can rapidly penetrate the underground excavations through the cracks and similarly made by exploitation and endanger all workers, but also damage the equipment, etc.

## 3. DEFINING THE CRITERIA FOR MINE ACCIDENTS RANKING

The criteria include the most important parameters for accidents ranking in underground production systems, which are:

**Size of damage (criterion C1)** is a very important factor that has a great influence on accidents ranking process in underground mines. This criterion indicates the total damage that was caused by the accident.

**The degree of threat to employees (criterion C2)** is also a very important factor that significantly affects the ranking of accidents. It points to the danger to the health and lives of employees at the mine, depending on the type of accident.

**Time of mine repair (criterion C3)** is a criterion that takes into account the time required to mine recover from accidents and to start its normal work.

**The cost of mine repair (criterion C4)** is a criterion that takes into account the total cost of rehabilitation of the mine after the accident. Costs include the rehabilitation of underground excavations, purchase and equipment repair, purchase of materials and others.

**The possibility to prevent accidents (criterion C5)** is a criterion that includes all the measures, along with their costs in order to prevent or minimize the probability of the occurrence of an accident in a mine, in accordance with the type of emergency.

#### 4. AHP METHOD

AHP is a quantitative technique that displays and analyzes the complex decision making problem in a multi-dimensional hierarchical structure of objectives, criteria and alternatives. AHP calculates the strength of each criterion, then compares the alternatives with respect to the criteria and finally ranks the alternatives [2].

Accordingly, AHP uses a comparison matrix to assess the impact of each criterion and comparison of alternatives in relation to the each criterion. Comparison of criteria and alternatives is made on the basis of assessment of 1 to 9 – Table 1.

Table 1. Pair-wise Comparison Scale for AHP preference

Verbal Judgement	Numerical Rating
Equally preferred	1
Moderately preferred	3
Strongly preferred	5
Very strongly preferred	7
Extremely preferred	9
2, 4, 6 and 8 are intermediate values	

Based on a comparison of the decision elements, the application of proper assessment leads to the final rank of alternatives.

#### 5. RANKING RESULTS OF ACCIDENTS

After defining alternatives (a types of accidents) and the criteria, they are being scored and ranked by AHP method. In addition, the Criterion DecisionPlus software was used for calculations.

At the same time, the underground coal mines in Serbia are considered because there are the most difficult working conditions and there occur many accidents [3-6].

Firstly, the multi-dimensional hierarchical structure of the objectives, criteria and alternatives is defined – Figure 1. After that, That is the coefficients of criterion weights are determined based on the scale of comparison given in Table 1. The results of comparison are shown in Table 2 and Table 3.

Table 2. Defining of criterion weights

Criterion	C1	C2	C3	C4	C5
C1	1	1	3	2	1
C2		1	5	3	2
C3			1	1/3	1/3
C4				1	1/3
C5					1

Table 3. The results of criterion weights

Criterion	C1	C2	C3	C4	C5
Criterion weights	0.243	0.337	0.064	0.122	0.234
Coeff. of consistency	0.033 < 0.1				

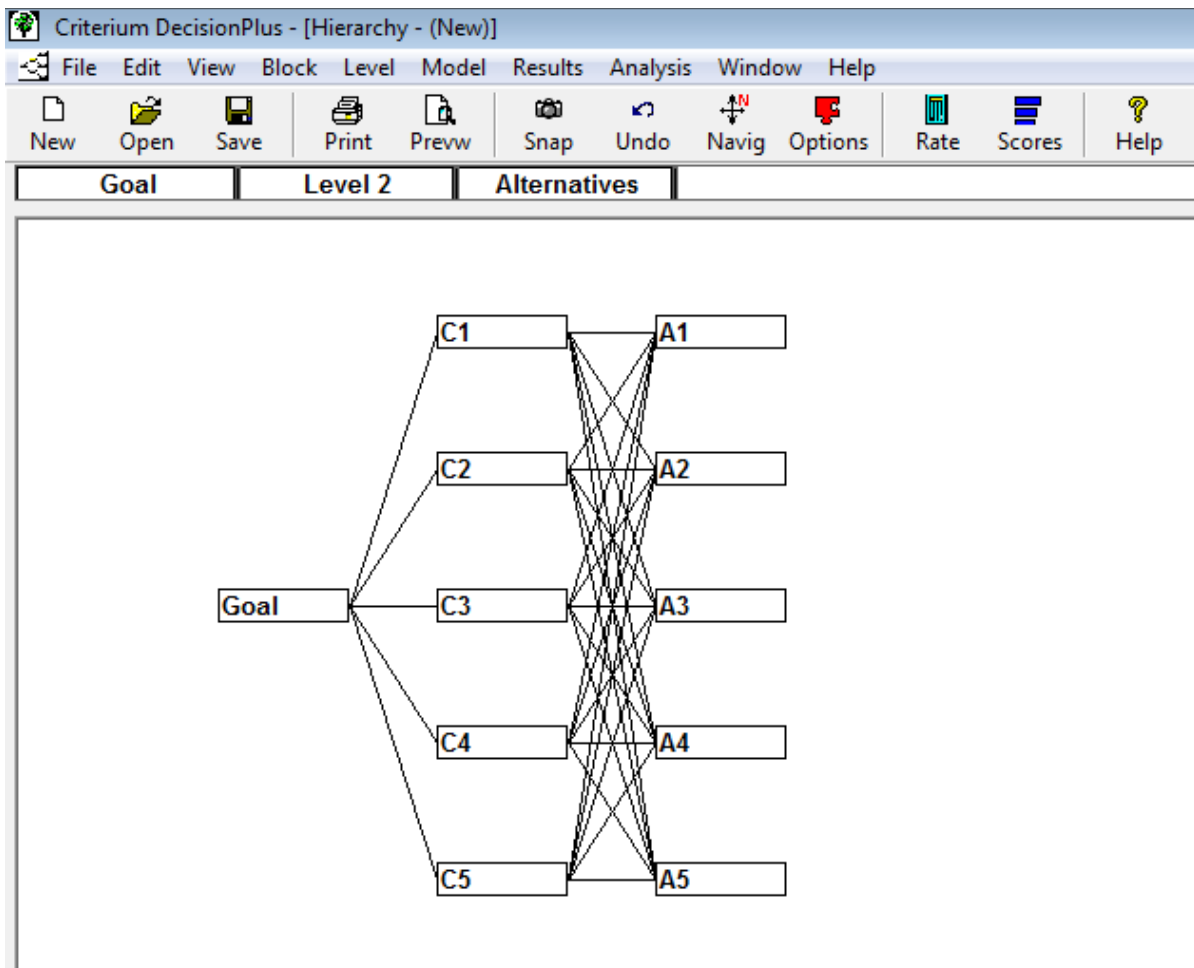


Figure 1. Hierarchical decision structure (Criterium DecisionPlus softver)

In the next step, the comparison of the defined mine accidents (alternatives) in relation to all five criteria is done – Tables 4 – 8.



Table 4. Alternatives comparison in relation to criterion C1

Alternatives	A1	A2	A3	A4	A5
A1	1	7	1	3	5
A2		1	1/4	1/3	1
A3			1	4	3
A4				1	2
A5					1
<b>Coeff. of consistency</b>	0.030<0.1				

Table 5. Alternatives comparison in relation to criterion C2

Alternatives	A1	A2	A3	A4	A5
A1	1	4	1/2	5	6
A2		1	1/7	1/5	1/3
A3			1	4	7
A4				1	2
A5					1
<b>Coeff. of consistency</b>	0.087<0.1				

Table 6. Alternatives comparison in relation to criterion C3

Alternatives	A1	A2	A3	A4	A5
A1	1	8	3	6	8
A2		1	1/6	1	2
A3			1	4	6
A4				1	3
A5					1
<b>Coeff. of consistency</b>	0.039<0.1				

Table 7. Alternatives comparison in relation to criterion C4

Alternatives	A1	A2	A3	A4	A5
A1	1	7	2	5	7
A2		1	1/5	1	2
A3			1	3	5
A4				1	2
A5					1
<b>Coeff. of consistency</b>	0.016<0.1				

Table 8. Alternatives comparison in relation to criterion C5

Alternatives	A1	A2	A3	A4	A5
A1	1	1/5	1/3	1/2	1/3
A2		1	3	1	1
A3			1	1/3	1/4
A4				1	1/2
A5					1
<b>Coeff. of consistency</b>	0.060<0.1				

Finally, the results of ranking are obtained – Table 9. The results indicate that the most serious type of accident is an alternative A1 (large scale rock demolishing and rock bursts). In the second place is an alternative A3 (the explosion of the explosive mixture gas and air or mixture of air and coal dust, and non-controlled explosion of explosive), in the third place is an alternative A4 (mine endogenous or exogenous fires), in the fourth position is an alternative A5 (toxic and noxious gases breakthroughs from their collectors) and in the last place is an alternative A2 (sludge and water breakthroughs).

Table 9. The final rank of the alternatives

No.	Accident	Result
1.	A1 (Large scale rock demolishing and rock bursts)	0.312
2.	A3 (The explosion of the explosive mixture gas and air or mixture of air and coal dust, and non-controlled explosion of explosive)	0.310
3.	A4 (Mine endogenous or exogenous fires)	0.141
4.	A5 (Toxic and noxious gases breakthroughs from their collectors)	0.126
5.	A2 (Sludge and water breakthroughs)	0.111

## 6. THE ANALYSIS OF OBTAINED RESULTS

When analyzing the impact of the criteria on the order of alternatives ranking we start from the most influential criterion – the degree of threat to employees. It points to the degree of danger to the health and lives of employees at the mine. Employees are the most important because their loss or injury is irrecoverable loss for mines and beyond.

In second place is the criterion the size of the damage. It represents the total damage that was caused by the accident. After employees, the damage is the biggest loss of the mine.

In third place is the criterion the possibility of preventing accidents. When ranking the accidents, it is very important to define all measures, together with their costs in order to prevent or minimize the probability of occurrence of the accident at the mine. In fact, most accidents can be prevented by applying appropriate preventive measures.

In fourth place is the criterion the cost of mine repair. This is a criterion that takes into account the total cost of rehabilitation of the mine after the accident. Various types of accidents lead to different costs of rehabilitation of mines and reinstatement.

On the last place is the criterion time of mine repair. It takes into account the time required to mine recover after accident and to restore its normal work. Time of mine repair also depends on the type of accident and the caused consequences of the accident.

In the analysis of the final rank of alternatives (accidents in underground production systems) it is started from the most devastating and most difficult accidents (first group of accidents). These are alternative A1 (large scale rock demolishing and rock bursts) and A3 (the explosion of the explosive mixture gas and air or mixture of air and coal dust, and non-controlled explosion of explosive). These are the worst forms of accidents with great material destruction and often with a significant number of casualties.

The third, fourth and fifth places in the ranking process are alternatives A4 (mine endogenous or exogenous fires), A5 (toxic and noxious gases breakthroughs from their

collectors) and A2 (sludge and water breakthroughs). This is the second group of accidents, that usually cause less damage and human casualties, but have a higher frequency of events.

## 7. CONCLUSION

In this paper is applied multicriteria method for ranking of accidents in underground production systems. Accidents significantly and adversely affect the operation of the mine due to the large material damage and human losses that they cause. It is analyzed the five types of accident according to their source – large scale rock demolishing and rock bursts (alternative A1), sludge and water breakthroughs (alternative 2), the explosion of the explosive mixture gas and air or mixture of air and coal dust, and non-controlled explosion of explosive (alternative A3), mine endogenous or exogenous fires (alternative to A4) and toxic and noxious gases breakthroughs from their collectors (alternative A5). It is also discussed five criterions for ranking – the size of the damage (criterion C1), the degree of threat to employees (criterion C2), the time of mine repair (criterion C3), the cost of mine repair (criterion C4) and the possibility to prevent accidents (criterion C5).

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

Based on the obtained results by AHP method, it is identified the most dangerous and difficult accidents in the mines, which are alternative A1 (large scale rock demolishing and rock bursts) and A3 (the explosion of the explosive mixture gas and air or mixture of air and coal dust, and non-controlled explosion of explosive). The most influential criterion for ranking the accidents in mines is the criterion C2 (the degree of threat to employees).

## REFERENCES

1. Ivković M., Miljanović J., Figun Lj., Kovačević Ž., Rudarski radovi, 3, (2014), 26-35.
2. Saaty T.L., The Analytical Hierarchy Process, New York, McGraw-Hill, 1980.
3. Babović M. et al., Rudarski radovi, 3, (2014), 1-13.
4. Denić M., Kokerić S., Rudarski radovi, 4, (2013), 1-12.
5. Ivković M., Energija-Ekonomija-Ekologija, No. 4, (2010), 5- 8.
6. Vidanović N. et al, Mining and Metallurgy Engineering Bor, 3, (2013), 81-88.

## ENVIRONMENTAL COST MANAGEMENT IN RETAIL

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**Abstract:** Lately, there is an increasing influence of environmental costs - ecological costs on performance of companies in all sectors, including food sector and food retail. That is why considerable attention is devoted to their analysis, both in theory and practice. This paper examines the determinants of dynamics and specifics of environmental cost structure, as well their impact on the performance in food retail. Three significant categories of environmental costs in the food retail are: energy use, carbon dioxide emissions and water use. It is necessary to effectively manage them in order to "optimize" their influence, as well as the total environmental costs on performance in the food retail. For this purpose it is necessary to develop appropriate strategies and apply relevant methods of environmental cost management as important determinants and components of the overall sustainable value (environmental value, social value and economic value) in food retail. In the context of that, so called "green business" development should be considered, especially green building retail, private label and organic products sale.

**Keywords:** renewable energy, greenhouse gases, water, supply chain, sustainable indicators.

### 1. INTRODUCTION

Due to the increasing importance, concerning the positive impact on performance, considerable attention is devoted, both in theory and practice, to exploring the effects of the development and implementation of the concept of sustainable development (which integrates environmental, social and economic dimensions) in food retail. In the context of this, the effects of environmental costs - ecological costs on performance in food retail are particularly examined. Also, the attention is paid to the analysis of the dynamics of organic food sales in specific types of shops (Lukic, 2011, 12).

Considering the importance of treated problems in this paper, we have especially highlighted: the importance of the food sector, the dynamics of organic food sale, specifics of environmental influence on food supply chain, components of food cost, the structure of environmental costs in retail and food and beverage sectors (of the S & P 500), the importance of energy efficiency, the effects of carbon dioxide emissions that produces the greenhouse effect, the need to reduce water use in food retail, food waste treatment, trend of eco-labelling (private label) in food sector, and a system of sustainable indicators in food retail. Considerable attention is devoted to the strategies and techniques of environmental cost management in retail as an important member of the food supply chain. Thus, in our opinion, this paper thoroughly treated the given problems and it should, provide relevant theoretical, methodological and empirical basis for further study of this very important, current and complex issue (Anders, 2011; Bircic-Stipcevic et al., 2011; Eriksson, 2012; Papista, 2012; Van Passel, 2013).

## 2. THE INFLUENCE OF ENVIRONMENT ON THE FOOD SUPPLY CHAIN

The food sector in the EU is the first in its revenue, with more than 8 million employees. Logistics and supply chain management plays a significant role in the food sector. The characteristics of the food supply chain are different for low, medium and high-income countries (Boye, 2013). They are, as an illustration, shown in Table 1, and each country can be seen through the characteristics of its food supply chain, such as Serbia - a modernized agriculture.

Table 1. The main characteristics of the food supply chain for low, medium and high-income countries

Constituents of the food supply chain	Traditional agriculture	Modernized agriculture	Industrialized agriculture
Inputs, the intensity	Low input use	High level of use	Enhanced input use efficiency
Primary agriculture	Diversified	Specialization of cropping systems	Specialisation and focus on conservation
Processing sector	Very limited	Processed products are seen as value-added and provide employment	Large processing sectors for domestic and export markets
Wholesalers	Traditional wholesalers with retailers bypassing for exports	Traditional specialised and wholesalers	Specialized wholesalers and distribution centres
Retailers	Small market	Spread of supermarkets, less penetration for fruits and vegetables	Widespread supermarkets
Customers	Rising caloric intake	Diet diversification, switch to processed foods	High-value, processed foods
Traceability	No traceability	In some chains with private standards	HACCP programs

*Source: Boye (2013)*

An integrated approach of designing and managing the supply chain involves the simultaneous control of quality, protection, sustainability and logistical efficiency from food production and processing throughout the entire food supply chain according to the principle "from the farm to the fork" (Manzini, 2013). Figure 2 shows the influence of environment on the food supply chain.

Inclusion of sustainability in the food supply chain is one of the significant changes as a function of the realization of sustainable development and growth of all the members, including retail sales. European Environment agency has published the data that food and beverage sector participate in the global resource consumption by 23%, carbon dioxide emissions with greenhouse effects by 18%, and with 31% of acid gases (Manzini, 2013)

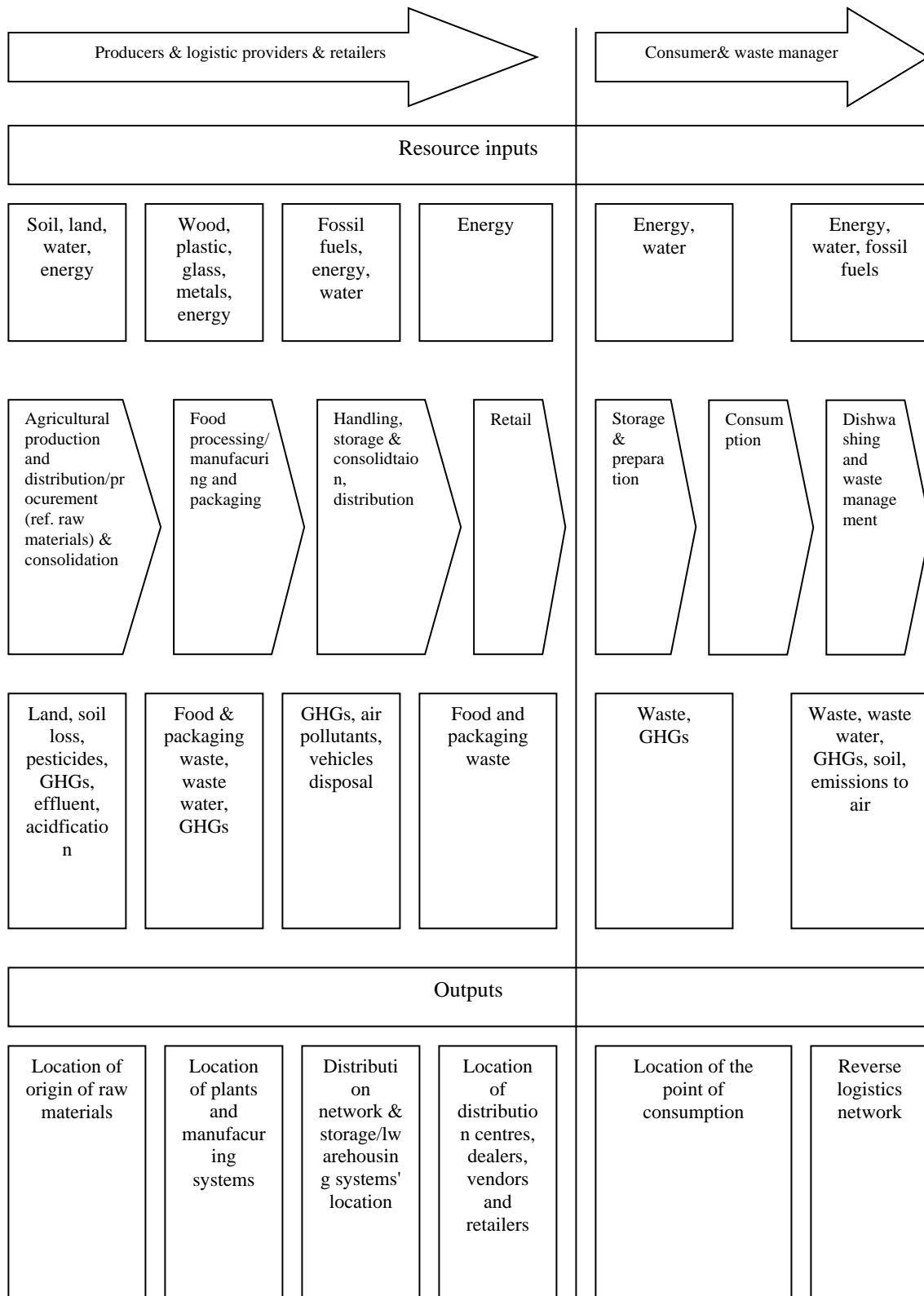


Figure 2 . The influence of environment on the food supply chain

Source: Manzini (2013)

By using carbon footprints, issues concerning environment in food transportation can be envisaged. Table 2 shows the carbon footprints through milk production life cycle.

Table 2 . Carbon footprints in raw milk production through life cycle phases (in percent)

Life cycle stage	Raw material production	Manufacture / processing	Logistics / distribution	Retail	Use by consumer	Recycling and disposal
Carbon footprint	73.00%	9.00%	3.00%	10.00%	3.00%	2.00%

Source: Konieczny, (2013)

The data in the table above show that the carbon footprints in milk retail are lower compared to manufacture and processing. Carbon footprints are different in certain food categories. Those amounts are expressed in grams per kilogram (CO<sub>2</sub> eq -Emissions (in g per kg foods)) for beef 13300, butter 23800, apples 550 and brown bread 750 (Konieczny, 2013).

### 3. COST OF LOSS AND WASTAGE OF FOOD

At the global level, one-third of the total food produced for human consumption is lost, what amounts to about 1.3 billion tons per year (Gustovson, 2011). Food loss per capita in Europe and North America amounts to 280-300 kg and in sub-Saharan Africa and South / Southeast Asia 120-170 kg annually. Total production of food for human consumption in Europe and North America is about 900 kg, and in sub-Saharan Africa and South / Southeast Asia 460 kg per year (Gustovson, 2011). Loss of food in production per capita in Europe and North America is 95-115 kg, and in sub-Saharan Africa and South / Southeast Asia only 6-11 kg a year.

Generally speaking, losses of food are high in industrialized as well as in developing countries. While in developing countries more than 40% occurs after harvest and processing, in industrialized more than 40% of losses occurs in retail and consumption. Loss of food in production in industrialized countries (222 million tons) is almost on the same level as the total net production in Saharan Africa (230 million tonnes) (Gustovson, 2011).

### 4. ENERGY EFFICIENCY IN THE RETAIL AND FOOD SECTOR

An important component of the food cost is energy. Energy efficiency in the food sector is viewed through supply chain. Primary energy consumption through the food supply chain in Spain in 2000 amounted to: agricultural production – 34.14%, transportation 17.43%, processing - 9.83%, packaging - 10.64%, food retail - 9.61% and 18.35% household consumption (Infante Amate, 2013). Therefore, the sources of sustainability are in agricultural production (as the main beneficiary), followed by household (related to the protection and preparation), transportation and packaging. Reorientation towards organic foods and new expenditure structure (in terms of location, seasonal food, less meat consumption) can significantly contribute to improving sustainability in food sector in Spain.

Food transport is one of the significant sources of gas emissions and greenhouse effects. It is quite understandable when having in mind the fact that 817 million tons of food is transported on the planet every year. "Food miles" is one of the leading methods for assessing sustainability in envisaging the effects of the environment. This term refers to transport of food to the place of final consumption. Every year transport distance of food increases, so that the average is 1,300 miles today.

In order to evaluate effects more realistically we have to mention the three related concepts: 1) food miles, 2) expansion of food miles, and 3) sustainable food chain (Passel, 2013). Using only the concept of food miles for the assessment of sustainability can be questionable (food transportation). The concept of food miles expansion includes all relevant externalities plus the various modes of transport and transport efficiency (food transport: external environmental costs, external social costs, external economic costs of + transport model + transport efficiency). Sustainability concept requires that all relevant economic, social and environmental aspects should be included and, in addition to transport externalities, externalities caused by the production of food, food packaging, food marketing and food consumption (food chain: production, processing, distribution, sales and consumption, including external environmental costs, social costs and external economic costs).

Chris Weber of Carnegie Mellon University, the distinguished author of a study on food, recently published by Environmental Science & Technology, emphasizes that 83% of gas emissions with the greenhouse gas effect in the food value chain comes from growing and harvest. Almost all stages of food value chain play an important role in carbon footprint. Greenhouse gas emissions (GHG) at different stages of the food supply chain in the United Kingdom are: agriculture - 40%, fertilizers production - 5%, food production – 12%, packaging - 7%, transport 12%, retail - 7% catering - 6%, household consumption - 9% and treatment (removal) of scattering - 2% (Garnett, 2011).

According to the Earth Policy Institute, the use of energy throughout the food value chain within following stages is: agricultural process - 21%, food processing – 16%, packaging - 7% and 4% of retail. Currently, 9% of total U.S. energy consumption is used for the production, processing, and transport of food (Food Miles - the Centre for Environmental Education, [www.ceeonline.org](http://www.ceeonline.org) > ...> Upload Knowledge).

Energy consumption and emissions of carbon dioxide, which produces greenhouse gas effect, are affected by transport model (Table 3). Energy consumption and carbon dioxide emissions that produce the greenhouse effect are greatest in the air and the lowest in international water-carriage transportation. Therefore, by selecting transport model consumption can be optimized. Reducing of greenhouse gas emissions has a positive impact on climate change.

Table 3. Impact of transport model on energy consumption and carbon-dioxide emission

	MegaJoules per ton-km	Kg CO <sub>2</sub> eq per ton-km
International water - container	0,2	0,14
Indoor water	0,3	0,21
Rail	0,3	0,18
Truck	2,7	1,8
Air	10	6,8

Source: Konieczny, (2013)



## 5. COST COMPONENTS IN THE FOOD RETAIL ENVIRONMENT

There is public disclosure of the effects of environmental costs impact (about 40%) in the food and beverage sector. This is fully applied to the food retail sector, too (about 20%) (Mattison, 2013). Environmental costs are considerable in food and beverage sector, and food retail sector respectively, as data in Table 4 show:

Table 4 . Components of environmental costs for companies in retail and food and beverage sector (S & P 500 companies)

Components	Food and beverage (in millions)	Retail (in millions)
Water	\$38,398	\$8,009
Contamination of soil and water	\$12,019	\$7,409
GHGs	\$10,323	\$3,110
Air pollution	\$7,589	\$1,724
Waste	\$353	\$943
In total	\$68,682	\$21,195

Source: Mattison, (2013)

The information in the table show that the environmental costs for companies in the food and beverage sector amounted to 69, i.e. 22 billion dollars in food retail respectively (of S & P 500 companies). Key components of the environmental costs in food and beverage sector are: use of water (\$ 38 million), soil and water pollution (\$ 12 million), greenhouse gases (\$ 10 million), and air pollution (\$ 8 million). In food retail these are: use of water (\$ 8 million) and GHG (\$ 7 million).

Environmental cost components are different by certain food categories. Table 5 shows components by certain categories of consumer goods (for companies in the retail and food and beverage sector of S & P 500 companies).

Table 5 . Environmental costs components for selected food category

Components	Breakfast cereal (18 g pack)	Fruit juices (Litre pack)	Cheese (18 g pack)
Water	58.8%	43.7%	38.7%
Soil and water contamination	23.0%	11.4%	14.1%
GHGs	10.8%	24.6%	33.0%
Air Pollution	6.8%	14.7%	13.6%
Waste	0.6%	2.1%	0.6%
Total environmental costs	\$0.55	\$0.19	\$1.18
Retail value	\$3.50	\$3.00	\$6.50
Actual costs - the true cost	\$4.05	\$3.19	\$7.68

Source: Mattison, (2013)

The information in the given table show that the use of water is significant component of the environmental cost for the observed consumer goods. Water consumption for some products is: 1) breakfast cereals: best - \$ 3.74, average - \$ 4.05 and worst - \$ 5.33, 2) fruit juice: best - \$ 3.11, average - \$ 3.19 and worst - \$ 3.35 and 3) cheese: best - \$ 7.26, average - \$ 7.68 and worst - \$ 8.22. Best and average water consumption as a component of environmental costs is welcome opportunity, while the worst is considerable risk (Mattison, 2013).

## 6. THE ECONOMIC BENEFITS OF FOOD WASTE REDUCTION

The benefits of reducing waste through food supply chain are significant for society as a whole as well as for the company and individual (Eriksson, 2012) and according to the survey conducted in Sweden the following data in the Table 6 verify this.

Table 6 . Estimated yearly wastage of food in Sweden and the effects of reduction throughout the supply chain

Food supply chain sector	Waste (ton)	Waste per capita (kg)	Marginal benefit to society of reduced waste (SEK/kg)	Marginal benefit to individual or company of reduced waste (SEK/kg)
Household	675000	72	81	62
Restaurants and catering	125000	13	31	12
Retail	39000	4	25	6
Industry	171000	18	25	6

Source: Eriksson (2012)

The benefits of reducing waste throughout the food supply chain are obvious, for the society, individual and company. However, they were significantly higher for the society itself than for an individual or company (In Store, June 2013 [www.instore.rs](http://www.instore.rs)).

Because of the immense environmental benefit, returnable packaging system is being strongly advocated instead of non returnable packaging system, which spends millions. It is well known that glass is indestructible in nature, but it is very easy to recycle. Recycling of one glass bottle saves enough energy for 100W bulb to produce light four hours. Company Heineken conducted a global analysis which compared the impact of non returnable and returnable packaging on the environment, by comparing 0.5-liter packaging of beer produced in the Netherlands and consumed in Germany, expressed through the rate of pollution, waste material and waste water. The method applied in this survey is Life cycle analysis (LCA), i.e. the whole process "from barley to a full glass of beer at the bar." Below are the results of a given study.

The rate of pollution emitted throughout the production is equal to the sum of the effects of greenhouse gases that contributes to global warming. The rate of pollution in producing non returnable bottle is 76kg of carbon dioxide per hectolitre, while with returnable bottle it is 43kg of carbon dioxide per hectolitre. It is assumed that returnable bottle is reused 25 times, what is relatively small number of reuses compared to the real possibilities (for

example, in the Netherlands it is 32, while it is reused 30 times in Italy). Returnable packaging system emits less pollution even if it is used only once.

Returnable bottle system provides reduction of waste water. Waste water amounts to 10 hectolitres per hectolitre of beer in production of non returnable, and 6 of returnable bottles. During the production of returnable bottles, carbon dioxide emissions decreased by 43% compared to a non returnable (In Store, June 2013 www.instore.rs).

Significant benefits are achieved by recycling food and all members of the food supply chain increase the percentage of recycled waste (disposal) of food every year (Takata, 2012).

A special system of indicators of sustainable food chain is developed and it is shown in the Table 7.

Table 7 . Selection of sustainability indicators for the food chain

Sustainable dimensions	Sustainable goals	Measurement criteria	Sustainable indicator
Environmental dimensions	Waste Emissions to air Water Energy Biodiversity Food transportation	Packaging Emission produced Water use Energy use Contribution to biodiversity Transport mode/ tactic use Vehicle fill Time utilization Engine performance	Total waste per basket Recycle waste per basket Carbon dioxide emission Steam emissions Purchase of water for own consumption per enterprise (€) Primary energy consumption per enterprise (€) Primary energy requirements (MJ/kg production) The percentage of local versus non-local product varieties offered The percentage of local versus non-local products various cultivated The percentage of local sourcing The percentage of air transport products The percentage of direct store deliveries Percentage of available capacity actually used - in weight and volume terms The percentage of vehicle km run empty Proportion of products moved in vehicles of differing size, weight and refrigeration use Deviation from schedule Driver performance

			management Vehicle telematics Alternative versus normal fuels (percent) Fuel consumption CO <sub>2</sub> emission
Social dimensions	Urban distribution Nutrition and health Food safety Workplace improvements  Community Ethical trading	Vehicle km (congestion, noise, accidents) Total travel time  Signposting Contamination Equality Health and safety Employment volume Employment quality Contribution to the community Economic linkages with community Ethical trade schemes	Vehicle (km) used to supply all stores Vehicles` driving time on the road Percentage of “out of hours” delivery Number of product signposted Number of incidents Female vs male employment (per cent) Ethnic versus national employment (per cent) Disabled employment (per cent)  Accident rate Number of employees per enterprise Average wages per person (€) Donations (e. g. school building) Local versus non-local purchasing and transactions, percentage of value Percentage of increase of local products sales Ethical vs total product (per cent)

Source: Banterle, (2013)

## 6.CONCLUSION

Due to the increasing importance of environmental influence on food supply chain greater attention is paid to its analysis lately. In this paper, the emphasis is on considering factors, structure specifics and the effects of environmental costs on performance in retail as a member of the food supply chain.

In that context, it was concluded that the environmental costs are very significant factor of cost efficiency and thus performance in food retail. Their structure in retail is specific concerning the total food sector. Three important components of environmental costs in food retail are: energy use, greenhouse gases and water use. They are different in certain

food categories. Their effective management can significantly optimize environmental costs and improve the performance of food retail.

Generally speaking, the development and implementation of "green practices" greatly contributes to the improvement of business performance in food retail. This especially applies to retail stores green building, private label and organic products sell, as special characteristics of modern food retail. This practice is largely followed by global food retail chains. In the tradition of them and because of great universal significance, other food retailers should implement this practice to their business.

## REFERENCES

- 1.Anders, S. and Ahmad, W. (2011), «Private label and national brand Pricing and Promotional Strategies in Health Differentiated product categories: Canadian Evidence», 2011 International Congress, August 30-September 2, 2011, Zurich, Switzerland 114223, European Association of Agricultural Economists.
- 2.Banterle, A. et al. (2013), «Labelling and sustainability in food supply networks», *British Food Journal*, Vol. 115, No.5, pp. 769-783.
- 3.Boye, J. I. and Areand,Y. (2013), «Current Trends in Green Technologies in food production and processing», *Food Eng Rev*, 5, pp. 1-17.
- 4.Brcic-Stipcevic, V. et al. (2011), “Distribution Channels and Characteristic of organic Food market”, *Business Logistics in Modern Management*, volume 11, pp. 111-125.
- 5.Eriksson, M. (2012), *Retail Food Wastage a Case Study Approach to Quantities and Causes*, Swedish university of Agricultural Sciences, Uppsala.
- 6.Garnet, T. (2011), «Where are best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)?», *Food Policy*, 36, pp. S23-S32.
- 7.Gustavsson, J. (2011), *Global Food Losses and Food Waste*, FAO, pp. 1-38.
- 8.Inflante Amate, J. and González de Molina, M. (2013) «'Sustainable de-growth' in agriculture and food: an agro-ecological perspective on Spain's agri-food systems (year 2000)», *Journal of Cleaner production*, 38, pp. 27-35.
- 9.Konieczny, P., Dobrucka, R., Mroczka, R. (2013), «Using carbon footprint to evaluate environmental issues of food transportation», *LogForum*, 9 (1), pp.3-10.
- 10.Lukic, R. (2011), "Estimates of economic performance of organic food retail trade", *Economic research*, Vol. 24, No. 3, pp. 157-169.
- 11.Lukić, R. (2012), "Sustainable Development of Retail in Serbia", *Review of International Comparative Management*, Volume 13, Issue 4, pp. 574-586.

12. Manzini, R. and Accorsi, R. (2013), «The new conceptual framework for food supply chain assessment», *Journal of Food Engineering*, 115, pp. 251-263.
13. Mattison, R. (2013), *The True Cost of the S & P 500 - True Cost of food & Beverage and Retail sectors*, Trucost.
15. Papista, E. and Krystallis, A. (23 June 2012), "Investigation the Types of Value and Cost of Green brands: Proposition of a Conceptual framework", *J Bus Ethics* DOI 10.1007/s10551-012-1367-6.
16. Takata, M. et al. (2012), «The effects of recycling loops in food waste management in Japan: Based on the environmental and economic evaluation of food recycling», *Science of the total Environment*, 432, pp. 309-317.
17. Van Passel, S. (2013), «Food Miles to Assess Sustainability: A Revision», *Sustainable Development*, 21, pp.1-17.

## THE ENERGY COSTS IN TRADE

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**Abstract:** Energy costs are significant determinant of the performance of total economy, all sectors, including trade and individual enterprises. Due to that, they are lately more analyzed in the context of sustainable development and the impact on the performance of the economy, sectors and enterprises. The use of renewable energy is an important factor in energy costs reducing and increasing of profitability. Under the influence of specific factors it varies in individual economies (countries), sectors and companies. Having this as a starting point, our article specially investigates the problem of energy efficiency in trade sector. This is due to considerable economic impact of trade on total energy consumption in economy and especially service sector (share in gross domestic product and the number of employees). The research on many global retail companies find, and also confirmed in this study, that the increase of energy efficiency can significantly improve the profitability of the trade sector. This is particularly achieved with as increased use of renewable energy in total final energy consumption in the trade sector. **(JEL classification: Q40, Q44, Q32, Q57)**

**Keywords:** energy intensity, renewable energy, energy management, green energy, final energy consumption

### 1. INTRODUCTION

Energy costs are lately considered as very significant determinant of performance at all organizational levels (country, sector, company, product category). Accordingly, this paper examines the impact of efficient energy costs management on the performance of the trade sector, trading enterprises, shops and product categories.

Extensive literature is written on the subject of energy efficiency. Despite this, insufficient literature is devoted to the determinants of efficient energy costs management in the trade sector, particularly in Serbia, which is the focus of research in this paper ([6 - 13]. The aim of this work is to study the specifics, factors and measures for efficient energy costs management in comparable countries in order to increase profitability of the trade sector. Knowledge of general and specific problems of managing energy costs is fundamental prerequisite for their reduction in trade companies.

In the context of primary research hypotheses - energy costs are a key determinant of profitability, we point to the importance of energy costs and ways of their reduction in order to increase the profitability of trade enterprises. The stress is put on the effects of sustainable, "green" energy in trade.

The basic methodology of research is based on a comparative analysis of energy costs of trade in some global regions, countries, companies, types of stores and product categories. This way of research provides complete information for improving management of energy costs efficiency in trade at all organizational levels, particularly at the enterprise level, store and product category.

For the purposes of writing this paper we gathered empirical data from different comparable sources. On the basis of them we carried out appropriate statistical and mathematical calculations in accordance with the purpose and character of this study.

## **2.THE SIGNIFICANCE AND FACTORS OF SIZE AND STRUCTURE OF ENERGY COSTS IN TRADE**

Energy costs are very significant economic category in trade. They greatly affect the profit in trade, what is indicated by numerous studies and available empirical data. Every year \$ 20 billion of energy is spent in retail. Based on this energy consumption, and with increase of energy efficiency (replacement of existing technology with new and implementation of other energy programs) up to 15% or \$ 3 billion of energy could be saved in retail annually [4]. The energy is a significant component of operating costs in retail. Reducing energy costs in retail for 10% equals increased sales by 8% per square meter. By applying appropriate programs for efficient energy management and the best sustainable practices, profitability in retail can be greatly increased as a consequence of the reduction of energy costs (10 - 30%) [5]. All in all, efficient energy management significantly increases the yield of investments in retail.

According to a study conducted by the *US Department of Energy's Pacific Northwest National Laboratory*, between 10 and 20% energy can be saved in existing commercial buildings. *The United States Environmental Protection Agency* report "*Sector Collaborative on Energy Efficiency Accomplishments and Next Steps*" identifies potential savings in supermarkets up to 21% and in conventional stores up to 41%. In general, energy reduction can be up to 30% with more efficient energy management in retail. The reduction of operating costs reflects positively on profit, taking into account the fact that energy costs participate in total operating costs in retail with about 5.5%. As it is generally known, retailers usually operate at a 4% profit margin, so the reduction of energy consumption by 15% increases profit margin from 4% to 4.7%, which represents an 18.7% increase [4].

As shown by the available empirical data energy costs are significant component of operating costs in retail. In terms of structure, energy costs differ in the retail of food and non-food goods. In food retail, 82% of total energy consumption is related to electricity and 18% to natural gas / other liquid fuels; average energy consumption per square meter of sales area is 51.3 kWh. In food retail, structure of energy consumption is: refrigeration 48%, lighting 18%, heating, ventilation and air-conditioning 20% and others 14%. Unlike food, the structure of energy consumption in the non-food retail sales is as follows: lighting 50%, heating, cooling and air-conditioning 40% and others 10%. Given the need for refrigeration, heating, ventilation and air-conditioning, food retailers, therefore, consume three times more energy for these purposes than non-food retailers[4]. Accordingly, in order to reduce operational costs and increase profitability in food retail, the focus of analysis of energy efficiency should be energy costs categories in food retailing. Product category is a significant determinant of the size and structure of energy costs in retail. In addition to the categories of products, the size and structure of energy costs in trade is affected by numerous specific controlled and "uncontrolled" factors to which we shall closely look further.

*Global climate changes* affect the cost of energy in all sectors, including trade. Thus, for example, warming of 1° C (1.8 ° F) requires cooling, which increases energy costs by



about 5-20% [4]. Increasing energy efficiency in retail reduces the risk of increasing energy costs. It has a positive impact on operating costs and profits in retail.

The *size of the store* also significantly affects energy costs in retail. According to one study, energy consumption per individual store is as follows: small retail facilities up to 5000 m<sup>2</sup> - \$1.42 /m<sup>2</sup>, medium size to 50,000 m<sup>2</sup> - \$ 0.90 /m<sup>2</sup>, and large – more than 50,000 m<sup>2</sup> - \$ 1.40 / m<sup>2</sup> [4]. High energy consumption in small and "big-box" facilities is very attractive for reduction, in the context of energy management. Specialized strategies must be implemented to control energy consumption in stores that typically manage energy costs only 30-40%. In "big-box" stores the largest part of the energy consumption is related to lighting and refrigeration (over 50%). In small stores, the control of energy consumption must be much more efficient than in large where, in particular, systems for lighting and heating, ventilation and air-conditioning must be controlled. Due to the limitations of the system of efficient control of energy consumption in small stores the potential reduction is between 3-10%. Given the high level of effective controls in large stores the energy consumption can be reduced by 20-30%, depending on the initiative of replacing the existing with new energy efficient equipment, and age of building [4].

*Size, age and location* of the building are very important factors of energy costs in retail. Small objects have high cost of energy per square meter. Age affects energy costs, and facilities built after 1960 are energy inefficient. Location of store is one of the important factors of energy costs in retail. As to illustrate, according to one study, energy consumption in existing retail facilities varies geographically: 37.8 Miami, 50.4 Seattle and 79.2 Chicago (thousand Btu per sq/ft) [1].

Trade companies increasingly apply the concept of *sustainable development* in their business in order to improve performance. Its application differs among specific retail formats (stores). Generally speaking, it is considerably higher in hypermarkets than in traditional stores [18]. Leading retailers aim at reducing costs and increasing brand loyalty. So-called sustained efforts lead to a reduction of costs, risks, and increase brand loyalty. *Sustainable brands* are highly acceptable in the market and significantly affect an increase in sales [5].

In the context of the application of the concept of sustainable development in trade great importance is paid to the use of renewable energy, so-called *green energy*. The costs of using traditional and sustainable energy sources are different. However, due to this, optimizing the structure of energy sources can greatly affect the amount of total energy costs as a factor of performance in trade.

The structure of energy costs depend on the *type of retail business*, i.e. product categories. Average energy consumption in the retail (in kWh / m<sup>2</sup> / year) is: non-food retailers 167-500, food retailers 695-945 and shopping centers 333-390. The structure of energy consumption in the non-food retail (i.e. clothing store) (in %) is as follows: heating, ventilation and air-conditioning 50%, lighting 40% and other 10%. In the food retail (supermarket) energy consumption structure (in %) is as follows: refrigeration 50%, heating, ventilation and air-conditioning 25%, lighting 15%, and food processing/office 10% (*Resource efficiency for the Retail Sector, Green Business, Clean Technology Centre, Cork Institute of Technology, 2014, <http://greenbusiness.ie/wp-content/uploads/2012/11/Retail-Guide-NEW-Web-version.pdf>*). In non-food retail stores primary categories of energy costs are lighting, and heating, ventilation and air-conditioning. In food retail stores most of the energy costs refers to refrigeration. Energy costs are determinant of food prices. The study revealed that those have moderate influence on price in food retail [3].

Energy and sustainable objectives of the leading retailers, with best practices, are as follows: monitoring of internal indicators (energy, resources, loss, coordination with suppliers); improving of communication by intensification of efforts through the website, Internet and social networks; internal reporting on indicators of sustainable development, with tendency to external reporting; focusing on the reduction of energy consumption; development of multi-annual strategic planning and identifying strategic objective; and identifying risks in the supply chain, tracking and reports on energy suppliers [5]. All in all, energy costs are significant determinant of performance in retail. So, for example, according to estimates of the *Carbon Trust*, reduction of energy costs by 20% results in an increase in sales of 5% in retail (*Quoted in: 25-in-5: BRC launches new initiative to stimulate retailers' energy efficiency*, <http://www.edie.net/news/6/BRC-initiative-launched-to-stimulate-energy-efficiency-in-retail-sector/>). Numerous factors influence the cost of energy in the retail market. Their effective control can significantly reduce energy costs and thus increase profits in retail. Considerable energy savings in the retail are accomplished by improving the structure of building in terms of energy efficiency, increased use of modern energy efficient technologies, and development and implementation of special programs for more efficient energy consumption. All employees, business partners and consumers should be familiar with the effects of the concept of energy management (especially in the context of "green"), because far greater energy savings are then achieved. Fact that should be borne in mind that reduction of energy costs by 10%, as well as margin, causes an increase in sales for 8% per square meter [5].

There are basically two ways of reduction of energy costs. These are: the reduction of the cost of electricity, gas and other fuels and/or reducing the amount of energy consumption. Reduction of energy prices are established by the development of competitive price, avoiding the payment of penalties, and changes in types of energy use. Reduction in the amount of energy consumption is achieved by identifying energy users, increasing conscientiousness of staff regarding energy consumption and more efficient energy management with direct beneficiaries.

### 3. THE ENERGY COST IN TRADE OF SELECTED COUNTRIES

Energy costs are influenced by different factors specific to trade in individual countries. In this article we will look at energy costs in the sale of major countries, with special emphasis on Serbia.

As it is known, the use of renewable energy sources can significantly reduce the total cost of energy. The share of renewable energy in the net energy production in the world is about 10%, while the **United States** is 8%. The costs of other energy sources are different. Thus, for example, the cost of individual sources of energy (\$ / kW-hr) in the United States in 2015 were: coal \$ 0.10 to 0.14, natural gas \$ 0.07-0.13, nuclear \$ 0.10, wind - \$ 0.08-0.20, solar PV \$ 0.13, solar thermal \$ 0.24, geothermal \$ 0.05, biomass \$ 0.10, and hydro \$ 0.08 (*Renewable Energy Sources: Cost Comparison*, [www.renewable-energysources.com/](http://www.renewable-energysources.com/)). Given the different prices, optimizing the use of resources, significant reductions in the cost of energy can be achieved in all sectors, including trade.

In the United States retail participate in total energy consumption with about 13%. In this respect, it is the second largest (*Advanced Energy Retrofit Guide: Retail Buildings*,

*Pacific Northwest National Laboratory, US Department of Energy, [http://www.pnnl.gov/main/publications/external/technical\\_reports/PNNL-20814.pdf](http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20814.pdf).*

On average, retail outlets consume 14 kilowatt-hours (kWh) of electricity and 31 cubic meters of natural gas per square meter in the United States, annually. In other words, retail stores annually consume \$ 1.21 of electricity per square meter, and 14 cents of natural gas per square meter in the United States on average (Managing Energy Costs in Retail buildings; [https://www.nationalgridus.com/non\\_html/shared\\_energyeff\\_retail.pdf](https://www.nationalgridus.com/non_html/shared_energyeff_retail.pdf)). The percentage structure of electricity use in retail in the United States is as follows: lighting 53%, cooling 13%, refrigeration 9%, ventilation 8%, heating 3%, computer equipment 1%, office equipment 1%, water heating 1% and other 11 % (*US Energy Information Administration. According to: Managing Energy Costs in Retail Buildings; Published on Business Energy Advisor, <https://bizenergyadvisor.com>*). In typical retail stores in the United States 69 % to 84% of total energy consumption is spent on lighting, refrigeration and heating, depending on climate zone and systems applied to achieve the highest energy savings (*Managing Energy Costs in Retail buildings, [https://www.nationalgridus.com/non\\_html/shared\\_energyeff\\_retail.pdf](https://www.nationalgridus.com/non_html/shared_energyeff_retail.pdf)*). More than one-half of total electricity consumption is spent on lighting. The implementation of effective systems for lighting, refrigeration and heating contributes significantly to energy savings in retail stores.

The percentage structure of natural gas consumption in retail stores in the United States is as follows: heating 91%, cooking 3%, water heating 3% and other 3% (*US Energy Information Administration. According to: Managing Energy Costs in Retail Buildings; Published on Business Energy Advisor <https://bizenergyadvisor.com>*). Natural gas is, therefore, mostly used for space heating in the United States.

In retail, electricity consumption for certain purposes (lighting, cooling and ventilation) differs during 24-hour business operations (*Source: Managing Energy Costs in Retail Buildings; Published on Business Energy Advisor (<https://bizenergyadvisor.com>)*).

Energy costs are a significant factor in the cost efficiency and performance in trade of the United States. They are different in certain sectors of trade - wholesale and retail trade, stores and product categories, as shown by the data in Table 1.

Table 1. Energy costs in trade by sector, stores and product categories in the United States, 2012

	Cost of electricity (in % of total operating expenses)	Fuel costs (as % of total operating expenses)
<b>Wholesale</b>	0,9	0,4
Durable goods	0,8	0,4
Nondurable goods	1,0	0,5
<b>Retail</b>	2,5	0,2
Motor vehicles and parts dealers	1,8	0,4
Furniture and home furnishing stores	2,2	0,3
Electronics and appliances stores	1,5	0,2
Building material, garden equipment, suppliers and dealers	2,2	0,5
Food and beverage stores	4,2	0,3
Health and personal care stores	s	0,1
Gas stations	4,5	0,3
Clothing and clothing accessories stores	1,9	0,1
Sporting goods, hobby, book and music stores	2,3	0,2
General merchandise stores	3,1	0,1
Miscellaneous store retailers	2,4	0,3
Non-store retailers	0,9	0,2
Accommodation and food services, total	3,1	0,7
Accommodation services	3,2	0,7
Food and beverage services	3,0	0,6

Source: U.S. Census Bureau

In the wholesale trade in the United States electricity costs participated in total operating costs in 2012 with 0.9% and fuel costs 0.4%. Energy costs are higher in non-durable goods wholesale trade than durable. It is quite logical considering differences in the nature of their business.

Electricity costs are involved in the total operating costs by 2.5% and fuels 0.2% in the retail trade in the United States in 2012. Given the differences in the nature of business, energy costs in the United States are, therefore, higher in retail than in wholesale. Within the retail trade in the United States there are significant differences in the cost of energy observed by certain types of stores and product categories. As to illustrate this, the cost of electricity in 2012 ranged from 4.5% (gas station) to 0.9% (non-store retailers - online sales). That same year, fuel costs have ranged from 0.1% (health and personal care stores, clothing stores and fashion accessories, general merchandise stores) to 0.5% (building materials, garden equipment, suppliers and dealers), or to 0.7% (accommodation and food). All this leads to a general conclusion: that energy costs are higher among food retailers than non-food goods.

By improving energy efficiency in existing retail stores energy costs can be significantly reduced. In the retail sales in the United States of America energy costs are after labor costs, rents and marketing significant component of total operating costs. Thus, for example, in a typical hypermarket, energy costs are \$ 500,000 per year. Energy costs differ among retail formats (types of stores), and range 4 - 9% of the total operating costs. Differences in the energy cost of similar stores are up to 40%. These differences are

determined by the age, type of goods and the size of the store. Energy costs may be reduced up to 20-30% by increasing energy efficiency, moreover, sometimes up to 50% (*Turning down the cost of utilities and retail, McKinsey & Company, [http://www.mckinsey.com/insights/consumer\\_and\\_retail/turning\\_down\\_the\\_cost\\_of\\_utilities\\_in\\_retail](http://www.mckinsey.com/insights/consumer_and_retail/turning_down_the_cost_of_utilities_in_retail)*).

In the United States, energy costs in retail stores of 50,000 square meters, amount to about \$ 90,000. Improvement of the energy efficiency of a retail outlet and investment in new so-called "green energy systems" affect the improvement of consumer comfort, better lighting, which in turn reflects positively on increasing sales and return on investment as a result of the "green" image. In retail outlets, 70% of energy is used for lighting and heating, what represents a source for energy savings. (*Managing energy costs in retail buildings, <https://www.mge.com/images/PDF/Brochures/business/ManagingEnergyCostsInRetailBuildings.pdf>*). The structure of energy costs varies by individual retail formats (types of stores). In the United States consumption of electricity and natural gas differs in grocery shops. According to a study the structure of energy consumption in food shops is as follows: A. Electricity: lighting 53%, cooling 11%, refrigeration 10%, ventilation 8%, space heating 3%, water heating 2%, office equipment 2 % computer 2% and other 10%; and B. Natural gas: space heating 91%, water heating 3%, cooking 3% and other 2% (*US Energy Information Administration; by: Managing energy costs in retail buildings, <https://www.mge.com/images/PDF/Brochures/business/ManagingEnergyCostsInRetailBuildings.pdf>*).

In the United States the structure of energy consumption in supermarkets is specific. The typical structure of electricity in supermarkets (33,000 square meters of sales area) is as follows: cooling 60%, lighting 18%, heating, ventilation and air-conditioning 15%, water heating 2%, bakery 1% and other 4%. In supermarkets, the average consumption of electricity is 50 kWh per square meter (and in medium-sized supermarkets kWh 57 per square meter), and 50 cubic meters of natural gas per square meter annually. The highest energy consumption in supermarkets is used for refrigeration, heating, ventilation and air-conditioning; and natural gas is mainly used for heating [15].

In order to have thorough empirical analysis of the issue in this paper Table 2 shows the participation of wholesale and retail trade in electricity consumption in total economy, commercial and service sectors in **Singapore** for the period 2005 - 2014.

Table 2. The share of wholesale and retail in the total consumption of electricity in economy, commercial and service sectors in Singapore, 2005 - 2014

(Unit: GMH)

	2005	2010	2011	2012	2013	2014
Overall economy	35,489,3	42,251,7	43,007,1	44,200,7	44,923,0	46,403,0
Commerce and service-related	12,640,7	15,163,9	15,714,6	16,134,7	16,605,6	16,954,3
The percentage share of wholesale and retail in total consumption of electricity of total economy, (%)*	6,35	5,01	4,91	4,61	4,42	4,77
The percentage share of wholesale and retail trade in the total consumption of electricity in the commercial and services sector, (%)*	17,22	13,97	13,14	12,65	11,96	11,71

Note: \* Calculation performed by the author

Source: Singapore Energy Statistics 2015

([https://www.ema.gov.sg/cmsmedia/Publications and Statistics/Publications/SES2015 Final website 2mb.pdf](https://www.ema.gov.sg/cmsmedia/Publications%20and%20Statistics/Publications/SES2015%20Final%20website%20mb.pdf))

In Singapore, share of wholesale and retail trade in the total electricity consumption of the total economy is moving from 4.77 to 6.35%, and the total consumption of electricity in the commercial and service sectors between 11.71 to 17.22%. Dynamically speaking, gradual reduction in share of wholesale and retail trade in the total consumption of electricity in Singapore is obvious. This, in other words, means that energy efficiency in the wholesale and retail trade in Singapore increased. This is due to the implementation of relevant programs and measures to increase energy efficiency in the retail sector in Singapore.

Reduction of energy consumption by 20% results in an increase in sales of 5%. Due to this, and in the context of climate change, the **European Union's** goal sets targets of a 40% reduction in greenhouse gas emissions and increase energy efficiency by 27% until 2030, (*Energy Efficiency Shows Its Worth for Retail Property*, <https://www.gresb.com/insights/2015/08/energy-efficiency-shows-its-worth-for-retail-property/>). This will have a positive impact on the performance of all the companies.

The concept of sustainable development in all sectors is being intensively more and more applied in the European Union. In this context, great importance is given to the use of renewable energy, so-called "green energy". Different costs of some energy sources have an impact on overall energy costs. By optimizing the structure of energy sources, total energy costs, as a factor in the performance of all enterprises can, therefore, be affected. The percentage share of renewed energy in total energy consumption by individual selected countries in the European Union in 2013 looked like this: The European Union (EU-28) 11.8%, Denmark 24.2%, Germany 10.3%, France 9.0 %, Croatia 16,2%, Italy 16.5%, Austria

29.6%, Portugal 23.5% Slovenia 16.5%, Finland 29.2%, Sweden 34.8%, United Kingdom 5.0%, Norway 37.4%, Montenegro 36.9% and Serbia 12.8%. The participation of a renewable energy in the total final energy consumption of some countries in the European Union in 2013 was as follows: The European Union (EU-28) 15.0%, Germany 12.14%, France 14.2%, Croatia 18.0%, Slovenia 21.5%, and the United Kingdom 5.10% (*Eurostat*).

From the showed data it is easy to conclude that the share of renewable energy in total energy consumption in Serbia is less than in other comparable countries in the region (Croatia and Slovenia). In Serbia, extensive utilization of power plants significantly reduces cost of production, which reflects positively on the cost of energy in all sectors, including trade. Under the influence of specific factors, final energy consumption also varies in individual sectors. Thus, for example, in the 2013 final energy consumption in the EU by individual sectors is as follows: transport 31.6%, households 26.8%, industry 25.1%, services 13.8%, agriculture and forestry 2.2%, and others 0.5% (*Eurostat*).

Energy costs significantly affects price which differs among countries. Table 3 shows the price of electricity in the industry for selected countries in the European Union.

Table 3. Cost of electricity (per kWh) in the industry of selected countries in the European Union, 2013 - 2015

	2013	2014	2015
European union (EU-28)	0,119	0,123	0,121
Germany	0,143	0,159	0,151
France	0,097	0,096	0,101
Croatia	0,095	0,096	0,092
Slovenia	0,097	0,087	0,083
United Kingdom	0,117	0,129	0,149
Serbia	0,057	0,051	0,060

Source: *Eurostat*

The price of electricity in Serbia in 2015 was slightly higher compared to previous years, which resulted in an increase in energy costs. Nevertheless, it is lower than the European Union average, the observed countries of the European Union and the region.

As in other countries, general and specific factors affect energy costs in trade of **Germany**. Table 4 shows the energy consumption in the retail trade in Germany for the period 2006 - 2013.

Table 4. Projected energy use in the retail trade in Germany, 2006 - 2013

	2006	2007	2008	2009	2010	2011	2012	2013
Energy unit: TWh	67,6	64,5	62,1	62,4	65,9	59,1	61,1	63,0
The share of retail trade in the total balance energy consumption in the tertiary sector (%)	15,85	17,74	15,49	16,57	16,00	15,80	16,35	16,05

Note: \* Calculation performed by the author

Source: *Fraunhofer ISI (2015). Energy consumption of the tertiary sector (trade, commerce and services) in Germany for the years 2011 to 2013 ([http://www.isi.fraunhofer.de/isi-wAssets/docs/x/de/projekte/Final-report\\_GHD\\_2006-2013\\_Summary\\_February2015.pdf](http://www.isi.fraunhofer.de/isi-wAssets/docs/x/de/projekte/Final-report_GHD_2006-2013_Summary_February2015.pdf)).*

Retail in Germany participated in total balance energy consumption in the tertiary sector (in 2013) to about 16%. The structure of consumption of electricity in the retail trade in Germany (in 2013) involved: lighting 48.9%, plants 9.3%, water heating 3.1%, other heating processes 2.7%, cooling process 18.7%, AC (air-conditioning) with 2.2%, ICT (information and communication technology) 8.4% and space heating 6.2%. The largest share in the consumption of electricity goes on lighting and cooling.

The structure of fuel consumption in retail trade in Germany (in 2013) was: water heating 3.2%, AC (air-conditioning) 0.5%, space heating 96.1% (*Fraunhofer ISI, 2015: Energy consumption of the tertiary sector (trade, commerce and services) in Germany for the period 2011 to 2013* [http://www.isi.fraunhofer.de/isi-wAssets/docs/x/de/projekte/Final-report\\_GHD\\_2006-2013\\_Summary\\_February2015.pdf](http://www.isi.fraunhofer.de/isi-wAssets/docs/x/de/projekte/Final-report_GHD_2006-2013_Summary_February2015.pdf)). In fuel consumption the largest part refers to the surface heating.

All in all, the structure of energy consumption in the retail trade in Germany is similar to that in other comparable countries. It is primarily determined by the nature of business in retail trade.

In the **United Kingdom** service sector participated in 2008 with 19% in total energy consumption. The share of the retail sector in the total energy consumption in the service sector in 2008 amounted to 20%. Total energy consumption in the retail sector in 2008 was consumed as follows: lighting 32%, heating 31%, catering 13%, cooking 8% and other 16% [2]. *Carbon Trust* is, as noted above, found that reducing energy costs by 20% contributes to an increase in sales of 5% (*Carbon Trust, 2006, by: [2].*). In the United Kingdom, research has found that replacing existing with new energy-efficient equipment can increase the market value of the shopping center up to 5% (*Energy Efficiency Shows Its Worth for Retail Property*, <https://www.gresb.com/insights/2015/08/energy-efficiency-shows-its-worth-for-retail-property/>).

In the United Kingdom, the goal is to reduce carbon dioxide emissions by 34% by 2020 and 80% by 2050. Given the economic importance (5% share in GDP and the number of employees by 10%) retail plays an important role (*Improving energy efficiency of retail sector is a commercial necessity*; <http://www.thecrownestate.co.uk/news-and-media/views-and-analysis/paul-clark-improving-energy-efficiency-of-retail-sector-is-a-commercial-necessity/>). By 2050, according to the British Retail Consortium (BRC) retailers in the United Kingdom can decrease energy costs up to £ 4.1 billion and carbon dioxide emissions by 25% by using the appropriate energy efficiency programs (*25-in-5: BRC launches new initiative to stimulate retailer energy efficiency*, <http://www.edie.net/news/6/BRC-initiative-launched-to-stimulate-energy-efficiency-in-retail-sector/>).

In **Serbia**, as in other countries, energy costs are important determinant of profitability of trade. Table 5 shows the share of the cost of materials, fuel and energy in total operating revenues (i.e. sales revenue) and operating expenditures in the trade of Serbia for 2013 and 2014.



Table 5. The share of costs of materials, energy and fuel in total operating revenues and operating expenditures in the trade of Serbia, 2013 and 2014

	2013	2014
Share of costs of materials, energy and fuel in operating income, (%)	3,77	3,91
Share of costs of materials, energy and fuel in operating expenditures, (%)	3,88	4,03

*Note: Calculation performed by the author*

*Source: Annual financial statements bulletin 2014 (Jul 2015). The Republic of Serbia, the Agency for Business Registers, Belgrade.*

Data presented clearly show that cost of materials, fuel and energy in 2014 participated in total operating revenues in trade of Serbia with 3.91% and in operating expenditures with 4.03%. Given the high proportion of total operating revenues (i.e. sales revenue) they are higher compared to trades of other comparable countries. By applying appropriate energy programs, above all so-called "green energy", they can be significantly reduced in order to increase profitability in the trade of Serbia.

#### 4. CONCLUSION

Energy costs are significant component of operating costs and profits in trade, especially in food retailing. The size and structure of energy costs in retail is influenced by numerous controlled and uncontrolled factors. These are: climate zones, location, age and isolation of building, the size of store, type of commodity, energy system, caring staff, energy prices, the amount of energy consumed and others. Acquaintance of the effects of individual factors is important for efficient energy management in retail.

In recent years, the key factor for improving energy efficiency in retail is usage of renewable energy sources. Due to this, the goal of global retailers in perspective is more use of renewable energy sources in total energy consumption. Likewise, it is the reduction of carbon dioxide with respect to energy consumption. All this will decrease the energy costs of the global retailers. Positive economic effects of reducing energy costs in retail are: further increase in sales, profits and return on investment.

#### REFERENCES

- [1].Aydin, N. (2015). Benefits of Global Sustainability. *International Journal of Enhanced Research in Management & Computer Applications*, 4(4), 9-12.
- [2].Basarir, M.N. (2010). Energy Appraisal of Retail Units: Assessing the Effect of Door Operations on Energy Consumption and Thermal Comfort. *Dissertation*, Department of Engineering, University of Cambridge
- [3].Charlebois, S. et al., (2014). Food Price Report 2015, The food institute of the University of Guelph, 1-17. [online] [2015-10-18]. Available at:

<https://www.uoguelph.ca/foodinstitute/system/files/Food%20Price%20Report%202015.pdf>.

- [4].Jamieson, M. (2014). A \$3 Billion Opportunity: Energy Management in Retail Operations. *White paper*, Schneider Electric, 1-9.
- [5].Jamieson, M. and Hughes, D. (2013). A Practical Guide to Sustainability and Energy Management in Retail Environments. *White paper*, Schneider Electric, 1-11.
- [6].Lukic, R. (2011). *Evaluacija poslovnih performansi u maloprodaji*. Ekonomski fakultet, Beograd.
- [7].Lukic, R. (2012). Sustainable Development of Retail in Serbia. *Review of International Comparative Management*, 13 (4), 574-586.
- [8].Lukic, R. (2013). Sustainable Cost Management in Retail. *Review of International Comparative Management*, 14, 2, 268-280.
- [9].Lukic, R. (20014). The Analysis of the Efficiency of Trade Costs Management in Serbia, *Economia. Seria Management*, 17(2), 195-209.
- [10].Lukic, R. (2015). **The Analysis of Profit per Employee in the Trade of Serbia**, *Economia. Seria Management*, 18( 1), 1-16.
- [11].Lukić, R. (2015). Analiza faktora koji utječu na kreiranje dodatne vrijesnosti kao pokazatelj učinkovitosti poslovanja trgovine u Srbiji, *Ekonomska misao i praksa*, 1, 99-125.
- [12].Lukic, R. (2015). The Analysis of Efficiency of Managing Inventories in Trade in Serbia. *Review of International Comparative Management*, 16(2), 222-238.
- [13].Lukic, R. (2015). The Impact of Financial Leverage on Performance of Trade in Serbia. *Business Excellence and Management*, 5( 3), 5-21.
- [14].Lukic, R., Vojteski-Kljenak, D. and Jovancevic D. (2014). Food waste management. *Management Research and Practice*, 6(4), 23-39.
- [15].Schönberger, H., Galvez-Martos, J.L. and Styles, D. (2013). Best Environmental Management Practice in the Retail Trade Sector. European Commission JRC Scientific And Policy Reports. Learning from frontrunners.
- [16].Tassou, S.A. et al. (2011). Energy consumption and conservation in food retailing. *Applied Thermal Engineering*, 31, 147-156.
- [17].Tassou, S.A. et al. (2014). Energy demand and reduction opportunities in the UK food chain. *Energy*, 167 (EN3), 162-170.
- [18].Vijayan, G. et al., (2014). Sustainability Practices in the Malaysian Grocery Retail Industry. IAC2014, Extended Abstract Template, *Agricongress*, 1-4.

## EVALUATION AND RISKS OF MACHINERY ENTERPRISES

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**Abstract:** This article focuses on the current condition of economical and technical evaluation of small and medium enterprises with the risks connected with such evaluation. There is a need to get an objective tool for enterprise evaluation in the complexity. The task and aim of the work is to create functional practically applicable rating evaluating model of enterprise's quantitative and qualitative data including creation of methodology for their domestic and international comparison. The functionality of academically suggested model including the methodology was tested by benchmarking in the time period of years 2009 - 2011 using the statistically validated financial data from the file of 21 anonymous domestic small and medium enterprises from the machinery industry. Discovered results were compared by the benchmarking with the esteemed Rating of SME - the product of the company CCB – Czech Credit Bureau, a. s. from the multinational group CRIF, whose relevant calculation and methodology are under its own know-how and a trade secret. The suggested model is more easily calculated using the less input data while providing high accuracy against the SME Rating. In conclusion of the article there is also an overview of risks connected with the subject and a proposal for their minimalisation.

**Keywords:** Rating, evaluation of machinery enterprises, financial (quantitative) method, non-financial (qualitative) method, small and medium enterprise (SME)

### 1. INTRODUCTION

Economic progress and growing competition place great demands on technical and economical standards of engineering enterprises. High-efficiency efforts and optimal use on the market requires vast co-operation and business relationships between supplier and customer subjects. To expand business while starting it and in many cases also when investing into its upgrade calls for somebody else's capital.

For many enterprises and financial institutions it is necessary to have an objective instrument for economical and technical evaluation (rating) in such a situation [1]. To fulfil this goal there was an initial prerequisite: to gather and upgrade optimal list of specialized literature and references or their parts which would correspond with the topic of the thesis. Practical layout of the topic represented the creation of functional and easily presentable enterprise rating model for the SME including the methodology for domestic and international comparison.

The evaluation of the SME, which brings academical and practical aspect of solving this issue, is not available as a whole at this point. That is why it was given as a topic for the doctoral thesis at the J. E. Purkyně University, at the Faculty of Production Technologies and Management to find solution for this issue. This has become an intent for the scientific research.

In connection to the above, the goals are:

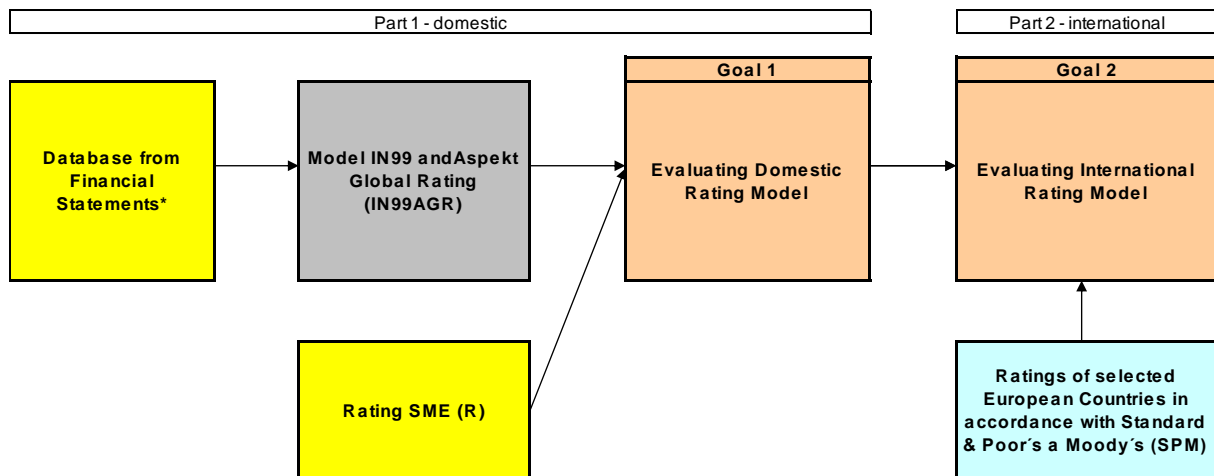
1. To suggest and evaluate an easily usable and functional rating model for the SME for this country while using academically well-known methods, statistically valid financial data of anonymous engineering enterprises and their ratings during an observed period of time.
2. To suggest and evaluate an easily usable and functional model for the abroad SME while using the domestic rating model of the SME and international rating for the countries during an observed period of time.

The hypothesis, which would correspond with the above mentioned intention and which would measure the results of the thesis against the respected Rating of SME validated by the Czech National Bank, was as following:

*„It is possible to create a new, more simple model of the SME evaluation with less input data than it is typical for the SME Rating. The ability of the new model will be close to the SME Rating in its quality.“*

## 2. BACKGROUND RESEARCH AND SOLUTION CONCEPT

Procedure schedule of tasks and targets to be solved accordig to the Pic. 1.



**Legenda:**

- Publicly unavailable figures and information which were provided for the dissertation work by the company CCB –Czech Credit Bureau, a.s. The calculation process and methodology for the SME Rating are the know-how and the trade secret of this company.
- Publicly available figures and information. The calculation proces and methodology for the SME Rating of the countries are the know-how and the trade secret of the companies SPM.
- Publicly available figures and information. These are academically well-known and publicly published models including the calculation process and methodology.
- The goals of the dissertation work which represent the new contribution to the researched issue.

\* Statistically validated database of financial figures for the period of years 2009 to 2011 of 21 anonymous domestic SME operating in the machinery field.

Figure 1. Procedure schedule of tasks and targets to be solved

In compliance with the procedure schedule there came the solving of tasks and targets in the following steps (see the Chapter 3).

### **3. DATA PROCESSING**

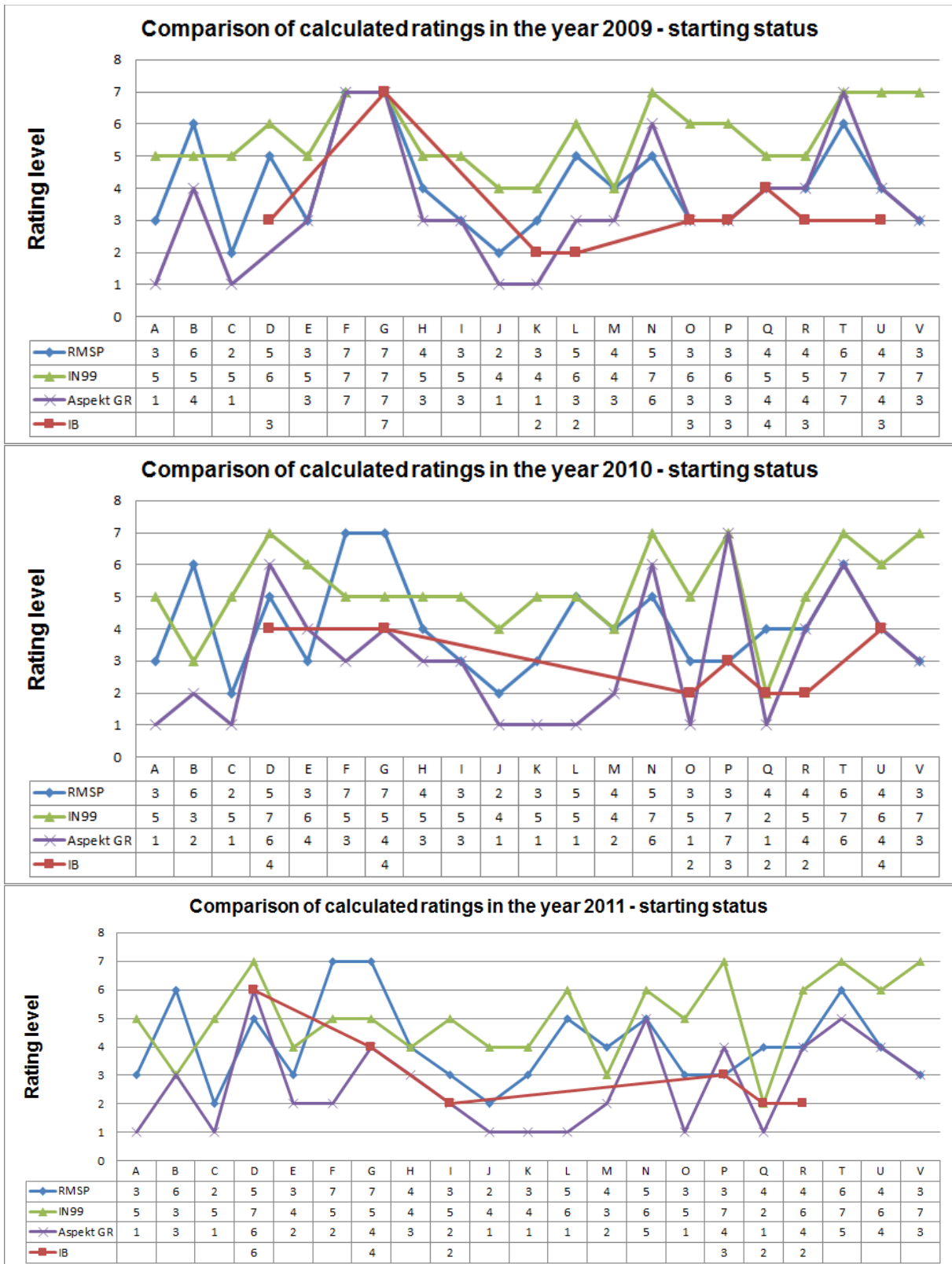
#### **3.1 CALCULATION ON THE BASIS OF MODELS IN99 BY THE NEUMEIERS AND THE ASPEKTGLOBALRATING**

The company CCB – Czech Credit Bureau, a.s. provided the authors with the statistically validated database of figures from the financial statements covering the periods of 2009 to 2011 showing 21 anonymous domestic SME which do their business in the machinery field (i.e. labeled as 28 and 33 following the first two positions of economical activities classification CZ-NACE, which has been used in the Czech Republic since 2008 and which replaced the branch classification of economical activities called OKEČ). The number of financial data (variables) which are the input figures for calculation of the Domestic Rating KMEP was in total 15 [4]. More detailed information for the variables are in the Attachment 1.

The obtained results were very good [11]. It is possible to say that with the IN99 there was a practical result gained each time (i.e. in the single years 2009 to 2011 in 21 cases out of 21 cases) and with the AspektGlobalRating almost each time (i.e. in 2009 in 20 cases out of 21, in the years 2010 and 2011 in 21 cases out of 21).

The results were then matched (harmonized) within the intervals into seven rating levels, following the same principle as with the SME Rating [4]. Then it was possible to carry out their comparison with the SME Rating, which could be grafically represented in the single years 2009 to 2011, see the Graphs 1.

The authors worked with the figures using the mathematical and statistic apparatus. It is possible to say that during the period of the years 2009 and 2001 the rating of the SME oscillated within the interval of figures of the IN99 and the AspektGlobalRating with the probability of 85 to 85.71 %. This provided a proper space for generalization and creation of pattern for domestic rating of the SME. They originated a simple and practically usable formula.



Graphs 1. Comparison of ratings based on IN99 and AspektGlobalRating with the SME Rating

### 3.2 MEETING OF THE GOAL 1 – DOMESTIC RATING MODEL FOR THE SME

Within the framework of meeting the goal 1 there was a rating model (see the Pic. 1) formulated, which the authors named as the **Domestic Rating KMEP** (KMEP is the abbreviation of the Management and Economics Department of his faculty in Ústí nad Labem), and which they wrote as a mathematical formula:

$$\text{DomesticRatingKMEP} = 0.9 \frac{IN99 + \text{AspektGlobalRating}}{2}, \quad (1)$$

The validity and accuracy of the formula results has been verified on the figures used from the financial data database of 21 anonymous SMEs from the machinery field (i.e. on the qualitative data set). For the single years of 2009 to 2011 there is the graphical illustration of the results against the validated SME Rating, enabling the comparison with the use of the benchmarking method. For further details see also the Attachment 1.

The validated sets of qualitative (non-financial) data of SME from the machinery field, nor from any other field, are not publicly accessible. Selected figures are systematically gathered and handled only by banks and financial institutions for their own use as they offer the leasing, factoring, forfaiting, credit insurance, etc. [5]. The same thing is true also for the benchmarking, and this is why the authors could only process the initial and basic methodology in this field.

The evaluation of technical standard of an enterprise is basically completely dependent on the willingness and trust of particular partners, next also on the voluntary providing and publishing of relevant figures which are (same as the financial data) very sensitive in any competitive settings.

While the evaluation of economical standards of an enterprise comes out of the figures from the financial statements and it is possible to work with them directly using the mathematical and statistic apparatus, the evaluation of technical standards is primarily necessary to be done by an expert or by a group of experts, i.e. by qualitative description which would be to a certain degree subjective. Next is usually used a point system which evaluates the single factors (criteria).

The developed methodology of calculation for Domestic Rating KMEP and the rating methodology of non-financial (qualitative) criteria of the SME from the machinery field based on the benchmarking, with the evaluation suggestion of the five factors described into particular criteria using the point system of evaluation, is following [8]:

1. Factors of economic and branch setting.
2. Factors of business activity and management.
3. Factors of sale and purchase.
4. Factors of production.
5. Other factors.

The goal 1 was met in the domestic evaluation of financial and non-financial figures of the SME, or rather the machinery enterprise. Compared with the Rating of SME, the new methodology is less time consuming and more simple for the programmers because it works with a lower number of the input data. Practical benefit of this rating model is its

methodology and the fact that the model shows a high accuracy of 95% against the reputable product – the SME Rating.

### 3.3 RATINGS OF SELECTED EUROPEAN COUNTRIES

The ratings of world countries including the Czech Republic are published on the ČNB's web page. These ratings were determined by the international rating agencies Standard & Poor's and Moody's [10] (see the Tab. 1 and Tab. 2). Based of this information there was a chart of selected European countries ratings created.

Table 1. Rating evaluation of selected European countries as of 25<sup>th</sup> March 2015

Moody's		Standard & Poor's	
<b>Investment Levels</b>			
Aaa	Denmark, Finland, Luxembourg, Germany, Netherlands, Austria, Sweden	AAA	Denmark, Luxembourg, Germany, Great Britain, Sweden
Aa	France, Great Britain	AA	Finland, Netherlands, Austria, Belgium, France, the CR, Estonia
A	The CR, Estonia, Poland, Slovakia, Malta	A	Ireland, Slovakia, Poland, Slovenia
Baa	Lithuania, Slovenia, Bulgaria, Ireland, Latvia, Romania, Spain	BBB	Malta, Latvia, Bulgaria, Lithuania, Spain, Italy
<b>Speculative Leves</b>			
Ba	Croatia, Hungary, Portugal	BB	Romania, Croatia, Hungary, Portugal
B		B	Greece
Caa	Greece, Cyprus	CCC	Cyprus

### 3.4 MEETING OF THE GOAL 2 – INTERNATIONAL RATING MODEL FOR THE SME

Within the Framework of meeting the goal 2 there was a rating model (see the Pic. 1) formulated which the authors named as the **International Rating KMEP** and which they wrote as a mathematical formula:

$$InternationalRatingKMEP = DomesticRatingKMEP \cdot \frac{1 + (100 - CountryRatingIndex)}{100} \quad (2)$$

The Rating Index of a country is expressed by the index in %, from which the SME comes and in which the Domestic Rating KMEP was calculated. See the following table with examples which were used for the formulation of general formula version. This formula was next harmonized by intervals into the 7 rating levels.



Table 2. Ratio of country ratings

Moody's and Standard & Poor's	Harmonized into 7 Rating Levels		Country Index Rating in %
Aaa	1	Top Level	100
Aa	2		85
A	3	Average Level	70
Baa	4		55
Ba	5	Speculative Level	40
B	6		30
Caa	7	Delayed Level	20
Ca	8		10
C	9		5
D	default		0

It was not possible to verify the results of the formula 2 because the data file of 21 anonymous SME contains only domestic data about the enterprises, but it doesn't contain the international figures and comparisons.

Following the two input figures, i.e. from the formula 1, the Domestic Rating KMEP and the rating evaluation of the selected European countries, the authors created a matrix of total resulting figures with a brief recommendation – the legend for its use with the International Rating KMEP (see the Pic. 2).

For the Matrix of final figures it is possible to recommend:

- If the SME or a country from which the SME comes from are evaluated by one or double rating level 7 (see the grey colour), it is desirable for the evaluator to pay caution because it is very probable to certain that there will be the criteria O.K. or K.O. applied within the risk speculative level,

- It is also recommended to pay caution with higher probability to apply the O.K. or K.O. criteria if the evaluated SME or the country it comes from, is evaluated by double rating level 6.

The goal number 2 was fulfilled by the proposal of evaluating methodology for the international comparison of the SME. There is also an indication in which possible direction the scientific research and the follow-up practical application in the company practice might go.

Country Rating after the Harmonization into 7 Rating Levels									
Domestic Rating KMEP		1	2	3	4	5	6	7	
	1	1	<1;2>	2	<2;3>	3	<3;4>	4	4
	2	<1;2>	2	<2;3>	3	<3;4>	4	<4;5>	<4;5>
	3	2	<2;3>	3	<3;4>	4	<4;5>	5	5
	4	<2;3>	3	<3;4>	4	<4;5>	5	<5;6>	<5;6>
	5	3	<3;4>	4	<4;5>	5	<5;6>	6	6
	6	<3;4>	4	<4;5>	5	<5;6>	6	<6;7>	<6;7>
	7	4	<4;5>	5	<5;6>	6	<6;7>	7	7


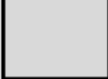
Legend for the grey area:  Area with the double evaluation 7 has 100% probability of the usage of criteria K.O.  
 Area with the one evaluation 7 has ≥ 50% probability of the usage of criteria K.O.

Figure 2. Matrix of final figures for International Rating KMEP in total

#### 4. RISKS OF ECONOMIC AND TECHNICAL EVALUATION OF ENTERPRISES

Assessment of the company rating is usually required because of internal reasons or it is needed because of the external conditions [6].

The internal reason is mainly the need to know the company's position on the market in comparison with the similar companies in the given or in analogous segment. It is possible to use the positive results in marketing and in economic and contractual dealings [8].

The external reason to define the company rating are usually the market subjects requirements for the knowledge about the company position, its economic health and its business vitality (perspective). This often corresponds with the requirements of the financial institutions when they deal with granting or restructuring the credits or the bank guarantees [8]. Next to the risk investigation, the risk of the bank guarantee, etc. the financial institutions require also the knowledge of creditworthiness and rating of a given company.

Reaching of the required rating is necessary but not sufficient condition for making a contractual agreement. In some cases there is a sanction for provable stating of incorrect or incomplete data for the enterprise rating determination.

## 5. CONCLUSION

The new evaluating methodologies are based on the company financial data (quantitative figures) and they are structured the way so they allow also for the quantitative aspect of companies on the non-financial factors base (economic setting and branches; business activities and management; sale and purchase; technical and technological production facilities; others). The hypothesis was in the goal number 1 proved.

Compared with the SME Rating, The Domestic Rating KMEP provides the verified results with an average accuracy of 95 %. This discovered accuracy was verified by the mathematical and statistical apparatus on the validated database of financial figures from 21 SMEs for the period of years 2009 to 2011.

With the non-financial data (qualitative part) it was not possible to verify and find out the accuracy of this new methodology aspect due to the absence of needed non-financial data. With the qualitative part of the enterprise evaluation it is supposed that the evaluation is primarily done in the expert way.

Economical and technical evaluation of enterprises involves also risks. The risks have to be specified as well as proceeded based on their priority, probability and importance to occur.

## REFERENCES

- [1] Barták K., Průvodce Evropskou unií, Praha: MZV ČR, 2000.
- [2] Brealey R.A., Myers, S.C., Teorie a praxe firemních financí, Praha: Victoria Publishing, 1992.
- [3] Finger P., Neinformovanost ohrožuje zdravé podnikání, Praha: Journal of Zpravodaj Hospodářské komory ČR no. 1, 2013.
- [4] Finger P., CRIBIS informace o firmách, Praha: Presentation of the chairman of SME section in Hospodářská komora Praha, 2013.
- [5] Hnilica J., Fotr J., Aplikovaná analýza rizika ve finančním managementu a investičním rozhodování, Praha: Grada, 2009.
- [6] Horváth G., Sellner K., Mádlová D., Lacko B., Kocour P., Rizika vybraných podnikových procesů, Ústí nad Labem: FVTM UJEP, 2012.
- [7] Kantorek P., Benfordův zákon, Praha: Journal of VESMÍR no. 77, 1998.
- [8] Korecký M., Trkovský V., Management rizik projektů se zaměřením na projekty v průmyslových podnicích, Praha: Grada, 2011.
- [9] Mařík M., Metody oceňování podniku – proces ocenění, základní metody a postupy, Praha: Ekopress, 2007.
- [10] Mařík M., Metody oceňování podniku pro pokročilé – hlubší pohled na vybrané problémy, Praha: Ekopress, 2011.
- [11] Mařík M., Mařík, P., Moderní metody hodnocení výkonnosti a oceňování podniku, Praha: Ekopress, 2005.
- [12] Smejkal V., Rais, K., Řízení rizik ve firmách a jiných organizacích, Praha: Grada, 2010.

## Attachment 1 – Financial data (variables) which are the input figures for The Domestic Rating KMEP calculation

### Financial data (variables), which are the starting figures for calculation of the Domestic SME Rating

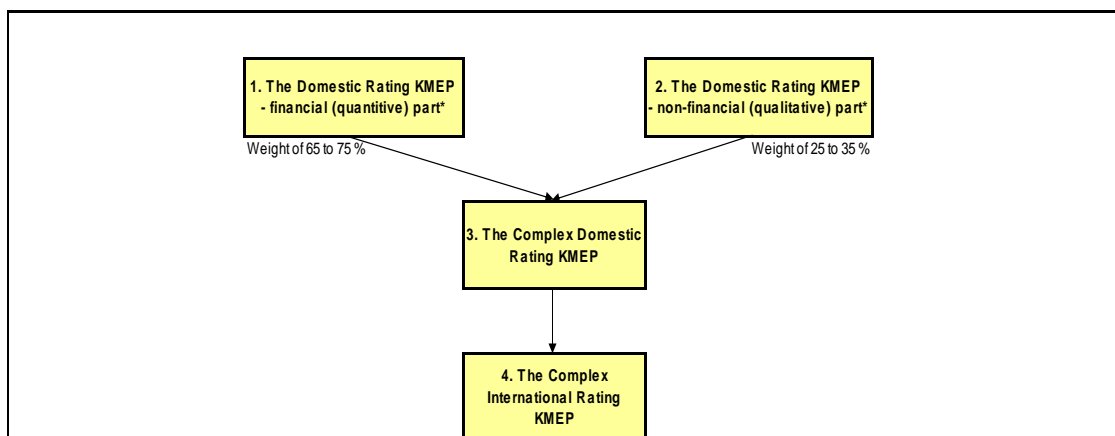
Data Order Number	Name of data
1	TOTAL ASSETS
2	Current Assets
3	Short-term Debt
4	Short-term Financial Assets
5	Equity
6	Debts
7	Short-term Debts
8	Bank Loans and Credits
9	Turnover
10	Sales of own Products and Services
11	Depreciation of Long-term Tangible and Intangible Assets
12	Operating Profit/Loss
13	Cost Interests
14	Income Tax
15	Profit/Loss of the Accounting Period

Note for the column name "Data Order Numer", which marks in colour the figure according to the Financial Statement:

Figure from the Line enters the Calculation of the Domestic Rating KMEP in part 1 (calculation IN99).
Figure from the Line enters the Calculation of the Domestic Rating KMEP in part 2 (calculation AspektGlobalRating).
Figure from the Line enters the Calculation of the Domestic Rating KMEP in parts 1 a 2 (calculation IN99 and AspektGlobalRating).

## Attachment 2 – The Scheme of Complex Rating KMEP

### Scheme of the Complex Rating KMEP



#### The Notes for the Above Mentioned Scheme:

1. It is possible to work with the mathematical and statistic apparatus directly. There is a validated database of financial figures and their time lines for the SME available.
  2. It is possible to describe it in the qualitative expert way and only later within the framework of e.g. benchmarking work with the mathematical and statistic apparatus. There is not a validated database of the non-financial figures and their time lines for the SME available.
  - 1 and 2 are processed in the MS EXCEL 97 in the dissertation work attachment which is not publicly available.
  - 1 is processed in the dissertation work as a proposal of methodology of the SME and the accuracy of its result was compared against the reputable SME Rating, which expert guarantor is the CCB - Czech Credit Bureau, a.s. from the multinational group seated in Bologna, Italy.
  - For 3 a 4 are not available the validated databases of figures and their time lines for the SME.
  - For 4 there are available the ratings of the sovereign countries and their time lines from the reputable agencies e.g. Moody's and Standard & Poor's from the USA.
- \*) Financial (quantitative) part and non-financial (qualitative) part, i.e. economic and technical aspects are the integral part of the complex evaluation of the SME where there is necessary to bear this fact in mind and fully abide it in order to gain the maximum objective result of the domestic or/and the international SME evaluation.

## VIRTUAL ORGANIZATIONS AS A STRATEGIC CHOICE MULTIPLE CASE STUDY

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**Abstract:** Digitalization is an important global megatrend causing major changes in business processes, strategies and future skills requirements. Due to developments in digital media and information technologies, a growing number of important items on financial statements have come under real-time management as information technology has made such practices both economically feasible and competitively necessary. Digitally enabled business may create a range of challenges as well as new opportunities for accounting information providers. However, there still remains a paucity of evidence on accounting services produced by virtual organizations. This multiple case study examines how a virtual organization could be configured alongside information technologies, and looks at how it would operate, and what the organizational challenges are in a virtual context. The three companies selected for this case study operate in the e-services business and use cloud-based information systems. The findings suggest that a virtual organization requires a data-driven organizational attitude, and changes in the decision-making processes. Additionally, a virtual organizing appears to require a new kind of attitude towards its workers from the employer. The findings suggest that even if the organization is dynamic, e.g. its members may change quite frequently, employees could experience organizational cohesion formed by the services related to the employment relationship. The findings of this study indicate that startup enterprises could benefit from accounting services in a new way. They expect a reliable, safe and easy digital network of services. Therefore, in the future service providers might operate increasingly as providers of self-services. This study contributes toward the current discussion of virtual organization by evidencing that the change to e-services implies a significant change in strategic management and business models for professional service providers, as well as acceptance and adoption of the new services.

**Keywords:** Digitalization, virtual organization, accounting, strategic management

### 1. INTRODUCTION

Digitalization and the Internet of Things (IoT) are important global megatrends that affect all sectors and will cause major changes in all sectors for business processes, strategy and employee know-how, as well as future skills requirements. In addition, the current digital era allows new forms of organization based on digitization. According to Bailey and colleagues [1:1485], “Digitization involves the creation of computer-based representations of physical phenomena”. Correspondingly, the term virtuality refers to the situation when digital representations substitute physical objects, processes, or people they represent [1]. The traditional view is that organizations create services, but modern IT technology allows that

services may also create dynamic virtual organizations forming a basis for exchange relationships between buyers and suppliers. According to the Service Federation Based Model for the creation of virtual organizations (VO), potential members of a virtual organization are comprehended as service providers [2]. These service providers constitute a service portal based on an indirect selection where services, not providers, are selected by customers [3].

In the accounting service industry, a growing number of important items found on financial statements have come under real-time management, as information technology has made such practices both economically feasible and competitively necessary [4] [5] [6] [7]. Extant studies [8] [4] [5] [9] [10] [6] [7] indicate that digitally enabled business may create a range of challenges as well as new opportunities for accounting information providers. However, there still remains a paucity of evidence on accounting services produced by virtual organizations. Digitalization is radically changing the way of working. Information technology allows employees to be more flexible about their working locations and the line between work and free time is becoming more blurred. Virtual organizations create and offer the opportunity for strategic choices for employees and for subcontracting to client companies.

This case study examines how a virtual organization could be configured together with information technology, and explores how it would operate, and what organizational challenges exist in a virtual context. The findings suggest that a virtual organization requires a data-driven organizational attitude and changes in the decision-making processes. This study contributes to the current discussion on virtual organization by evidencing that the change to e-services implies a significant change in business models for professional service providers, as well as acceptance and adoption of the new services.

## **2. THEORETICAL BACKGROUND**

### **2.1. DIGITALIZATION AND BUSINESS STRATEGIES**

The current ongoing process of global digitalization is predicted to become as significant a change as the process of industrialization had been [11]. Globally produced data doubles every 18 months, and the volumes expand by 35–50% per year [8]. Digitalization and the digital revolution has led to new ways of doing business, as well as threatening traditional ways of doing business, which remain in the old operating models. Expert work and analytics will be automated, and thus the importance of employees or consultants with relevant skills will continue to grow. Almost all information is undergoing a process of becoming digital, services are becoming electronic and data itself can be processed into new business. Despite the process of digitalization, the objectives of most companies remain traditional, such as achieving improvements in profitability, as well as developing and improving quality, market share, returns on capital and the achieving better results. Business processes that are especially improving include payments, invoicing, orders, distribution channels and other completely new services.

The development of digitalization will promote collaboration in the organizations of the digital service channels, customer relationship management (CRM), sales, ordering and marketing automation, process automation, document management, and knowledge management. Brynjolfsson and McAfee [12] suggest that “everything that can be digitized will be digitized and everything that can be automated will be automated”. Traditional

business strategies and digital business strategies will be combined in the near future [13]. What do these changes mean for accounting services? These issues are discussed in the following sub-section.

## 2.2. ACCOUNTING SERVICE DIGITALIZATION

In a very short span of time several new techniques have evolved as a result of increased global development in communications and information technologies [14]. E-services and real-time accounting (cloud computing) go even further, because these allow users to access accounting software via the Internet, providing access to financial data anywhere, from any device. Gullkvist [15] has argued that a new feature in emerging e-services is the introduction self-services. The real-time economy, consisting of automatic digital format transactions between companies, will revolutionize the way accounting transactions are received, processed and exploited [16]. Although the term “e-services” is commonly used in business and information science journals, a generally accepted definition of the concept does not seem to exist [15] [17]. For this study, based on Gullkvist [15] and Rust and Kannan [18], an e-service is defined as “the provision of service over electronic networks” where in this study the term “networks” implies the Internet.

Terms such as paperless accounting, e-accounting, internet accounting and digital accounting have emerged in the media [15]. Digitization has fundamentally and permanently changed the accounting profession, and the computerization of accounting has moved into a new stage, the digitalization of accounting [19] [15]. Deshmukh [20] defines digital accounting as the representation of accounting information in digital format, which can then be electronically manipulated and transmitted. Gullkvist [15] notes that emerging technologies are being developed for further automating procedures, developing more appropriate information technology-based processes, e.g. electronic bank statements, electronic reporting to tax authorities, electronic invoicing and web-based accounting software. Technological innovations cover a broad range of information technologies and systems.

Computerized accounting systems have been highly valued because they have made it easier to monitor and compare costs between different time periods [21]. Traditionally an accountant has been a key person in the client firm’s business [22] [23] [24] [14] [7]. However, the use of new technologies may create management problems [8]. Accounting service providers should provide financial information according to the clients’ specific requirements or needs [7]. The main motive given in extant studies for adopting such a practice was to form a virtual organization [9]. As soon as the information became freely available, the cost of network building collapsed [25]. Digitization and automation are set to reach dramatically higher levels over the short term [8]. However, the question remains how the virtual service providers will take their position in this changing digital environment.

## 3. RESEARCH METHODOLOGY

In this study, a qualitative multiple case study approach [26] was chosen to examine 1) how virtual organizations could be configured alongside information technologies to produce e-accounting services, 2) how they would operate, and 3) what the challenges of strategic management in a virtual context would be. The data was collected in a series of in-depth,

semi-structured interviews, which were transcribed and analyzed with an inductive analysis method. The data consists of four interviews (an interview from each company, except two interviews from Case Company A) each lasting from 50 min to 1 h 15 min. The interviews were carried out between March 2015 and March 2017. The data collection continued until a point of data saturation was reached.

The qualitative data used were transcripts of the recorded interviews. The benefits and challenges of virtual organizations were analyzed throughout using a systematic two-phase analysis procedure. The inductive analysis method included two coding phases from first-order concepts to second-order order themes. To increase the objectivity and reliability of the analyses, the first-order concepts were categorized by a research team consisting of three researchers. The first-order concepts were elicited using an open-coding technique. The second-order themes were based on joint axial coding by the above-mentioned team.

The companies A, B and C were selected for case evidence of a virtual organization (VO). The three companies selected for this study operate in the e-services business and use cloud-based information systems. Company A was originally a traditional accounting service provider which has expanded its services towards into a digital platform that forms a VO. Company B supports start-up enterprises and individuals in starting a business by taking care of the required bureaucracy. The service has already over 30,000 users in the Nordic countries. Company C is a billing service cooperative established in 2008 and is part of a larger human resource management company. The service has already over 20,000 users in Finland. The business ideas of these virtual companies are to allow employees to combine the benefits of entrepreneurship and employment. The workers are employed in the company, but they do their work by telecommuting, and invoice their own customers through these case companies. The companies are responsible for accounting and real-time reporting for their employees, and professionals involved are typically freelancers, consultants, designers, graphic designers, and photographers.

## 4. FINDINGS

### 4.1. STRATEGIC OPERATION MODELS

The following description of case VO functions provides the answers to our research questions of how a VO could be configured alongside information technologies, and how it operates. The configuration of the organizations is dynamic, since the length of the employment depends on the employees themselves and their projects. The operation model of the case virtual organizations is presented in Figure 1. The case organizations (A, B, C) provide different sorts of direct real-time services or commodities to their own employee/customers. These employees inform the VO for invoicing, and the VO provides service by invoicing customers, paying salaries to employees, providing them with other accounting services, and taking care of legal obligations, such as taxes and employee costs:

*“The organization handles billing, pays salaries, takes care of legal obligations, insurance, and voluntary obligations. – We have made a payroll calculation program, where employees see their own incomes and are able to pay for their own work they have done for their customers. And we have some extensive financial management software, that is cloud computing software and has all accounts receivable, accountants payable. – The billing*



program, and banking connections are mostly used. The billing program automatically registers the customer's payments in the system. It also allows you to send debt collection letters. If there are any problems with debt collection, you can send a direct signal to the collection agency." CEO CASE A

"In an optimal case, the whole can work independently, it does not require the work of a third party or a staff for its virtual workforce. The system is comprised of a real-time balance and is based on the automation and development of these digital processes. At the same time, when some information is searched for once, an automatic model can be created that continuously generates data. On this basis, it can be said that our systems are very real-time." CEO CASE B

"We have different so-called low barrier entrepreneurs, freelancers, self-employed people, and employees who don't have to do their own accounting. We pay them a salary and transmit all statutory payments to the right people. If they need help, they can contact us by e-mail, messaging, extranet messaging, chat and telephone. Users expect that the program is simple and easy to use." CASE C

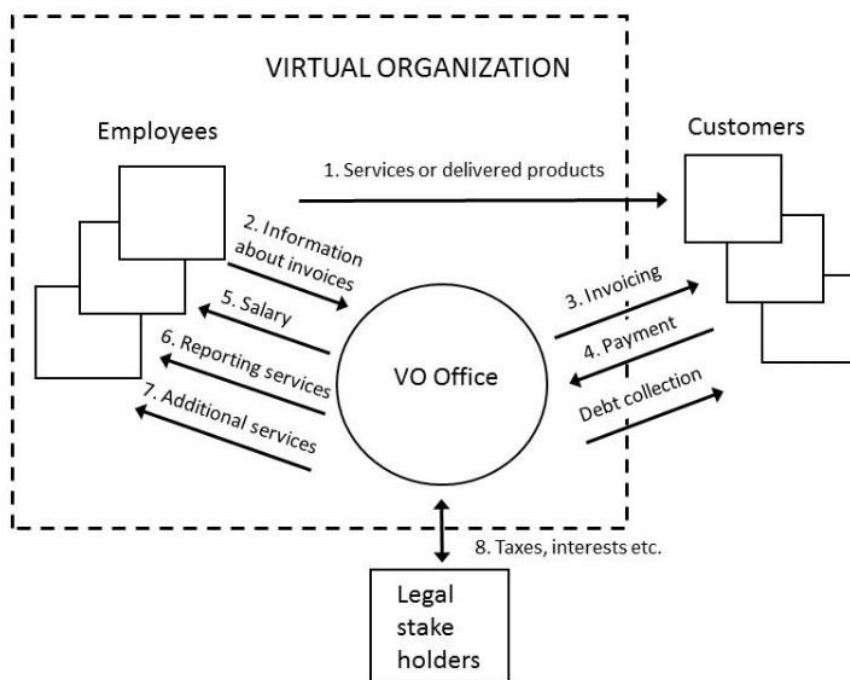


Figure 1. The operating model of the case organizations

Thus, these kinds of virtual organizations could bring a sense of organizational cohesion and employee security provided by an employer. In addition, the findings indicate that the virtual organization's attitude towards its employees seems to be different than in conventional organizations. When analyzing the discourse of the owners about their employees the used term was typically "client". This can be understood so that the dynamic

context of these virtual organizations requires a new kind of attitude towards its workers from the employer.

#### 4.2. BENEFITS AND CHALLENGES OF VIRTUAL ORGANIZING

The second sets of questions aimed to investigate how informants comprehended the benefits and challenges of the virtual organization. The themes which emerged from the analysis related to benefits were: new service markets for start-up enterprises, electronic business processes and cloud services improving efficiency, performance, and flexibility, competitive advantage from effective data exploitation, economies of scale, and the opportunity to take advantage of mobile applications and on-line self-services.

The most principal and the most frequently mentioned benefit was that the novel digitalization enabled the business idea of service markets for start-up enterprises:

*“The services are that the organization handles billing, pays salaries, takes care of legal obligations, insurance, and voluntary obligations. [...] The service allows entrepreneurial activities without the risks to the entrepreneur.” CEO Case A*

*“Start a business without a company of your own” [...]. “Work as freelancer and invoice for work without owning a company” [...] “Try out your business idea before setting up an actual company.” [...] “We’ll take care of all the paperwork and pay your income as a salary to you after the client has paid the invoice you have created.” [...] “Register free and start invoicing your clients.” CEO Case B*

Compared to the alternative of working directly with their own customers, these enterprises receive many benefits from the employment relationship with the case organizations, e.g. real-time automatic financial management, e-services for optimizing reporting for all stakeholders, salary reports, real-time taxation and statistics. Furthermore, digitalization enabled virtual on-line services and the use of mobile applications increase the user friendliness:

*“The connections are mainly via the Internet. Face-to-face meetings and conversations are not needed”[...] “And we are also developing a mobile application that I think is good for the modern world and will make this more user-friendly”. Executive Case C*

The challenges that emerged from the analysis included providing a more demanding electronic customer service, dependence on the functioning of electronic co-operation between state institutions, and the risk that manual work may decrease the efficiency of virtually organized processes:

*“Providing customer service electronically is considerably more demanding compared to a situation where all the users would be physically present, and then we would be able to guide them in the use of the service.” CEO Case B*

*“IT interfaces with state institutions should be developed in order to provide information to those parties and retrieve information from them.” CEO Case B*

*“And as long as certain processes or work is manual or requires manpower, then a virtual organization will not work, because it relies on a staff workload tied to a time and place.” CEO Case B*

In summary, these results indicate that in order to gain full benefits from digitalization of services as a strategic choice, it should be based novel business ideas and markets based on digitalization. Furthermore, the digitalization of the processes should be thoroughly implemented without manual phases.

## 5. DISCUSSION

This study using a multiple case study methodology examines how virtual organizations could be configured alongside information technologies, how they operate, and what benefits and challenges lay in virtual organizational context. The dynamic context of virtual organizations seems to require a new kind of attitude towards its workers from employers. The findings suggest that even if the organization is dynamic, e.g. its members change quite frequently, employees could experience some form of organizational cohesion formed from the services related to the employment relationship.

These kinds of virtual organizations might be seen as a social construct linking together buyers and suppliers demanding a new culture of decision making. It could be concluded that data-intensive approaches may offer new opportunities for service providers. However, strong leadership and responsible management are conditions for successful and efficient data utilization [27]. For leaders, it might demand a more comprehensive view of the context ensure successful change. Furthermore, management needs encouragement to try new experiments. In general, making digital data based organizational control systems will require a data-driven organizational attitude. Other studies have reported challenges in the area of decision-making, such as a lack of a data-driven organizational culture [28] [29]. Therefore, utilizing data may lead to changes in the organizational decision-making processes. New managerial skills will be needed, not only for understanding, but also supporting these changes. Managing these changes requires training in collecting, storing, analyzing and reporting data and on how to use data to make decisions. The findings of this study also indicate that startup enterprises could challenge the accounting service industry in a new way, because the release of information creates opportunities for new market entrants. Startup enterprise customers expect a reliable, safe and easy digital network of services. Therefore, in the future service providers might operate increasingly as producers of self-services.

This study contributes to the current discussion on virtual organizing by evidencing that the change to e-services implies a significant change in business models for professional service providers, as well as acceptance and adoption of new services for employees. In terms of the managerial implications for companies aiming towards virtual operations, this study suggests the full utilization of IT systems without manual phases of operation will be necessary to make operations totally time and place independent, and innovatively take advantage of new customers and markets brought about by digitalization.

The scope of this study was limited to these cases, and these findings might be not applicable to other kinds of virtual organizations. In addition, other limitations need to be acknowledged. Firstly, the context of this study focuses on three selected VO business networks, and this should be considered when utilizing the results in another context. Secondly, the local and situational context should be reflected. Despite of the exploratory nature of this study, the findings suggests that virtual organizations demand new kinds of organizational skills and attitudes. A possible area for future research would be the identification of these changes, and more importantly, how members of virtual organizations make sense and adapt their behavior to meet these changes.

## REFERENCES

1. D.E. Bailey, P.M. Leonardi, S.R. Barley, The lure of the virtual, *Organization Science*, 23 (2012) 5, pp. 1485-1504.
2. L.M. Camarinha-Matos, H. Afsarmanesh, M. Ollus, M. Virtual Organizations: Systems and Practices, Springer, Boston, 2005.
3. L.M. Camarinha-Matos, I. Silveri, H. Afsarmanesh, A.I. Oliveira, Towards a framework for creation of dynamic virtual organizations. In *Collaborative Networks and their Breeding Environments (PRO-VE'05)*, Springer, Valencia, Spain, 26–28 Sep 2005.
4. L.M. Dyer, C.A. Ross, Seeking advice in a dynamic and complex business environment: Impact on the success of small firms. *Journal of Development Entrepreneurship*, 13 (2008) 2, pp. 133-149.
5. P. Everaert, G. Sarens, J. Rommel, Using Transaction Cost Economics to Explain Outsourcing of Accounting, *Small Business Economics*, 35 (2010) 1, pp. 93-112.
6. G. Sarens, P. Everaert, F. Verplancke, I. De Beelde, Diversification of External Accountants Serving Small and Medium-sized Enterprises: Evidence from Belgium, *Australian Accounting Review*, 73 (2015) 25, pp. 155-174.
7. H. Sjögrén, P. Syrjä, K. Puumalainen, Use of Management Accounting Information in SMEs – role of service provider relationship, *International Journal of Business Information Systems*, 17 (2014) 3, pp. 340-354.
8. A. Bhimani, L. Willcocks, Digitisation, ‘Big Data’, and the transformation of accounting information, *Accounting and Business Research*, 44 (2014) 4, pp. 469-490.
9. J. Hättönen, T. Eriksson, 30+ years of research and practice of outsourcing – Exploring the past and anticipating the future, *Journal of International Management*, 15 (2009), pp. 142-155.
10. J. Salo, Business relationship digitalization: What do we need to know before embarking on such activities, *Journal of Electronic Commerce in Organizations*, 4 (2006) 4, pp. 75-93.
11. C.B. Frey, M.A. Osborne, *The Future of Employment: How Susceptible Are Jobs to Computerisation?* Oxford University Programme on the Impacts of Future Technology, England, 2013.
12. E. Brynjolfsson, A. McAfee, *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*, W. W. Norton & Company, New York, 2014.
13. A. Bharadwaj, O.A. El Sawy, P.A. Pavlou, N. Venkatraman, Digital business strategy: Toward a next generation of insights, *MIS Quarterly*, 37 (2013) 2, pp. 471-482.
14. R. Nandan, Management Accounting Needs of SMEs and the Role of Professional Accountants: A Renewed Research Agenda, *Journal of Applied Management Accounting Research*, 8 (2010), pp. 65-77.

15. B.M. Gullkvist, Emerging e-services in accounting: A longitudinal case study. (pp. 89–106), In A. Scupola (ed.): Cases on Managing E-services. Information Science Reference, Hershey, 2009.
16. M.A. Vasarhelyi, R.A. Teeter, J.P. Krahel, Audit education and the real-time economy, *Issues in Accounting Education*, 25 (2010) 3, pp. 405-423.
17. T.F. Stafford, E-services. *Communications of the ACM*, 46 (2003) 6, pp. 26-28.
18. R.T. Rust, P.K. Kannan, E-service: New direction in theory and practice, M.E. Sharpe, Armonk, NY, 2002.
19. J.E. Hunton, Blending information and communication technology with accounting research, *Accounting Horizons*, 16 (2002) 1, pp. 55-67.
20. A. Deshmukh, *Digital Accounting: The Effects of the Internet and ERP on Accounting*, IGI Global, Hershey PA, 2006.
21. A. Halabi, R., Barrett, R. Dyt, Understanding financial information used to assess small firm performance: An Australian qualitative study, *Qualitative Research in Accounting & Management*, 7 (2010) 2, pp. 163-179.
22. P.N. Gooderham, A. Tobiassen, E. Døving, O. Nordhaug, Accountants as sources of business advice for small firms, *International Small Business Journal*, 22 (2004) 5, pp. 1-9.
23. E. Larsson, L., Hedelin, T. Gärling, Influence of expert advice on expansion goals of small businesses in rural Sweden, *Journal of Small Business Management*, 41 (2003) 2, pp. 205-212.
24. M. Lucas, M., Prowle, G. Lowth, Management Accounting Practices of (UK) Small-Medium-Sized Enterprises (SMEs): Improving SME performance through Management Accounting Education, *CIMA Chartered Institute of Management Accountants*, 9 (2013) 4, pp. 1-14.
25. R. Nandan, S. Ciccotosto, Networks in knowledge-intensive industry: the case of a regional accountants' network, *Journal of Accounting & Organizational Change*, 10 (2014) 1, pp. 2-21.
26. R.K. Yin, *Case Study Research: Design and Methods*, 4th Edition, Beverly Hills: Sage Publications, 2009.
27. T.H. Davenport, *Big Data at Work Dispelling the Myths, Uncovering the Opportunities*. Harvard Business School, Boston, 2014.
28. Y. Shen, V.E. Varvel, Developing data management services at the Johns Hopkins University, *The Journal of Academic Librarianship*, 39 (2013), pp. 552-557.
29. D. Dutta, I. Bose, Managing a Big Data project: The case of Ramco Cements Limited, *International Journal of Production Economics*, 165 (2015), pp. 293-306.

## **MARKETING MANAGEMENT AT A MODERN ENTERPRISE: PECULIARITIES OF THE PROCESS**

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**Abstract:** Marketing is one of the most powerful tools used by various enterprises in their struggle for survival, prosperity and competitiveness. It is also known as business philosophy, aimed at identifying consumers' needs, target markets that enterprises can meet in the best way producing appropriate products, and making each employer think from consumers and markets' viewpoint.

The marketing management concept is a customer orientation, backed by a set of measures to meet the market needs such as: studying enterprise's customers regularly, meeting their needs completely, acquiring core competence and competitive advantages, determining the strategic direction of enterprise's activities, identifying market prospects and etc.

The transfer of "Perfume Cosmetics Ltd." to the marketing management concept is necessary to achieve its efficiency, profitability and competitiveness in wholesaling perfumery and cosmetics to customers in the competitive market environment of the Ural and Siberian federal districts. It also means building and improving the organizational structure of marketing management at the enterprise, creating a marketing information system allowing the enterprise to develop in the perfume and cosmetics market more effectively through collecting, processing, analyzing and distributing information that is reliable and necessary for making marketing decisions.

This concept is also aimed at attracting marketing specialists, distributing tasks, rights and responsibilities in the marketing management system, making conditions for effective work of employees, arranging collaboration of different services at the enterprise, creating a consumer value to satisfy potential customers and achieve strategic competitive advantages.

**Keywords:** marketing management concept, meeting the customer's needs, competitive advantages, modern enterprise, profitability

### **1. INTRODUCTION**

Marketing is one of the most powerful tools used by various enterprises in their endless struggle for survival and prosperity. Marketing is considered to be a diverse concept. First of all, it is known as business philosophy aimed at identifying consumers' needs and target markets that the enterprise can best meet by producing appropriate products, so that each employee could think in terms of "consumer", "market", etc. The marketing management concept is a customer orientation, backed by the measures directed to meeting the market needs.

The necessity of transferring an enterprise to the marketing management concept lies in constant studying its customers, meeting their needs in the best way, acquiring core competence and competitive advantages, as well as in determining the strategic direction of the enterprise's activities and identifying market prospects.

Enterprise's transferring to the marketing management concept is vital to achieve efficiency, profitability and competitiveness, build and improve the organizational structure of marketing management in the enterprise, create a marketing information system allowing the enterprise to develop more efficiently through collecting, processing, analyzing and distributing reliable information that is highly important for making marketing decisions.

The marketing management concept also implies hiring marketing specialists, distributing tasks, rights and responsibilities in the marketing management system, creating conditions for effective work of marketing services employees, as well as organizing the effective interaction of marketing structures with other enterprise's services. The strategy of transferring the enterprise to the marketing management concept enables to create consumer values that result in meeting potential customers completely, as well as helping the enterprise achieve strategic advantages relative to competitors.

## 2. METHODOLOGY

The essence of the marketing management concept has thoroughly been studied by many national and foreign researchers, theorists and practitioners of marketing and management for many years. On the one hand, marketing is used both at the level of individual enterprises, organizations of commercial and non-commercial nature, at the regional and state levels. On the other hand, marketing links social needs and the economic response of the society aimed at satisfying them.

There are many definitions of marketing. Hence, it is impossible to define this concept in a single notion. Thus, in E. Golubkov's opinion, the marketing concept is a system of basic ideas, provisions of marketing activities that proceeds from the fact that achievements of company's goals depend on its successful having studies consumers' needs and having met them most fully and effectively compared to competitors [1].

From Ph. Kotler's viewpoint, the idea of the marketing concept also lies in determining the needs and requirements of the target markets and ensuring their desired satisfaction [2].

To T. Danko's mind, the essence of the marketing concept is that the company builds its work on combining its interests with the ones of the market, orientates itself in developing solutions for market needs, achieves its goals through meeting its requirements [3].

The subject of marketing management is functioning the marketing system for managing the company's position in the market [4]. Hence, G. Bagiev interprets the marketing concept as an orientation towards buyers, backed by measures aimed at meeting the market needs [5].

According to Peter R. Dickson, marketing management is a diverse organizational activity directed to studying consumers' needs and their psychology, analyzing and forecasting competitors' behavior, developing and promoting new competitive goods and services, as well as managing the system of commercial relations with suppliers and intermediaries [6].

Approaches to the definition of the marketing concept offered by Ph. Kotler, E. Golubkov, T. Danko and G. Bagiev combined and found their reflection in J.-J. Lamben's viewpoint. He defines three aspects of the marketing concept in the following way: an active aspect - penetration to markets, an analytical aspect - understanding markets and their needs, and an ideological aspect - a special way of company's thinking [7].

Thus, the essence of the marketing management concept is the constant studying its consumers, possibilities of meeting their needs completely, acquiring core competence and competitive advantages. The marketing concept is a modern approach to the entrepreneurial activity that is typical for the post-industrial period of the economic development. According to this concept, the achievement of the company's goals is identifying wants and needs of target markets and providing the desired satisfaction in more effective and more productive ways than competitors [ 8].

There is a variety of definitions of the concept of "marketing management" in the economic literature. Let's consider and analyze some of them (table 1).



Table 1. Definitions of the “marketing management” concept offered by different authors

Authors	Definitions
Ph. Kotler	Marketing management means analyzing, planning, implementing, monitoring the activities designed to establish, strengthen and maintain profitable exchanges with targeted customers to achieve specific objectives of the organization, such as making a profit, increasing sales, increasing market share, etc. [9].
T. Danko	Marketing management is a purposeful activity of the firm to regulate its position in the market by planning, organizing, accounting, controlling the execution of each phase of the firm's position and activity behavior, taking into account the influence of the laws of market space development, the competitive environment for achieving profitability and efficiency of the subject's activity in the market [3].
N. Moiseeva, M. Konysheva	Marketing management is the impact on the level, time and nature of demand to helps achieve the goals the company faces. This activity is carried out through analyzing, planning, implementing and monitoring the event to establish, strengthen and maintain profitable exchanges with target buyers to achieve the organization's goals [10].
A. Korotkova, I. Sinyaeva	Marketing management is a scientific direction and an academic discipline, the subject of which is functioning the marketing system to manage the enterprise position in the market. In other words, it is a marketing activity aimed at developing and implementing marketing solutions, as well as forming and maintaining the marketing management system [4].
A. Kryukov	Marketing management is an organized activity aimed at studying consumers’ needs and their psychology, analyzing and forecasting competitors’ behavior, developing and promoting new competitive goods and services, managing relationships with suppliers and intermediaries [11].
N. Nagapetyants	Marketing management is an important part of the overall system of enterprise management, the process of the internal and external environment reconciliation, analyzing, planning, organizing and monitoring the activities on the enterprise interaction with the market to achieve its goals and ensure profit [12].
O. Burtseva, V. Sizov, O. Tsen	Marketing management is a complex process of managing subject's influence on the management object (company management, public authorities, concerns, monopolies), in which processes and entities in the marketing system act [8].

Thus, these definitions unite understanding the essence of the “marketing management” concept as the enterprise’s activity, including planning, organizing, analyzing, controlling marketing activities necessary to achieve the goals and effectiveness of the enterprise’s activities in the market.

### **3. DISCUSSION AND RESULTS**

Different enterprises use different systems of marketing management. In modern business practice, the organizational structure of marketing management is considered as a system of interrelated, coherent elements performing the marketing management functions in the enterprise’s management system. Therefore, while building an organizational structure at an enterprise, the main aim is to identify conditions ensuring a high level of consistency of these elements. Such conditions are primarily the internal state of the organization itself.

Efficiency and proportionality of the organizational marketing management structure depend mainly on the consistency level of the elements of the organizational structure, the goals and objectives of the enterprise’s divisions, strategic and tactical plans. In other words, the organizational marketing management structure is effective if it is built on the basis of the organization’s goal-setting and it is necessary to solve specific problems [4].

Marketing management is a leading function that determines the style and nature of management of all business activities. Transferring the enterprise into the marketing management concept requires a deep analysis of the enterprise’s activities and its organizational structure.

At the present stage of the market economy development, a great number of enterprises participate in tough competition, intensive saturation of markets, special attention is paid to building a customer relationship management and the strategic marketing management system based on balanced indicators and other modern management methods. Marketing management allows to increase the competitiveness of enterprises.

One can say that the marketing concept of managing a modern enterprise basically assumes the orientation of all its activities and structural divisions to ensure the desired satisfaction of customers’ needs. The application of this concept implies the formation of marketing thinking of all enterprise’s divisions, the organization of their effective interaction, the selection of the organizational structure of marketing management corresponding to the goals and strategies of the enterprise, its construction and improvement, the distribution of tasks and responsibilities in the system of corporate, functional and instrumental levels of marketing management.

Modern enterprises that are moving to the marketing management concept are beginning to focus on consumers and their individualized needs, developing integrated marketing efforts that are more effective than competitors’ and are aimed at meeting consumers’ satisfaction as the basis for achieving their goals, thereby increasing efficiency, profitability and the competitiveness of enterprises.

A good example of the enterprise using the marketing management concept in its activity is “Perfume Cosmetics Ltd”. It has been developing, creating and launching perfume and cosmetic products for B2B market for more than 25 years. The enterprise deals with specialized and retail networks, small wholesale companies.

The analysis of the enterprise's portfolio with the help of a goal-oriented policy matrix made it possible to assess the relative attractiveness of investments in specific areas of the enterprise's activity and found that all perfumery and cosmetic products take the position of winners. "Perfume Cosmetics Ltd." realizes the managing marketing concept.

The mission analysis of "Perfume Cosmetics Ltd." ("Being closer to its customers") made it possible to conclude that it is not fully formulated; the enterprise understands its purpose, the reason for its existence and the aim of its activity from the viewpoint of customer satisfaction; it does not correlate with strategic goals; the mission needs further development. It results in implementing holistic marketing goal setting, that leads to inconsistencies in development, the formation of a negative image in the enterprise's internal and external environment, inefficient management decisions, and lack of consumers' orientation.

The assessment of the enterprise's competitiveness shows that it possesses qualified management personnel, functional exhibition areas, a modern heavy truck fleet, an extensive customer base, significant customer loyalty, compared to other enterprises that sell perfume and cosmetics.

The competitive advantages of "Perfume Cosmetics Ltd." are the management of assortment policy and management of service policy. The enterprise is the contender for leadership. A real threat to the enterprise can be strengthening positions of certain competitors.

The main corporate goal of "Perfume Cosmetics Ltd." is to become the leading distributor of perfumery and cosmetic products in the B2B market of the Ural and Siberian Federal Districts.

According to the type of the competitive strategy, "Perfume Cosmetics Ltd." has sufficient attack potential, with a 30% market share. The achievement of the leader's position will be facilitated by increasing the enterprise's market share to 40%, which requires increasing the efficiency, profitability and competitiveness of the enterprise in the perfume and cosmetics market. The achievement of this goal will help to ensure the implementation of marketing functions completely and the formation of marketing thinking among the enterprise's employees.

A SWOT analysis of "Perfume Cosmetics Ltd.", which revealed its strengths, weaknesses, opportunities and threats to the environment, identified and evaluated the enterprise's main competitors: "Magrave Ltd." and "Cosmetic Market Ltd.", that supply perfume and cosmetics to the Ural and Siberian Federal Districts and satisfy the entire range of requests made by buyers to this product.

As a result of the analysis of the strengths and weaknesses of the main competitors, the analysis of their assortment management systems, price, sales channels, promotion complex, marketing management, it was concluded that the only competitor having a specialized marketing unit in the enterprise's structure responsible for implementing marketing functions completely, is "Magrave Ltd.", that is its strongest side and the advantage over "Perfume Cosmetics Ltd." and other competitors realizing only individual marketing and sales promotion functions in the B2B market of the Ural and Siberian Federal Districts.

This advantage of "Magrave Ltd." is connected with the orientation towards consumers, an individual approach to each client, high customer loyalty, the establishment of long-term relationships, a high market shares and the leading position in the business market of perfumery and cosmetics.

"Magrav Ltd." has high performance in such functional areas as: promotion management (advertising in specialized publications, on radio and television, in the Internet,

through planning and implementing the advertising campaigns developed by the marketing department); management of assortment activities (efficiency resulted from the activity of marketers in analyzing, assortment planning, developing measures for expanding and harmonizing in accordance with changes in customers' demand); management of marketing activities (application of both direct and indirect forms of marketing channels, systematic evaluation of their effectiveness and development opportunities).

Weak functional areas of "Perfume Cosmetics Ltd." are the following:

- management of marketing activities: there is no effective marketing service, centralization of marketing functions, coordination and control, there is no effective marketing information system, marketing planning and marketing research;
- sales activity management: there is no activity connected with working out sales channels, their effectiveness assessment;
- promotion management: there is no good planning and implementing the advertising campaigns, namely, there is no advertising made by "Perfume Cosmetics Ltd." in specialized publications, on radio and television.

The analysis of the enterprise's competitive environment is conducted sporadically, not systematically. The head of the enterprise analyzes strengths and weaknesses of direct competitors and analyzes the best practices of competitors. "Perfume Cosmetics Ltd." does not analyze the existing and potential needs of consumers effectively enough.

The assessment of the marketing activity of "Perfume Cosmetics Ltd.", based on Yasheva's technique, showed that its efficiency is at a satisfactory level. It means that there are some shortcomings in marketing management at all the levels: corporate, functional, instrumental, comprehensive analysis thorough refinement and restructuring.

In addition, the implementation of marketing management principles in "Perfume Cosmetics Ltd." was analyzed [10]. Three groups of marketing management principles (value-oriented, conceptual and regulatory, ones of tactical analysis and design) were considered and their insufficient level of implementation was diagnosed.

To determine the market strategy and strategic directions for the development of the enterprise "Perfume Cosmetics Ltd." it is necessary to implement completely all the value-oriented principles of marketing management. To establish the interrelation between the external conditions of the enterprise's activities, its internal potential and development objectives in terms of competition of "Perfume Cosmetics Ltd." it is necessary to implement all the conceptual and regulatory principles of marketing management.

To plan and design effective enterprise's activities, to monitor the implementation of development programs and their adjustment, it is necessary to apply all principles of tactical analysis and design. To implement the principles of marketing management and coordinate the application it is necessary to set up a specialized marketing unit (based on a functional principle) and form employees' marketing thinking within the framework of enterprise's transferring to the marketing management concept.

One also conducted the analysis of marketing activities of "Perfume Cosmetics Ltd." based on a balanced scorecard with four components reflecting strategically important aspects of enterprise's activities: finance, customers, internal processes, training and growth.

Having estimated the effectiveness of marketing activities by calculating the integral indicator of efficiency and the degree of goal implementation for each group of indicators, one could obtain the following results: finance - 55%, clients - 48%, internal processes - 52%, training and growth - 48% from 100%.

This suggests that marketing and other goals of “Perfume Cosmetics Ltds.” in their interconnection are realized only by half and require an increase in the effectiveness of their implementation. First of all, it concerns the creation of a functional marketing service, the formation of marketing thinking and customer orientation, the marketing information system and the establishment of inter-departmental relationships, increasing the efficiency of marketing costs and increasing customers’ loyalty. Besides, rising the degree of goals implementation, the integral indicator for each area will rise, that will prove the increase in effectiveness of enterprise’s marketing activities.

Transferring “Perfume Cosmetics Ltd.” to the marketing management concept will allow to realize marketing functions completely, to create an orientation towards the consumer, to ensure full satisfaction of the customers’ needs, to organize an individual approach to each client and establish partnership relations on a long-term basis.

The operative decisions imply concrete actions of experts making marketing service in the enterprise, based on the following marketing complex:

- regarding 1P (product): product and product management: inventory management, participation in pricing strategy development, constant assortment replenishment, tracking illiquid assortment items;

- regarding 2P (price): price management: developing a discount system for large orders to regular customers so they couldn’t refuse to cooperate because of high costs; developing a bonuses system for existing customers;

- regarding 3P (place): goods promotion: organizing fast goods delivery to remote customers in comparison with competitors, delivering products to customers attaching informative and advertising materials;

- regarding 4P (promotion): developing and applying marketing communications management system, i.e. organizing advertising campaigns: advertising in specialized publications on perfumery and cosmetic products, on the Internet, active promotion and informing clients about the enterprise’s activity in the perfumery and cosmetic market;

- and besides: creating a marketing information system - MIS (media), including the conduct of marketing research, organizing the effective interaction of marketing service with other enterprise’s services; it is necessary to improve the client base, to strengthen the promotion complex with the aim of to finding new customers, as capacity and market growth rates are high.

Establishing a specialized marketing service in the structure of “Perfume Cosmetics Ltd.” will increase the effectiveness of marketing activities at the corporate, functional, and instrumental levels.

Thus, “Perfume Cosmetics Ltd.” will transfer to the marketing management concept and ensure high efficiency, enterprise’s competitiveness and competence of decisions, promote effective marketing management activities of the enterprise.

According to common practice, the experience of international enterprises and the experts’ assessment, the creation of a marketing service in the enterprise will result in increasing its net profit by 10% (due to the increase in sales, product marketing activities, sales promotion, marketing research, segmentation, product positioning in the minds of target segments consumers and etc. Some part of the costs will be included in production costs).

Calculations showed that the costs for transferring “Perfume Cosmetics Ltd.” to the marketing management concept will fully pay off in 5 months and will ensure an increase in the enterprise’s net profit. Thus, this action is cost-effective.

#### 4. CONCLUSION

The existing theoretical justification of necessity to use the marketing management concept of the modern enterprise as the basis for increasing its efficiency, profitability and competitiveness in the market terms has been developed by the theorists and practitioners of marketing management rather thoroughly. It can and should be used in real production by specific enterprises that need effective management solutions.

The questions related to choosing the principle of constructing the organizational structure of marketing management corresponding to the enterprise's goals and strategy, setting up a marketing information system, implementing the principles of marketing management at the corporate, functional and instrumental levels are multifaceted and controversial, and they require additional study and reflection.

The practical importance of transferring the enterprise to the marketing management concept is proved by the practice of applying these recommendations, which ensure an increase in the efficiency of the enterprise's marketing activities, profitability and competitiveness in the business market of perfumery and cosmetic products of the Ural Federal District and the Siberian Federal District.

#### REFERENCES

1. Golubkov E. Marketing as a concept of market management. *Marketing in Russia and abroad*, 2 (2007), 22.
2. Kotler Ph. *Marketing management*, Peter, Saint Petersburg, 2009.
3. Danko T. *Marketing Management*, INFRA-M, Moscow, 2009.
4. Korotkova A., Sinyaeva I. *Marketing Management*, Progress, Moscow, 2007.
5. Bagiev G. *Marketing, Economics*, Moscow, 2008.
6. Dickson P. *Marketing Management*, Binom, Moscow, 2007.
7. Lamben J-J. *Market-oriented management*, Peter, Saint Petersburg, 2008.
8. Burtseva O., Sizova S., Tsen A. *Marketing Management*, INFRA-M, Moscow, 2007.
9. Kotler Ph. *Marketing Essentials*, Progress, Moscow, 2009.
10. Moiseeva N., Konysheva M. *Marketing management: theory, practice, information technology*, Economics, Moscow, 2009.
11. Kryukov A. *Marketing Management*, KNORUS, Moscow, 2008.
12. Nagapetyants N. *Marketing in branches and spheres of activity*, Progress, Moscow, 2009.

## **IMPACT ANALYSIS OF THE ELEMENTS OF OCCUPATIONAL SAFETY AND KNOWLEDGE MANAGEMENT ON PROJECT GOALS REALISATION AND BENEFITS IN THE PROJECT-BASED ORGANIZATIONS IN ŠUMADIA DISTRICT**

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**Abstract:** This paper analyzes the impact of elements of occupational safety (management commitment to occupational safety and organizational environment) and elements of knowledge management (knowledge management tools and distribution knowledge) on successful realization of goals and achievement of benefits in the project-based organizations. For case studies have been selected are project-based organizations in Sumadija district. The aim of this work is the validation and testing of the suggested conceptual model. By using SEM (Structural Equation Modeling) methodology, the four-hypothesis model was developed and tested. Tested sample consists of 396 participants employed in 14 project-based organizations. Based on the results of empirical research are accepted three hypotheses, but one hypothesis is confirmed or not accepted.

**Keywords:** Occupational safety; knowledge management, project goals and benefits; project-based organizations; SEM methodology.

### **1. UVOD**

Interes društva, svih subjekata i svakog pojedinca je da se ostvari najviši nivo bezbednosti i zdravlja na radu (BZR), da se neželjene posledice kao što su povrede na radu, profesionalne bolesti i bolesti u vezi sa radom svedu na najmanju moguću meru. Značaj BZR se sagledava sa humanog (zadovoljstvo za svakog pojedinca), socijalnog (veliki broj zaposlenih koji se povrede) i ekonomskog (posledica povreda na radu) stanovišta. Zbog toga, ovoj problematici je neophodan sistematski pristup u preventivnom delovanju i povezivanju svih subjekata koji su nosioci određenih obaveza i aktivnosti. U ovim činjenicama se pronalazi jedan od motiva ovog istraživanja.

Predmet istraživanja su projektno orijentisane organizacije koje realizuju investicione projekte u Šumadijskom okrugu. Investicioni projekti, koje karakterišu veliki obim i kompleksnost poduhvata, ukazuju na angažovanje velikog broja radnika, uz korišćenje najrazličitije mehanizacije, mašina, opreme i alata. Upravo iz tog razloga, u većini slučajeva, ova vrsta projekata predstavlja skup aktivnosti koje se odlikuju visokim stepenom rizika i stopom povređivanja angažovane radne snage [1]. U takvim okolnostima ugrožavaju se i zadati projektni ciljevi i ostvarivanje benefita [2]. Svaki izgubljeni radni dan usled povrede radnika dodatno povećava troškove realizacije projekta i direktno ugrožava vremenske rokove. Iz tih razloga se kao imperativ nameće upravljanje bezbednošću angažovane radne snage. Zbog toga, prvi cilj ovog istraživanja jeste analiziranje organizacionih faktora koji

utiču na bezbednost rada. Upravljanjem ovim faktorima postiže se viši stepen bezbednosti rada, a tok realizacije planiranih aktivnosti dobija stabilniju potporu [3].

Za realizaciju investicionih projekata u savremenom poslovnom okruženju znanje predstavlja jedan od najznačajnijih resursa. Sa aspekta znanja, projekat predstavlja skup aktivnosti zasnovanih na razvoju zajedničkih interpretacija i shvatanja usmerenih u pravcu ostvarivanja postavljenih ciljeva [4]. Na taj način se generišu kako lična, tako i kolektivna znanja, koja doprinose efikasnijoj realizaciji aktuelnog projekta i dostizanju projektnih benefita. Dugoročno posmatrano, time se formira baza znanja koja za organizaciju predstavlja resurs od izuzetne važnosti u smislu efikasnosti realizacije budućih projekata. Naravno, to će se desiti samo u slučaju da organizacija na zadovoljavajući način upravlja znanjem, tj. uz adekvatna sredstva generiše nova znanja, vrši njihovu akumulaciju i u procesu distribucije među članovima projektnih timova ih ponovo upotrebljava, razvija i unapređuje [5]. U ovim činjenicama se pronalazi još jedan od motiva za ovo istraživanje. Zbog svega toga postavljen je i drugi cilj istraživanja. Cilj je analiziranje organizacionih faktora (elementi koncepta upravljanja znanjem) koji utiču na unapređenje upravljanja znanjem u organizacijama.

Treći cilj ovog istraživanja jeste da se sa nivoa pojedinaca angažovanih na realizaciji investicionih projekata utvrde mehanizmi na osnovu kojih organizacioni faktori bezbednosti na radu (posvećenost menadžmenta bezbednosti na radu i organizaciono okruženje) i upravljanja znanjem (alati upravljanja znanjem i razmena znanja) utiču na realizaciju projektnih ciljeva i ostvarivanje benefita.

Na osnovu motivacije, predmeta istraživanja i postavljenih ciljeva, formirana su istraživačka pitanja. Gde se nalazi projektni menadžment kod projektno-orjentisanih organizacija u Šumadijskom okrugu sa aspekta bezbednosti i zdravlja na radu i upravljanja znanjem? Da li projektno-orjentisane organizacije u dovoljnoj meri upotrebljavaju i razvijaju koncepte BZR i upravljanje znanjem, kako bi dostigle projektne ciljeve i ostvarile benefite?

Zbog svega navedenog, autori rada predložili su i testirali konceptualni model sa četiri istraživačke hipoteze.

## 2. LITERATURNI PREGLED I RAZVOJ HIPOTEZA

Mnogi istraživači su dali doprinos u pronalaženju načina poboljšanja klime bezbednosti kako u industriji uopšte, tako i kod investicionih projekata konkretno. Najčešći stav je da menadžment ima ključnu ulogu pri kreiranju pozitivne klime bezbednosti u okviru organizacije i prilikom dostizanja projektnih ciljeva [6]. Cox i Cheyne su u studiji [7] proučavali uticaj kulture bezbednosti, koristeći se kombinacijom metodologija: anketiranje, posmatranje ponašanja i situaciona proučavanja. Kao rezultat studije, Cox i Cheyne grupišu faktore uticaja bezbednosti na radu u grupe: uloga menadžmenta, posvećenost menadžmenta, prioriteti bezbednosti, komunikacija, bezbedonosna pravila, uključenost u sistem bezbednosti, lični prioriteti i potrebe za bezbednošću. U radu [8] se ističe da menadžeri svojim delovanjem utiču na određena ponašanja zaposlenih, čime se protokom vremena vrši promena u percepcijama i stavovima, a što ishoduje popravljanjem klime bezbednosti u organizaciji, odnosno povoljnijim performansama bezbednosti na dostizanju projektnih ciljeva. Zbog toga autori predlažu hipotezu: H1: *Posvećenost menadžmenta bezbednosti na radu pozitivno utiče na realizaciju projektnih ciljeva i dostizanje projektnih benefita.*

Tempo rada i poslovni pritisci uz postojeće rizike i vladajuću klimu bezbednosti opredeljuju bezbednosno ponašanje zaposlenih. Postavljanje proizvodnih ciljeva ispred ciljeva



bezbednosti čest su uzrok povreda na radu. Ovakva situacija je naročito izražena kod realizacije investicionih projekata [9]. U tom smislu, povoljne bezbednosne karakteristike radnog okruženja i usklađenost bezbednosnih procedura sa realnim zahtevima utiču na stavove i ponašanja zaposlenih, što konačno doprinosi umanjenju broja povreda na radu [10]. Zbog toga autori predlažu hipotezu: H2: *Organizaciono okruženje pozitivno utiče na realizaciju projektnih ciljeva i dostizanje projektnih benefita.*

Primena alata i tehnika upravljanja znanjem olakšava protok i kontrolu informacija na projektu, a takođe potpomaže i proces distribucije znanja među članovima projektnih timova [11]. Internet, softveri za pretraživanja, elektronska pošta, ekspertske sistemi upravljanja dokumentacijom, tehnike data mining-a, baze podataka i sistemi za upravljanje bazama podataka i brojni drugi proizvodi savremene informacione tehnologije, predstavljaju elemente alata upravljanja znanjem, kako na projektima, tako i u okviru kompanije. Njihova primena čini efikasnijim procese integracije, distribucije i upravljanja znanjem [12]. Konačno, primena alata i tehnika upravljanja znanjem pomaže menadžerima i projektnim timovima, kako pri rešavanju operativnih zadataka, tako i u procesu učenja, a samim tim povećava šanse za uspeh projekta [13]. Zbog toga autori predlažu hipotezu: H3: *Primena alata upravljanja znanjem pozitivno utiče na realizaciju projektnih ciljeva i dostizanje projektnih benefita.*

Razmena znanja u okviru organizacije predstavlja najveću podršku organizacionom učenju. Organizacije koje kontinuirano uvećavaju svoja znanja su bolje pripremljene za suočavanje sa dinamičnim i neizvesnim okruženjem [14]. Projektne orijentisane kompanije su suočene sa dodatnim izazovima. Naime, potrebno je obezbediti efikasne procese razmene znanja kako unutar tako i između projekata, kao bi se izbegao efekat dupliranja znanja, ili ponavljanja grešaka [5]. Razmena znanja se takođe obavlja i između projekata i matične organizacije. Na taj način, znanja i inovativna rešenja se akumuliraju u okviru organizacije i njihova primena poboljšava performanse svakog budućeg projekta i doprinosi efikasnijem postizanju projektnih ciljeva [15]. Zbog toga autori predlažu hipotezu: H4: *Razmena znanja pozitivno utiče na ostvarivanje projektnih ciljeva i dostizanje projektnih benefita.*

### 3. METODOLOGIJA ISTRAŽIVANJA

Za istraživanje je razvijen upitnik na osnovu dostupne relevantne literature [13,16-19] i pokušaja drugih istraživača da kreiraju podesan instrument za analizu i evaluaciju koncepta bezbednosti na radu i koncepta upravljanja znanjem u projektnim organizacijama. Takođe, kreiran je i veliki broj upitnika ovog tipa koji su univerzalno primenljivi, bez obzira na vrstu industrije ili projekata, a njihovom modifikacijom kreiran je i finalni upitnik, čiji je sadržaj prikazan u Tabeli 1. Upitnik sadrži 9 pitanja demografskog karakera (Tabela 1), i 33 istraživačka pitanja raspoređenih u 5 grupa (Tabela 2). Dve grupe pitanja opisuju elemente koncepta bezbednosti na radu: posvećenost menadžmenta bezbednosti na radu i organizaciono okruženje, dve elemente upravljanja znanjem: alati za upravljanje znanjem i razmena znanja, i jedna grupa opisuje koncept realizacije projektnih ciljeva i dostizanje benefita.

Podaci su prikupljeni u periodu od juna do septembra 2016. god, anonimnim anketiranjem zaposlenih u 14 projektnih organizacija Šumadijskog okruga. Ispitanici su upitnik popunjavali zaokruživanjem ponuđenih odgovora. Za ocenu odgovora korišćena je Likertova petostepena skala (od 1-apsolutno se ne slažem do 5-apsolutno se slažem). Ukupno je anketirano 437 zaposlenih, od čega je prikupljeno 396 ispravno popunjenih upitnika, što

predstavlja 90,62 %. Odnos veličine uzorka (396 ispitanika) i broja pitanja (33 pitanja) jeste 12, što je daleko iznad preporučene vrednosti 5, prema autorima Hair i saradnici u radu [20].

Tabela 1. Demografske karakteristike uzorka

R.br.	Kontrolne promenljive	Kategorija	Frekvencija	Udeo (%)
<b>1</b>	Pol	Muški	332	<b>83,8</b>
		Ženski	64	16,2
<b>2</b>	Godine starosti	≤25	18	4,5
		26-35	122	30,8
		36-45	162	<b>40,9</b>
		46-55	84	21,2
		≥56	10	2,5
<b>3</b>	Godine provedene u organizaciji	≤5	70	17,7
		6-10	132	<b>33,3</b>
		11-20	124	31,3
		21-30	64	16,2
		≥31	6	1,5
<b>4</b>	Školska sprema	Osnovna	14	3,5
		Srednja	296	<b>74,7</b>
		Viša	40	10,1
		Visoka	40	10,1
		Magistratura	6	1,5
<b>5</b>	Pozicija na projektu	Menadžer	72	18,2
		Radnik	292	<b>73,7</b>
		Pomoćno osoblje	32	8,1
<b>6</b>	Broj zaposlenih u organizaciji	≤10	0	0
		11-50	52	13,1
		51-250	208	<b>52,5</b>
		≥250	136	34,3
<b>7</b>	Starost organizacije (godine)	≤5	15	3,8
		6-10	28	7,1
		11-20	85	21,5
		21-30	88	22,2
		≥31	180	<b>45,4</b>
<b>8</b>	Vlasnička struktura organizacije	Domaće vlasništvo	326	<b>82,3</b>
		Strano vlasništvo	0	0
		Mešovito vlasništvo	70	17,7
<b>9</b>	Vrsta investicionog projekta	Građevinski objekti	32	8,1
		Infrastrukturni objekti	72	18,2
		Oprema	222	<b>56,1</b>
		Ostalo	70	17,7

Na osnovu demografskih karakteristika uzorka, može se zaključiti da je u istraživanju učestvovala pretežno muška populacija i to u visini od 83,8%. U najproduktivnijoj starosnoj dobi, od 26. do 55. godine starosti, nalazi se 92,9% ispitanika. Najviše je ispitanika sa radnim iskustvom dužim od 6 godina. 74,7% ispitanika ima završenu srednju školu, a 21,7% je fakultetski obrazovano. U anketiranju je učestvovalo 73,7% radnika i 18,2% menadžera. Istraživanje je obuhvatalo mikro, mala i srednja preduzeća, i može se uočiti da je najveći broj ispitanika, njih 52,5%, bio zastupljen kod srednjih preduzeća (51-250 radnika). Takođe, može se uočiti da najveći broj ispitanika radi u organizacijama čija je hronološka starost preko 30 godina, i to u 45,5% slučajeva. Uočava se i to da dominantan broj ispitanika radi u organizacijama domaće vlasničke strukture, i to u 82,3%. Najveća zastupljenost ispitanika, njih 56,1%, se nalazi u grupi investicionih projekata gde se ulaže u opremu (mašine, uređaji, postrojenja, instalacije, itd.).

#### 4. REZULTATI I DISKUSIJA

Deskriptivna statistika i statistička analiza prikupljenih podataka urađeni su korišćenjem softverskih paketa SPSS 18.0 i LISREL 8.80.

##### 4.1. DESKRIPTIVNA STATISTIKA

Upitnik sadrži 33 istraživačka pitanja (promenljive) raspoređenih u pet grupa (latentne promenljive): PMB-posvećenost menadžmenta bezbednosti na radu, OO-organizaciono okruženje, AZ-alati za upravljanje znanjem, RZ-razmena znanja i PCB-projektni ciljevi i benefiti. Praćeni su standardni statistički parametri: srednja vrednost, modus i varijansa.

Tabela 2. Stavke upitnika i rezultati deskriptivne statistike

Grupe pitanja	Stavke upitnika	Sr. vr.	Mod	Varijansa
PMB	1. Bezbednost je vidljiva na poslu koji obavljam	3,44	4	1,12
	2. Rukovodstvo smatra da je bezbednost na radnom mestu važnija od zadatka i postavljenih rokova	2,93	3	1,11
	3. Rukovodstvo smatra da je bezbednost na radnom mestu važnija od produktivnosti	2,79	3	1,02
	4. Osoba zadužena za bezbednost na radu uvek prekida nebezbedne aktivnosti	3,38	4	1,15
	5. Osoba za bezbednost prati pojavljivanje problema i rešava probleme	3,48	4	0,86
	6. Rukovodstvo često dobija izveštaje o bezbednosti na radu / povratne informacije od radnika	3,33	3	0,94
	7. Rukovodstvo brine o mojoj bezbednosti na poslu	2,83	3	1,23
OO	1. Ponekad ne prijavljujem opasnost na radu jer je vreme obavljanja aktivnosti jako kratko, tako da radim i pored postojanja opasnosti	3,38	4	1,62
	2. Ponekad ignorišem bezbednosna pravila kako bi se ispoštovali plan i rokovi	3,41	4	1,31
	3. Ponekad moram da odstupim od zahteva bezbednosti zarad projektnih ciljeva	2,95	3	1,26
	4. Ponekad je ritam posla toliko brz da se ne sprovede bezbednosne procedure	3,14	4	1,37
	5. Ponekad ima puno poslova koji se moraju obaviti bez sprovođenja bezbednosnih procedura	3,23	4	1,27
	6. Akcidenti tokom realizacije projekta su retkost	3,94	5	1,13
	7. Povrede na radu tokom realizacije projekta su retkost	3,30	4	1,53
AZ	1. U organizaciji se koristi internet kao podrška upravljanja znanjem	3,57	4	0,78
	2. U organizac. se koristi elektr. sis. upravljanja dokumentacijom kao podrška upravljanja znanjem	3,53	3	0,69
	3. U organizaciji se koriste softveri za pretraživanje kao podrška upravljanja znanjem	4,01	4	0,60
	4. U organizaciji se koriste video konferencije kao podrška upravljanja znanjem	2,43	3	1,21
	5. U organizaciji se koriste sistemi za upravljanje bazama podataka podrška upravljanja znanjem	3,34	3	0,52
RZ	1. Među angažovanim članovima na projektu se vrši razmena znanja	3,86	4	0,75
	2. Članovi različitih sektora u organizaciji razmenjuju znanje sa ciljem bolje realizacije projekta	3,16	3	1,04
	3. Članovi projektnog tima koriste bazu znanja pri rešavanju problema	3,42	3	0,63
	4. Članovi projektnog tima koriste bazu znanja u cilju efektivnijeg i efikasnijeg obavljanja posla	3,43	3	0,65
	5. Prilikom realizacije projekta znanje ima praktičnu primenu	3,84	4	0,60
PC	1. Svi projektni zadaci se izvršavaju prema planu	3,54	4	1,25
	2. Projekat se može realizovati pre roka	3,48	3	0,90
	3. Projekat se realizuje prema zahtevima naručioca i u skladu sa ugovorenim uslovima	3,89	4	0,70
	4. Ciljevi vezani za kvalitet projekta se ostvaruju	3,75	4	0,78
	5. Projekat se realizuje u skladu sa budžetom	3,53	3	0,54
	6. Projekta se realizuje u skladu sa zahtevima zaštite životne sredine, zdravlja i bezbednosti na radu	3,00	3	1,08
	7. Projekat generiše puno novih znanja, metoda i inovacija	3,67	3	0,66
	8. Ukupni benefiti projekta premašuju očekivanja kompanije	3,11	3	0,34
	9. Projekat daje odlične rezultate i pozitivne ishode	3,53	3	0,71

Srednja vrednost ( $x_{sr}$ ) odgovora ispitanika kreće u granicama od 2,43 do 4,01, modus ( $Mo$ ) od 3 do 5, a varijansa ( $S^2$ ) od 0,34 do 1,62. Odgovori ispitanika su takvi da oni imaju pozitivno mišljenje na postavljena pitanja. Takođe, na osnovu rezultata deskriptivne statistike može se zaključiti da ispitanici mogu zadovoljiti bitne pretpostavke o bezbednosti na radu, jer je  $x_{sr}=2,79\div 3,94$ ;  $Mo=3\div 5$ ;  $S^2=0,86\div 1,62$ , i upravljanja znanjem u organizaciji, jer je

$x_{sr}=2,43\div 4,01$ ;  $Mo=3\div 4$ ;  $S^2=0,52\div 1,21$ . Jedino kod pitanja PMB<sub>2</sub>, PMB<sub>3</sub>, PMB<sub>7</sub>, OO<sub>3</sub> i AZ<sub>4</sub>, dobijeni rezultati ukazuju na to da ispitanici imaju iskazan nešto nepovoljan stav.

#### 4.2. KONTROLNI MODEL

U cilju primene faktorske analize izvršeno je ispitivanje adekvatnosti uzorkovanja (MSAs - *Measures of sampling adequacy*) preko KMO indikatora (*Kaiser-Meyer-Olkin Measure of Sampling Adequacy*) i Bartlett-ovog testa sferičnosti (*Bartlett's Test of Sphericity*). KMO indikator, za latentne promenljive, se kreće u granicama od 0,776 do 0,913, a Bartlett-ov test sferičnosti je kod svih grupa Sig.=0,000. Dobijene vrednosti su iznad preporučenih minimalnih vrednost (KMO>0,6; Sig. ≤ 0,05), na osnovu literaturnih preporuka autora u radu [21]. Rezultat dobijen za KMO indikator upućuje na zaključak da su prikupljeni podaci pogodni za primenu faktorske analize. Takođe, podaci dobijeni za Bartlett-ov test sferičnosti upućuju na zaključak da postoje korelacije među pitanjima (promenljive) u okviru grupa, odnosno da korelaciona matrica nije jedinična [22].

##### 4.2.1. Ekploratorna faktorska analiza

Sa ciljem utvrđivanja jednodimenzionalnosti glavnih faktora (latente promenljive) u predloženom modelu urađena je eksploratorna faktorska analiza (EFA–*Exploratory Factor Analysis*). Rezultati analize upućuju na zaključak da je potvrđena jednodimenzionalnost kod svih latentnih promenljivih, jer su sve ispitivane stavke svrstane u po jedan faktorski skup sa sopstvenom vrednošću većom od 1 (jedan). Procenti varijabiliteta opisani svakim jednodimenzionalnim faktorom su prikazani u Tabeli 3. Faktorsko opterećenje promenljivih se nalazi u granicama od 0,432 do 0,898, što je iznad preporučene vrednosti od 0,4, za uzorke veće od 300, na osnovu literaturne preporuke autora Floyd i Widaman u radu [23]. Na osnovu dobijenih rezultata se može zaključiti da se formirane latentne grupe promenljivih mogu pouzdano opisati korišćenjem definisanih istraživačkih pitanja (promenljive).

##### 4.2.2. Konfirmatorna faktorska analiza

Kako bi se potvrdila pouzdanost i validnost razmatranog konceptualnog modela, urađena je konfirmatorna faktorska analiza (CFA–*Confirmatory Factor Analysis*) nad kontrolnim modelom. Rezultati su prikazani u Tabeli 3. Za pouzdanost kontrolnog modela koristi se pokazatelj unutrašnje saglasnosti, koji je meren Kronbahovim koeficijentom alfa (*Cronbach's Alpha*). Sve vrednosti Kronbahovog koeficijenta alfa su veće od preporučene 0,7, koja se navodi u literaturi [24]. Zato se nameće zaključak da postoji unutrašnja saglasnost latentnih promenljivih i da su istraživačka pitanja pouzdana za dalju analizu.

Konvergentna validnost kontrolnog modela potvrđuje se na osnovu dobijenih vrednosti CFA analize (Tabela 3) i potvrde fitovanja modela (Tabela 4). U predposlednjoj koloni Tabele 3, vrednosti faktorskog opterećenje su iznad preporučene vrednosti od 0,4, prema datim preporukama u radu [23]. U poslednjoj koloni Tabele 3 može se uočiti da su sve vrednosti *t*-testa dostigle nivo značajnosti od  $p<0,05$ . Na osnovu ovih rezultata može se zaključiti da je svaka odrednica (pitanje) razmatranih grupa pitanja postigla konvergentnu validnost.

Tabela 3. Rezultati EFA i CFA statistike za kontrolni model

Grupa pitanja	Promenljiva	Eksploratorna Faktorska Analiza (EFA)		Konfirmatorna Faktorska Analiza (CFA)		
		PCA		Pouzdanost		Konvergentna validnost
		% varijanse koji se može opisati jednodimenzionim faktorom	Faktorsko opterećenje	Cronbach alpha	Faktorsko opterećenje	t-vrednost
		68,962		0,919		
<b>PMB</b>	PMB 1		0,875		0,72	14,61*
	PMB 2		0,894		0,65	15,55*
	PMB 3		0,891		0,63	15,79*
	PMB 4		0,830		0,72	13,20*
	PMB 5		0,852		0,86	13,54*
	PMB 6		0,446		0,74	5,18*
	PMB 7		0,925		0,81	17,15*
		76,578		0,853		
<b>OO</b>	OO 1		0,835		0,77	13,31*
	OO 2		0,852		0,56	13,56*
	OO 3		0,845		0,48	13,37*
	OO 4		0,882		0,56	14,85*
	OO 5		0,815		0,62	13,76*
	OO 6		0,880		0,52	12,81*
	OO 7		0,719		0,63	16,80*
		60,608		0,810		
<b>AUZ</b>	AU 1		0,727		0,78	10,05*
	AU 2		0,894		0,69	15,15**
	AU 3		0,803		0,60	11,00*
	AU 4		0,590		0,48	8,20*
	AU 5		0,843		0,52	12,86**
		68,233		0,877		
<b>RZ</b>	RZ 1		0,771		0,75	9,98*
	RZ 2		0,782		0,72	10,17*
	RZ 3		0,886		0,63	17,40**
	RZ 4		0,898		0,65	17,78*
	RZ 5		0,772		0,60	9,89*
		65,012		0,879		
<b>PCB</b>	PCB 1		0,719		0,66	9,09*
	PCB 2		0,557		0,90	6,28*
	PCB 3		0,807		0,70	12,03*
	PCB 4		0,814		0,78	12,12*
	PCB 5		0,765		0,54	11,87**
	PCB 6		0,840		0,81	15,64*
	PCB 7		0,772		0,66	12,35*
	PCB 8		0,432		0,34	3,54**
	PCB 9		0,761		0,71	11,80*

Napomena: nivo statističke značajnosti \*  $p < 0,05$ ; \*\*  $p < 0,01$

#### 4.2.3. Mere fitovanja

Mere fitovanja (*goodness-of-fit measures*) kontrolnog i strukturnog modela su utvrđene na osnovu urađene CFA analize. Vrednosti nekih od parametara prikazani su u Tabel 4. Iako ima malih odstupanja kod RMSEA i GFI indikatora, može se zaključiti da je postignuta zadovoljavajuća podudarnost modela.

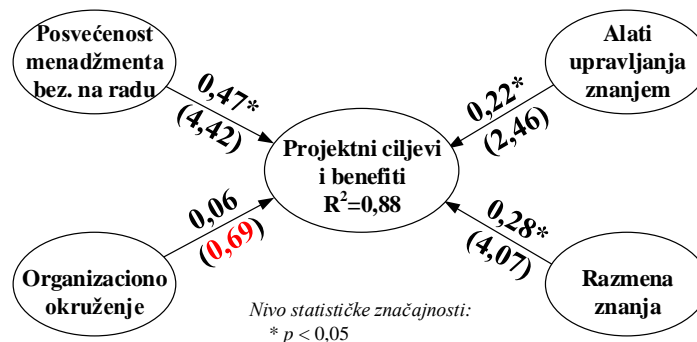
Tabela 4. Vrednosti indikatora fitovanja za kontrolni i strukturni model

Indikator fitovanja	Vrednosti za kontrolni (merni) model	Vrednosti za strukturni (PATH) model	Preporučene vrednosti
Chi-Square ( $\chi^2$ )	1413	1413	-
Degree of freedom (d.f.)	485	485	-
Relative Chi-Square ( $\chi^2/d.f.$ )	2,91	2,91	< 3,0
Root Mean Square Error of Approximation (RMSEA)	0,11	0,11	< 0,08 – 0,10
Goodness-of-Fit Index (GFI)	0,65	0,65	> 0,8
Adjusted Goodness-of-Fit Index (AGFI)	0,60	0,60	> 0,9
Comparative Fit Index (CFI)	0,96	0,96	> 0,9
Incremental Fit Index (IFI)	0,96	0,96	> 0,9
Normed Fit Index (NFI)	0,94	0,94	> 0,9
Non-Normed Fit Index (NNFI)	0,95	0,95	> 0,9
Relative Fit Index (RFI)	0,93	0,93	> 0,9

Na osnovu dobijenih podataka za ostale indikatore, nameće se zaključak da je postignuto dobro fitovanje kontrolnog modela, i da su podaci zaista reprezentativni. To znači da sva 33 istraživačka pitanja (promenljive) mogu na pouzdan i validan način da opišu formirane 5 grupe pitanja (latentne promenljive) na osnovu konceptualnog modela.

#### 4.3. TESTIRANJE STRUKTURNOG MODELA

Testiranje strukturnog modela je urađeno korišćenjem softverskog paketa LISREL 8.80, a rezultati analize su prikazani na Slici 1. Iznad strelica su predstavljene vrednosti koeficijenata regresije, koji objašnjavaju jačinu veza između zavisnih i nezavisnih promenljivih. Iznad koeficijenata regresije zvezdicama je označen nivo statističke značajnosti. Podaci u zagradama predstavljaju vrednosti  $t$ -testa. Koeficijent determinacije ( $R^2$ ) je prikazan u polju zavisne promenljive, koji određuje učešće objašnjenog varijabiliteta u ukupnom, odnosno koliko je varijacija zavisne promenljive objašnjena prediktorskom promenljivom.



Slika 1. Strukturni model

Svi koeficijenti regresije imaju pozitivnu vrednost, što znači da su sve četiri hipoteze potvrđene. Međutim, tri hipoteze mogu biti prihvaćene (H1, H3 i H4), jer su koeficijenti  $t$ -testa iznad preporučene vrednosti od 1,96, prema preporukama autora u radovima [20,24]. Na osnovu vrednosti  $t$ -testa ( $t=0,69 < 1,96$ ) hipoteza H2 nije prihvatljiva. Znači, rezultati testiranja hipoteza ukazuju na činjenicu da su tri istraživačke hipoteze H1, H3 i H4 potvrđene, prihvatljive i statistički značajne, jer su dobijeni rezultati: H1( $\beta=0,47$ ;  $t=4,42$ ;  $p < 0,05$ ); H3( $\beta=0,22$ ;  $t=2,46$ ;  $p < 0,05$ ); H4( $\beta=0,28$ ;  $t=4,07$ ;  $p < 0,05$ ). Hipoteza H2 je potvrđena ali nije prihvaćena. Moguće objašnjenje bi moglo da se pronade u činjenici da vremenska

ograničenja, obimnosti posla, tempo i ritam rada, poslovni pritisci, postojeći rizici, uz vladajuću poslovnu klimu o bezbednosti opredeljuju zaposlene da postavljaju proizvodne ciljeve ispred ciljeva bezbednosti i zdravlja na radu.

Koeficijent determinacije  $R^2$  (*Squared Multiple Correlations*) je indeks proporcije varijanse endogene promenljive, koja se izračunava preko egzogenih ili prediktorskih promenljivih. Što je veća vrednost koeficijenta veća je moć objašnjenja strukturnog modela, kao i bolje (jače) predviđanje zavisne promenljive. U konkretnom slučaju, koeficijent determinacije ukazuje na to da se uticaji latentnih prediktora “Posvećenost menadžmenta bezbednosti na radu”, “Organizaciono okruženje”, “Alati za upravljanje znanjem” i “Razmena znanja” na latentnu endogenu promenljivu “Projektne ciljevi i benefiti” može obračunati sa 88% varijanse.

## 5. ZAKLJUČAK

Dobijeni rezultati navode na zaključak da se primena koncepta bezbednosti i zdravlja na radu i koncepta upravljanja znanjem na projektima, kod projektnih organizacija, može pouzdano i validno opisati korišćenjem 33 istraživačka pitanja (promenljive), podeljenih u 5 grupa (latentne promenljive), što predstavlja predloženi konceptualni model. Proučavani kontrolni i strukturni model pokazuju zadovoljavajuću poduzarnost i validnost, i dobro fituju polazne podatke. Testiranjem hipoteza, tj. njihovim dokazivanjem, formiranih na osnovu konceptualnog modela, ukazano je na faktore bezbednosti na radu i upravljanja znanjem koji utiču na mišljenja, stavove i uverenja ispitanika (radnika). Posvećenost menadžmenta bezbednosti na radu, organizaciono okruženje, alati za upravljanje znanjem i razmena znanja pokazuju pozitivan efekat na ostvarivanje projektnih ciljeva i benefita.

Moguće objašnjenje za neprihvatanje H2 bi moglo da se pronade u činjenici da zaposleni postavljaju proizvodne ciljeve ispred ciljeva bezbednosti i zdravlja na radu, zbog vremenskih ograničenja, obimnosti posla, tempa i ritma rada, poslovnih pritisaka, postojećih rizika, vladajuće poslovne klime o bezbednosti i zdravlja na radu. Zaposleni su više orijentisani ka ostvarivanju zadataka nego na poštovanje bezbednosnih pravila i procedura.

Rezultati dobijeni ovim istraživanjem se mogu iskoristiti za komparativnu analizu sa rezultatima istraživanja dobijenih iz drugih regiona. Na taj način mogle bi se utvrditi univerzalno važeće veze koje bi doprinele razvoju koncepta upravljanja projektima.

## REFERENCE

1. Zou, P.X.W., Sunindijo, R.Z. (2013). Skills for managing safety risk, implementing safety task, and developing positive safety climate in construction project. *Automation in Construction*, 34, 92-100.
2. Rubio-Romero, J.C., Gámez, M.C.R., Carrillo-Castrillo, J.A. (2013). Analysis of the safety conditions of scaffolding on construction sites. *Safety Science*, 55, 160-164.
3. Teo, E.A.L., Ling, F.Y.Y., Chong, A.F.W. (2005). Framework for project managers to manage construction safety. *International Journal of Project Management*, 23, 329-341.

4. Jackson, P., Klobas, J. (2008). Building knowledge in projects: A practical application of social constructivism to information systems development. *International Journal of Project Management*, 26, 329-337.
5. Almeida, M.V., Soares, A.L. (2014). Knowledge sharing in project-based organizations: Overcoming the informational limbo. *International Journal of Information Management*, 34, 770-779.
6. Shen, Y., Tuuli, M.M., Xia, B., Koh, T.Y., Rowlinson, S. (2015). Toward a model for forming psychological safety climate in construction project management. *International Journal of Project Management*, 33(1), 223-235.
7. Cox, S.J. Cheyne, A.J.T. (2000). Centre for Hazard and Risk Management. The Business School, Loughborough University, Leicestershire.
8. DeArmond, S., Smith, A.E., Wilson, C.L., Chen, P.Y., Cigularov, K.P. (2011). Individual safety performance in the construction industry: Development and validation of two short scales. *Accident Analysis and Prevention*, 43, 948-954.
9. Fang, D., Wu, H. (2013). Development of a Safety Culture Interaction (SCI) model for construction projects. *Safety Science*, 57, 138-149.
10. Kwon, O.J., Kim, Y.S. (2013). An analysis of safeness of work environment in Korean manufacturing: The “safety climate” perspective. *Safety Science*, 53, 233-239.
11. Whyte, J., Lobo, S. (2010). Coordination and control in project-based work: digital objects and infrastructures for delivery. *Construction Management and Economics*, 28(6), 557-567.
12. Chen, Z., Liu, Z. (2011). A study of Knowledge Management in Construction Project Management. *Energy Procedia*, 11, 1039-1044.
13. Yang, L.-R., Chen, J.-H., Wang, H.-W. (2012). Assessing impacts of information technology on project success through knowledge management practice. *Automation in Construction*, 22, 182-191.
14. Liebowitz, J., Megbolugbe, I. (2003). A set of frameworks to aid the project manager in conceptualizing and implementing knowledge management initiatives. *International Journal of Project Management*, 21(3), 189-198.
15. Hansen, M.T. (2002). Knowledge networks: explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232-248.
16. Seo, D.C., Torabi, M.R., Blair, E.H., Ellis, N.T. (2004). A cross-validation of safety climate scale using confirmatory factor analytic approach. *Journal of Safety Research*, 35, 427-445.
17. Zohar, D., Luria, G. (2005). A multilevel model of safety climate: Cross-level relationship between organization and group-level climates. *Journal of Applied Psychology*, 90(4), 616-628.
18. Kasvi, J.J.J., Vartiainen, M., Hailikari, M. (2003). Managing knowledge and knowledge competences in projects and project organizations. *International Journal of Project Management*, 21, 571-582.



19. Reich, B.H., Gemino, A., Sauer, C. (2012). Knowledge management and project-based knowledge in it projects: A model and preliminary empirical results. *International Journal of Project Management*, 30(6), 663-674.
20. Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L. (2006). *Multivariate Data Analysis*, 6th ed. Pearson Prentice Hall, Upper Saddle River, NJ.
21. Cerny, C.A., Kaiser, H.F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate Behavioral Research*, 12 (1), 43-47.
22. Tobias, S., Carlson, J.E. (1969). Brief report: Bartlett's test of sphericity and chance findings in factor analysis. *Multivariate Behavioral Research*, 4 (3), 375-377.
23. Floyd, F.J., Widaman, K.F. (1995). Factor Analysis in the Development and Refinement of Clinical Assessment Instruments. *Psychological Assessment*, 7(3), 286-299.
24. Ho, R. (2006). *Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS*, Chapman & Hall/CRC, Taylor & Francis Group.

## **IMPACT OF ENTREPRENEURIAL ACTIVITIES ON THE INNOVATIVENESS AND PROFITABILITY OF SMES IN EASTERN SERBIA**

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**Abstract:** This paper explores the impact of entrepreneurial activity (entrepreneur's creativity, entrepreneurial self-efficiency, knowledge distribution) and their impact on innovativeness and profitability of SMEs (small and medium-sized enterprises) in Eastern Serbia. The conceptual model with four research hypothesis is proposed. In the research process, for data collection was used survey methodology. A sample of 336 respondents, ie. entrepreneurs-owners of SMEs, was tested. For statistical data analysis we used the software programs SPSS 17.0 and LISREL 8.80. Hypothesis testing was done by using SEM (Structural Equation Modeling) methodology. The empirical results confirm the hypothesis, and suggests a positive correlation between them.

**Keywords:** Entrepreneur's creativity; entrepreneurial self-efficiency; knowledge distribution; innovativeness of organizations; profitability of organizations.

### **1. UVOD**

Mala i srednja preduzeća (MSP) su veoma važan pokretač ekonomskog razvoja svake privrede, a preduzetnička orijentisanost njihovih vlasnika igraju važnu ulogu u ostvarivanju ovog zadatka [1]. Istraživanja autora u radu [2] su pokazala da preduzetnička orijentisanost ima pozitivan uticaj na poslovanje i profitabilnost organizacija. Organizacije sa visokim nivoom preduzetničkog duha konstantno istražuju i analiziraju okruženje u potrazi za novim idejama. Takođe, u radu [2] se ističe da je većina MSP zainteresovana za prikupljanje informacija sa tržišta o potrebama klijenata i konkurenata, kako bi što više učvrstile svoj položaj na tržištu i uvećale prodaju.

Prelazak sa centralno planske na trzisno orjentisanu privredu podrazumevalo je određene promene kako unutar organizacije, tako i u spoljnom okruženju. Najveći naponi bili su usmereni na to da se stvore politički i ekonomski uslovi u zemlji koji bi privukli strani kapital ali i omogućili ljudima sa kapitalom unutar zemlje da pokrenu sopstveni mali biznis. U svim tim naporima da se spoljno okruženje prilagodi nastaloj situaciji malo se pažnje posvetilo ljudima unutar organizacije i određenim karakteristikama ličnosti koje sa sobom nosi duh preduzetništva. Nastalo u zapadnoj kulturi preduzetništvo upravo odslikava zapadni način razmišljanja i poslovanja, koji se oslanja na kreativnost i inovativnost. Kao i u svim zemljama u tranziciji i u Srbiji je preduzetništvo još uvek u razvoju. U činjenici da je u Srbiji mali broj istraživanja urađen iz oblasti preduzetništva u području kreativnosti i inovativnosti MSP, a da je to aktuelna tema istraživanja mnogih svetskih istraživača, i činjenici da MSP u

Srbiji predstavljaju bitne izvore zaposlenosti i privrednog rasta, a ujedno predstavljaju i najefikasniji segment privrede Srbije, može se pronaći glavni motiv ovog istraživanja.

Predmet istraživanja predstavljaju MSP čije se sedišta nalaze u istočnoj Srbiji, odnosno istraživanje je usmereno na preduzetnike-vlasnike tih privrednih društava.

Cilj ovog istraživanja je da se, na nivou pojedinca, utvrde mehanizmi na osnovu kojih preduzetničke aktivnosti kao što su: kreativnost preduzetnika, preduzetnička samoeфикаsnost i distribucija znanja utiču na inovativnost i profitabilnost MSP u istočnoj Srbiji. Ovaj region je izabran za istraživanje zbog činjenice da spada u nerazvijenije u zemlji. Rezultati dobijeni sa ovog područja se mogu analizirati i upoređivati sa rezultatima istraživanja dobijenih iz drugih regiona, i na taj način utvrditi univerzalno važeće veze koje bi mogle biti važne za razvoj preduzetništva u Srbiji. Autor rada [3] ističe da se, zbog relevantnosti otkrića, preduzetničko istraživanje treba ograničiti samo na napredne privrede. Međutim, autori u radu [4] ističu da istraživanje u različitim kulturama može samo da unapredi preduzetništvo, jer se na taj način mogu istaknuti veze koje su univerzalno važeće u odnosu na veze koje važe u pojedinačnim kulturama. Takođe, autori u radu [5] naglašavaju važnost pitanja o prenosivosti zaključaka širom zemalja, i ističu da otkrića u istraživanjima u naprednim zemljama nisu neophodno relevantna za objašnjenje ponašanja u tranzicionim privredama.

Na osnovu motivacije, predmeta istraživanja i postavljenog cilja, mogu se formirati istraživačka pitanja: Gde se nalaze MSP istočne Srbije sa aspekata njihove inovativnosti i profitabilnosti? Da li MSP istočne Srbije u dovoljnoj meri upotrebljavaju i razvijaju koncept preduzetništva, kako bi dostigle zadovoljavajući nivo inovativnosti i profitabilnosti?

Zbog svega navedenog, autori rada predložili su i testirali konceptualni model sa četiri istraživačke hipoteze.

## 2. LITERATURNI PREGLED I RAZVOJ HIPOTEZA

Fenomen kreativnost preduzetnika je predmet izučavanja mnogih istraživača iz oblasti socijalne psihologije, ekonomije, filozofije, istorije, psihometrije. Kreativnost preduzetnika se često pripisivala čudu, kognitivnim procesima, društvenoj okolini, ličnim crtama i slučajnosti. Povezivana je s genijima, mentalnim poremećajima i humorom. Smatrana je osobinom sa kojom se rađamo, a ujedno se tvrdilo i da je, korišćenjem tehnika, moguće naučiti.

Šumpeter je u svojoj teoriji “Kreativna destrukcija” prvi ukazao da preduzetnička kreativnost ima ključnu ulogu u pokretanju tehnoloških inovacija i privrednih promena. Od tada kreativnost preduzetnika postaje predmet naučnog proučavanja u mnogim studijama. Maslow, naglašavaju da je kreativnost urođena osobina svih ljudi, ali da samo mali deo populacije deluje kreativno. U radu [6] Nystrom ističe da je preduzetnička kreativnost “izum budućnosti”. Autori Baron i Tang u radu [7] ističu pozitivan uticaj kreativnosti preduzetnika na učinak organizacija. U radu [8] autori Silvia i saradnici ističu da ljudi koji su kreativni u jednoj oblasti su, vrlo verovatno, kreativni i u drugim oblastima, baš kao što i ljudi koji su jako inteligentni imaju dobre rezultate pri mnoštvu kognitivnih zadataka. Autor Hall i saradnici u radu [9] ističu da je inovacija ključni element konkurencije i dinamičke efikasnosti tržišta. Zbog svega navedenog autori predlažu hipotezu H1: *Kreativnost preduzetnika pozitivno utiče na inovativnost organizacije.*

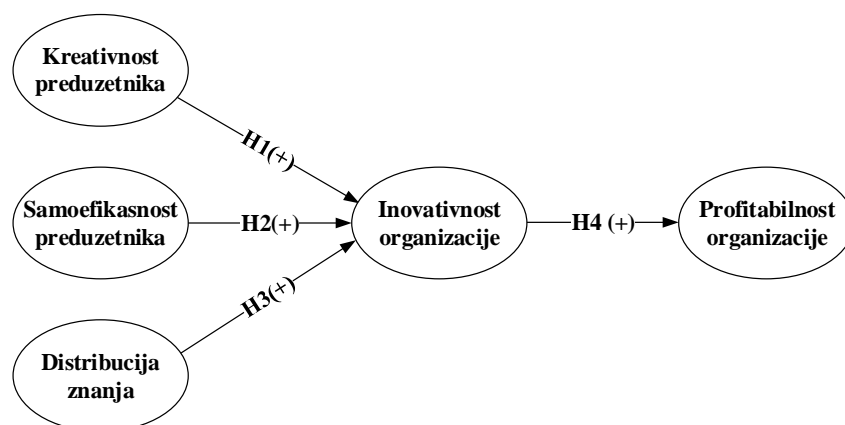
Samoeфикаsnost preduzetnika je veoma bitna kako bi organizacija bila inovativna jer, preduzetnik koji je samouveren u svoje sposobnosti da izvršava svoje zadatke, koji se ne boji izazova, koji je inovativan, može kao takav da organizaciji obezbeđuje inovativnost. Prema

definiciji preduzetnička samoefikasnost se odnosi na jačinu verovanja osobe da je ona sposobna da uspešno izvršava različite uloge i zadatke preduzetništva [10]. Preduzetnici sa istim veštinama mogu imati slab, adekvatan ili izvanredan učinak, zavisno od toga da li njihova sopstvena verovanja o efikasnosti jačaju ili umanjuju njihovu motivaciju i pokušaje rešavanja [11]. Postoje veće šanse da će pojedinci sa visokom samoefikasnošću za određeni zadatak više tragati i izdržati na tom zadatku, nego li pojedinci sa niskim verovanjima o samoefikasnosti [12]. Osoba može imati visoku samoefikasnost u jednoj oblasti, ali nisku samoefikasnost u drugoj oblasti, i to za određene, veoma specifične zadatke i/ili veštine [13]. Preduzetnici sa čvrstim uverenjima o preduzetničkoj samoefikasnosti teže da izazovne situacije dovode u vezu sa nagradama kao što je profit, priznanje zajednice i psihološka ispunjenost, zato što se samoefikasnost ne bavi prošlošću, već sudovima o tome šta bi se moglo postići u budućnosti [14]. Autor Tang u radu [15] ističe pozitivan efekat preduzetničke kreativnosti na inovativnost organizacije, koja stimuliše preduzetničku improvizaciju i sam poslovni učinak. Zbog svega navedenog autori predlažu hipotezu H2: *Samoefikasnost preduzetnika pozitivno utiče na inovativnost organizacije.*

U organizacionom smislu, distribucija znanja predstavlja proces u kojem iskustvo jedne grupe utiče na drugu grupu, obzirom da sam proces uključuje dve ili više strana [16], i ukazuje se na činjenicu da su to organizacione celine koje postoje unutar same organizacije. Kada je uspostavljena dobra komunikacija među ljudima, distribucija znanja se podrazumeva i dešava se indirektno [17]. Organizacije same po sebi nisu sposobne da stvore znanje, znanje stvaraju pojedinci i ono se udvostručuje onog trenutka kada ga pojedinci dele sa drugima [18]. Što je manje posrednika u odnosu između dve organizacione jedinice, koje nisu direktno povezane, to je bolja distribucija znanja [19]. Pravilna distribucija znanja unapređuje inovativnost organizacije, a time i prosečno poslovanje organizacije [20]. Autori Soo i saradnici u radu [21] ističu da bi svakoj organizaciji stečeno znanje omogućilo poboljšavanje svog učinka ukoliko bi bili u stanju da dobro apsorbuju to znanje, deluju kreativno po tom znanju i stvaraju nova znanja koja nastaju iz ovih aktivnosti. Zbog toga autori predlažu hipotezu H3: *Distribucija znanja pozitivno utiče na inovativnost organizacije.*

Kako inovativnost predstavlja visoko rizičnu aktivnost, a visok rizik je u pozitivnoj korelaciji sa dobiti od inovacije, organizacije u različitim industrijskim granama odlučuju da preuzmu rizik, znajući da uspešne inovacije mogu doneti konkurentsku prednost uz izuzetan rast [22]. MSP koja imaju prethodno iskustvo inovacije imaju dvostruko veće šanse za uspešno poslovanje, za veći izvoz svojih proizvoda/usluga, povećan rast i razvoj organizacije nego neinovativne [23]. Autori Love i Roper u radu [24] ističu pozitivni uticaj inovacija na profitabilnost MSP, na njihov rast i povećanje izvoza. Autori Golovko i Valentini u radu [25] tvrde da kod MSP postoji jaka pozitivna veza između organizacionih inovacija, njene profitabilnosti, rasta izvoza, a time i rasta organizacije. Zbog svega istaknutog autori predlažu hipotezu H4: *Inovativnost organizacije pozitivno utiče na profitabilnost organizacije.*

Konceptualni model pozitivnih uticaja, za predložene 4 hipoteze prikazan je na Slici 1.



Slika 1. Konceptualni model

Konceptualni model sadrži tri nezavisne latentne promenljive: kreativnost preduzetnika (KP), samoefikasnost preduzetnika (SP) i distribucija znanja (DZ), i dve zavisne latentne promenljive: inovativnost organizacije (IO) i profitabilnost organizacije (PO).

### 3. METODOLOGIJA ISTRAŽIVANJA

Za istraživanje je korišćena metodologija anketiranja. U tu svrhu je razvijen upitnik na osnovu dostupne relevantne literature [26-29], i pokušaja drugih istraživača da kreiraju podesan instrument za analizu i evaluaciju koncepta inovativnosti i profitabilnosti u MSP. Takođe, kreiran je i veliki broj upitnika ovog tipa koji su univerzalno primenljivi, bez obzira na vrstu industrije, a njihovom modifikacijom kreiran je i finalni upitnik. Upitnik sadrži 8 pitanja demografskog karaktera (Tabela 1), i 18 istraživačkih pitanja raspoređenih u 5 grupa (Tabela 2). Tri grupe pitanja opisuju elemente preduzetničke aktivnosti: KP, SP i DZ, jedna koncept inovativnost organizacije, i jedna koncept profitabilnost organizacije.

Podaci su prikupljeni neposrednim anonimnim anketiranjem preduzetnika-vlasnika slučajno odabranih MSP u istočnoj Srbiji, u periodu od maja do oktobra 2016. god. Ukupno je prikupljeno 336 ispravno popunjenih upitnika. Odnos veličine uzorka (336 ispitanika) i broja pitanja (18 pitanja) jeste 18,67, što je daleko iznad preporučene vrednosti 5, prema autorima u radu [30]. Za ocenu odgovora korišćena je Likertova petostepena skala (od 1-apsolutno se ne slažem do 5-apsolutno se slažem).

Upitnik je popunilo 77,4% muških i 22,6% ženskih ispitanika, tj. vlasnika MSP. U najproduktivnijoj starosnoj dobi, od 26. do 55. godine starosti, nalazi se 86,9% ispitanika. Na osnovu broja zaposlenih 73,2% ispitanika poseduje organizaciju u kategoriji mikro preduzeća (<10 radnika). U istraživanju je najviše zastupljeno "mladih" MSP (manje od 10 godina postojanja i rada), i to u 54,5% slučajeva. U 69,4% slučajeva ispitanici imaju prethodno poslovno iskustvo, što znači da je 30,6% njih koji su po prvi put pokrenuli privatni biznis. 77,7% ispitanika (181/233) je svoje poslovno iskustvo steklo baveći se istim poslom koji i trenutno obavljaju. Dominantna je domaća vlasnička struktura organizacija i to u 94,3% slučajeva, a najveći broj ispitanika nalazi se u uslužnom sektoru privredne delatnosti (61%).

Tabela 1. Demografske karakteristike uzorka

R.br.	Kontrolne promenljive	Kategorija	Frekvencija	Udeo (%)
1	Pol poslodavca-vlasnika	Muški	260	<b>77,4</b>
		Ženski	76	22,6
2	Godine starosti poslodavca-vlasnika	≤ 25	15	4,5
		26-35	85	<b>25,3</b>
		36-45	110	<b>32,7</b>
		46-55	97	<b>28,9</b>
		≥ 56	29	8,6
3	Broj zaposlenih u organizaciji	≤ 10	246	<b>73,2</b>
		11-50	65	19,3
		51-250	25	7,5
4	Hronološka starost organizacije (godine)	≤ 5	95	<b>28,3</b>
		6-10	88	<b>26,2</b>
		11-20	81	24,1
		21-30	42	12,5
5	Predhodno poslovno iskustvo poslodavca-vlasnika	Ne	103	30,6
		Da	233	<b>69,4</b>
6	Predhodno poslovno iskustvo u struci poslodavca-vlasnika	Ne	155	46,1
		Da	181	<b>53,9</b>
7	Vlasnička struktura vaše organizacije	Domaće vlasništvo	317	<b>94,3</b>
		Strano vlasništvo	8	2,4
		Mešovito vlasništvo	11	3,3
8	Sektor privredne delatnosi	Poljoprivreda	19	5,7
		Proizvodni	67	19,9
		Neproizvodni	45	13,4
		Uslužni	205	<b>61,0</b>

## 4. REZULTATI I DISKUSIJA

### 4.1. DESKRIPTIVNA STATISTIKA

Deskriptivna statistika je urađeni korišćenjem softverskih paketa SPSS 17.0. Praćeni su standardni statistički parametri: srednja vrednost, modus i varijansa.

Tabela 2. Stavke upitnika i rezultati deskriptivne statistike

Grupe pitanja	Oznaka	Stavke upitnika	Sr. vr.	Mod	Varijansa
KP	KP_1	Mogu da osmislim iznenadna rešenja	3,85	4	0,75
	KP_2	Moje ideje su obično vrlo jedinstvene	3,73	4	0,85
	KP_3	Kad predvidim moguće prepreke, sposoban sam da ih savladam	4,01	4	0,64
	KP_4	Pokušavam da nadjem nova rešenja, čak i kad to nije potrebno	3,60	3	1,04
	KP_5	Uvek imam u glavi veliki broj ideja	4,02	4	0,78
SP	SP_1	Sposoban sam da postavim i ispunim poslovne ciljeve	4,09	4	0,61
	SP_2	Sposoban sam da kontrolišem troškove	3,81	3	0,91
	SP_3	Sposoban sam da sprovedem analizu tržišta	3,75	4	0,73
	SP_4	Sposoban sam da razvijem nove ideje	4,03	4	0,65
DZ	DZ_1	Organizacija ima formalne mehanizme da garantuje razmenu najbolje prakse između različitih oblasti delatnosti	4,01	4	0,70
	DZ_2	Postoje pojedinci u organizaciji koji učestvuju u radu više različitih timova ili grupa i oni predstavljaju vezu između njih u funkciji razmene znanja	4,05	4	0,78
	DZ_3	Postoje pojedinci u organizaciji koji su nadležni za prikupljanje, sastavljanje i distribuciju sugestija zaposlenih radnika	3,93	4	0,86
IO	IO_1	Broj proizvoda ili usluga koje je organizacija prva plasirala	3,23	3	0,82
	IO_2	Broj proizvoda ili usluga koje je organizacija plasirala	3,15	3	0,74
	IO_3	Brzina razvoja novih proizvoda ili usluga	3,44	3	0,86
PO	PO_1	Naša organizacija posluje mnogo bolje od konkurentskih	3,45	3	0,96
	PO_2	Naša prodaja raste brže od konkurentске	3,42	3	0,81
	PO_3	Naš tržišni udeo je veći od konkurentskog	3,36	3	0,79

Srednja vrednost odgovora ispitanika kreće u granicama od 3,15 do 4,05, modus od 3 do 4, a varijansa od 0,61 do 1,04. Na osnovu odgovora se može uočiti da ispitanici imaju pozitivno mišljenje na postavljena pitanja. Takođe, na osnovu parametara deskriptivne statistike može se zaključiti da ispitanici (vlasnici MSP) mogu zadovoljiti bitne pretpostavke preduzetničke aktivnosti, koje su definisane kroz 5 grupa pitanja.

## 4.2. KONTROLNI MODEL

Za testiranje kontrolnog modela korišćeni su softverski paketi SPSS 17.0 i LISREL 8.80. U cilju primene faktorske analize izvršeno je ispitivanje adekvatnosti uzorkovanja preko KMO indikatora i Bartlett-ovog testa sferičnosti. Na osnovu literaturne preporuke [31], minimalno prihvatljiva vrednost za KMO indikator je 0,6, a nivo značajnosti Bartlett-ovog testa iznosi  $\text{Sig.} \leq 0,05$ . Za ispitivani uzorak, KMO indikator grupa (latentne promenljive) se kreće u granicama od 0,676 do 0,852, a Bartlett-ov test sveričnosti je kod svih grupa  $\text{Sig.} = 0,000$ . Na osnovu rezultata za KMO indikator može se izvući zaključak da su prikupljeni podaci pogodni za primenu faktorske analize, dok podaci dobijeni za Bartlett-ov test sferičnosti upućuju na zaključak da postoje korelacije među pitanjima (promenljive) u okviru grupa, odnosno da korelaciona matrica nije jedinična.

### 4.2.1. Ekploratorna faktorska analiza

Eksploratorna faktorska analiza (EFA–*Exploratory Factor Analysis*) je urađena sa ciljem utvrđivanja jednodimenzionalnosti glavnih faktora (grupe pitanja). Na osnovu dobijenih rezultata može se zaključiti da je potvrđena jednodimenzionalnost kod svih faktora, jer su sve ispitivane stavke svrstane u po jedan faktorski skup sa sopstvenom vrednošću većom od 1 (jedan). Procenti varijabiliteta opisani svakim jednodimenzionalnim faktorom su prikazani u Tabeli 3. Vrednosti faktorskog opterećenja promenljivih su iznad preporučene vrednosti od 0,4, koja važi za uzorke veće od 300, na osnovu literaturne preporuke u radu [32]. Na osnovu dobijenih rezultata se može zaključiti da se formirane latentne grupe promenljivih mogu pouzdano opisati korišćenjem definisanih istraživačkih pitanja.

### 4.2.2. Konfirmatorna faktorska analiza

Za potvrdu pouzadnosti i validnosti konceptualnog modela, urađena je konfirmatorna faktorska analiza (CFA–*Confirmatory Factor Analysis*) nad kontrolnim modelom. Dobijene vrednosti su prikazane u Tabeli 3. Za pouzdanost kontrolnog modela koristi se pokazatelj unutrašnje saglasnosti, koji je meren Kronbahovim koeficijentom alfa (*Cronbach's Alpha*) i Spirman-Braun-ovog koeficijenta (*Spearman-Brown coefficient*). Dobijeni rezultati ukazuju na činjenicu da su vrednosti koeficijenata, kod svih grupa, iznad preporučene vrednosti 0,7, koja se navodi u literaturi [33]. Zato se nameće zaključak da postoji unutrašnja saglasnost latentnih promenljivih i da su istraživačka pitanja pouzdana za dalju analizu.

Konvergentna validnost kontrolnog modela potvrđuje se na osnovu dobijenih vrednosti CFA analize (Tabela 3) i potvrde fitovanja modela (Tabela 4). Vrednosti faktorskog opterećenje su iznad preporučene vrednosti od 0,4, prema datim preporukama u radu [32]. Takođe, može se uočiti da su sve vrednosti *t*-testa dostigle nivo značajnosti od  $\text{Sig.} < 0,05$ .

Zbog toga se može isvesti zaključak da je svaka odrednica (pitanje) razmatranih grupa pitanja postigla konvergentnu validnost.

#### 4.2.3. Mere fitovanja

Mere fitovanja kontrolnog i strukturnog modela su utvrđene na osnovu urađene CFA analize, a vrednosti nekih od parametara prikazani su u Tabel 4. Iako su oučena mala odstupanja kod GFI i AGFI indikatora, ipak se može zaključiti da je postignuto dobro fitovanje kontrolnog modela i da su podaci zaista reprezentativni. To znači da sva 18 istraživačka pitanja mogu na pouzdan i validan način da opišu formirane 5 grupe pitanja na osnovu konceptualnog modela, koji je prikazan na Slici 1.

Tabela 3. Rezultati EFA i CFA statistike za kontrolni model

Grupa pitanja	Promenljiva	Eksploratorna Faktorska Analiza (EFA)		Konfirmatorna Faktorska Analiza (CFA)		
		PCA		Pouzdanost		Konvergentna validnost
		% varijanse koji se može opisati jednodimenzionim faktorom	Faktorsko opterećenje	Cronbach alpha (Spearman-Brown)	Faktorsko opterećenje	t-vrednost
<b>KP</b>	KP_1	61,256	0,771	0,755 (0,715)	0,62	17,55 *
	KP_2		0,682		0,51	15,87 *
	KP_3		0,726		0,50	16,25 *
	KP_4		0,675		0,54	15,10 *
	KP_5		0,720		0,52	16,63 *
<b>SP</b>	SP_1	62,562	0,755	0,763 (0,425)	0,48	17,63 *
	SP_2		0,732		0,56	15,54 *
	SP_3		0,786		0,59	17,32 *
	SP_4		0,722		0,57	19,42 *
<b>DZ</b>	DZ_1	74,315	0,756	0,884 (0,845)	0,79	31,42 *
	DZ_2		0,789		0,71	29,63 *
	DZ_3		0,902		0,78	27,41 *
<b>IO</b>	IO_1	82,625	0,895	0,905 (0,894)	0,81	31,03 *
	IO_2		0,925		0,79	31,63 *
	IO_3		0,903		0,75	28,84 *
<b>PO</b>	PO_1	85,652	0,920	0,912 (0,901)	0,83	28,25 *
	PO_2		0,932		0,87	31,64 *
	PO_3		0,891		0,83	30,98 *

Napomena: Nivo statističke značajnosti \*  $p < 0,05$

Tabela 4. Vrednosti indikatora fitovanja za kontrolni i strukturni model

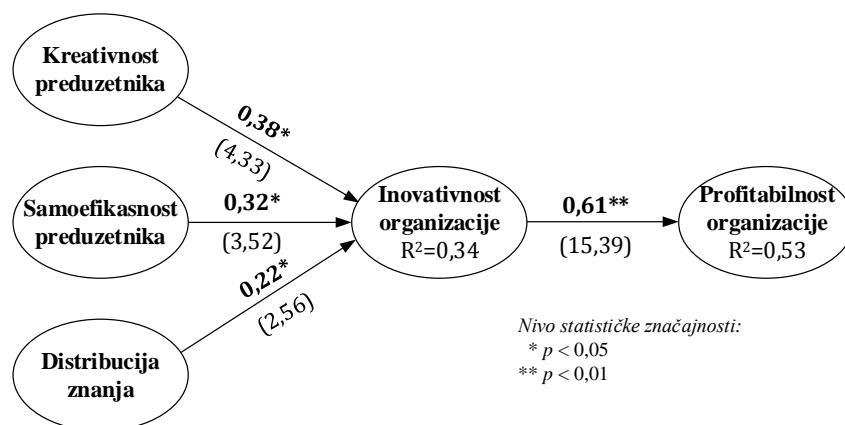
Indikatori fitovanja	Vrednosti za kontrolni (merni) model	Vrednosti za strukturni (PATH) model	Preporučene vrednosti
Chi-Square ( $\chi^2$ )	421	419	-
Degree of freedom (d.f.)	165	164	-
Relative Chi-Square ( $\chi^2/d.f.$ )	2,55	2,55	< 3,0
Root Mean Square Error of Approximation (RMSEA)	0,086	0,087	< 0,08 – 0,10
Goodness-of-Fit Index (GFI)	0,86	0,87	> 0,9
Adjusted Goodness-of-Fit Index (AGFI)	0,83	0,86	> 0,9
Comparative Fit Index (CFI)	0,93	0,94	> 0,9
Incremental Fit Index (IFI)	0,94	0,94	> 0,9
Normed Fit Index (NFI)	0,92	0,92	> 0,9
Non-Normed Fit Index (NNFI)	0,91	0,91	> 0,9
Relative Fit Index (RFI)	0,92	0,93	> 0,9



#### 4.3. TESTIRANJE STRUKTURNOG MODELA

Strukturnog modela je testiran korišćenjem softverskog paketa LISREL 8.80, a rezultati analize su prikazani na Slici 2. Iznad strelica su predstavljene vrednosti koeficijenata regresije (koeficijent putanje), a zvezdicama je označen nivo statističke značajnosti. Ispod strelica, u zagradama, su predstavljene vrednosti  $t$ -testa. U poljima zavisne promenljive su prikazani koeficijenti determinacije ( $R^2$ ), koji određuje koliko je varijacija zavisne promenljive objašnjena prediktorskom promenljivom.

Na osnovu rezultata Path analize, prikazanih na Slici 2, svi koeficijenti regresije imaju pozitivnu vrednost, što znači da su potvrđene sve četiri hipoteze H1, H2, H3 i H4. Odluka o prihvatanju hipoteza je doneta na osnovu rezultata  $t$ -testa. Svi koeficijenti  $t$ -testa su iznad preporučene vrednosti od 1,96, prema preporukama autora u radovima [30,33]. To znači da su sve četiri hipoteze prihvatljive. Za hipotezu H1, H2 i H3 obezbeđen je nivo statističke značajnosti manje od 0,05, a za hipotezu H4 manje od 0,01. Može se izvesti konačan zaključak da su sve četiri istraživačke hipoteze potvrđene, prihvatljive i statistički značajne, jer su dobijeni sledeći rezultati: H1 ( $\beta=0,38$ ;  $t=4,33$ ;  $p<0,05$ ); H2 ( $\beta=0,32$ ;  $t=3,52$ ;  $p<0,05$ ); H3 ( $\beta=0,22$ ;  $t=2,56$ ;  $p<0,05$ ) i H4 ( $\beta=0,61$ ;  $t=15,39$ ;  $p<0,01$ ).



Slika 2. Strukturni model

Na osnovu rezultata za koeficijent determinacije  $R^2$  (*Squared Multiple Correlations*) može se zaključiti da se uticaj latentnih prediktora “Kreativnost preduzetnika”, “Samoefikasnost preduzetnika” i “Distribucija znanja” na latentnu endogenu promenljivu “Inovativnost organizacije” može obračunati sa 34% varijanse. Takođe, uticaj latentne egzogene promenljive “Inovativnost organizacije” na latentnu endogenu promenljivu “Profitabilnost organizacije” se može obračunati sa 53% varijanse.

#### 5. ZAKLJUČAK

Proučavani kontrolni i strukturni model pokazuju zadovoljavajuću podudarnost i validnost, i dobro fituju polazne podatke. Dokazivanjem testiranih hipoteza, formiranih na osnovu konceptualnog modela, ukazano je na faktore (preduzetničke aktivnosti) koji utiču na mišljenja, stavove i uverenja ispitanika (preduzetnika-vlasnika MSP) u funkciji ostvarivanja

organizacione inovativnosti i profitabilnosti. Kreativnost i samoefikasnost preduzetnika, kao i distribucija znanja neposredno pokazuju pozitivan efekat na ostvarivanje organizacione inovativnosti i posredno na organizacionu profitabilnost.

Rezultati empirijskog istraživanja navode na zaključak da preduzetnici-vlasnici MSP poseduju odgovarajuće znanje iz oblasti preduzetništva. Takođe, preduzetnici imaju pozitivne stavove i percepcije o vrednostima i važnosti primene preduzetničkih aktivnosti sa ciljem ostvarivanja organizacione inovativnosti i profitabilnosti.

Implikacije koje bi ovo istraživanje moglo imati na preduzetnike-vlasnike MSP, one na koje se istraživanje odnosi, je to da se kreativnost i inovativnost moraju podsticati.

Prilikom istraživanja evidentirana su i određena ograničenja. Prvo ograničenje se odnosi na činjenicu da su preduzetnici sami ocenjivali svoju kreativnost i samoefikasnost, tako da je čitavo istraživanje zasnovano na njihovim subjektivnim ocenama, koje se uvek mora uzeti sa rezervom. Buduća istraživanja bi mogla da smanje objektivnost koristeći neku drugu skalu, koja isključuje samoocenjivanje preduzetnika. Drugo ograničenje se odnosi na činjenicu da je istraživanje sprovedeno u regionu koji važi za nerazvijeniji deo Srbije. Na taj način se dobijeni rezultati ne mogu generalizovati i odnositi za celu Srbiju, ali mogu biti dobra osnova za dalja istraživanja i u drugim regionima. Tako dobijeni rezultati se mogu upotrebiti za komparativnu analizu sa ciljem utvrđivanja univerzalno važećih veza koje bi mogle biti važne za razvoj preduzetništva u Srbiji. Zbog toga je želja autora bila da se, na nivou pojedinca, utvrde mehanizmi na osnovu kojih preduzetničke aktivnosti utiču na inovativnost i profitabilnost MSP u istočnoj Srbiji.

## REFERENCE

1. Acs, Z., Desai, S., and Hessels, J. (2008). Entrepreneurship, economic development and institutions. *Small Business Economics*, 31(3), 219-234.
2. Keh, H.T., Nguyen, T.T.M., Ng, H.P. (2007). The effects of entrepreneurial orientation and marketing information on the performance of SMEs. *Journal of Business venturing*, 22, 592-611.
3. Naude, W. (2010). Entrepreneurship, Developing countries, and development economics: New approaches and insights. *Small Business Economics*, 34(1), 1-12.
4. Engelen, A., Heinemann, F., Brettel, M. (2009). Cross-cultural entrepreneurship research: Current status and framework for future studies. *Journal of International Entrepreneurship*, 7(3), 163-189.
5. Leskovar-Spacapan, G., Bastic, M. (2007). Differences in organizations' innovation capability in a transition economy: Internal aspect of the organizations' strategic orientation. *Technovation*, 27(9), 533-546.
6. Nystrom, H. (1993). Creativity and entrepreneurship. *Creativity and Innovation Management*, 2(4), 237-242.
7. Baron, R. A., Tang, J. (2011). The role of entrepreneurs in firm-level innovation: The joint effects of positive affect, creativity, and environmental dynamism. *Journal of Business Venturing*, 26(1), 49-60.

8. Silvia, P.J., Kaufman, J.C., Pretz, J.E. (2009). Is creativity domain-specific? Latent class models of creative accomplishments and creative self-descriptions. *Psychology of Aesthetics, Creativity, and the Arts*, 3(3), 139-148.
9. Hall, B.H., Lotti, F., Mairesse, J. (2009). Innovation and productivity in SMEs: Empirical evidence for Italy. *Small Business Economics*, 33, 13-33.
10. Boyd, N.G., Vozikis, G.S. (1994). The influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice*, 18(4), 63-77.
11. Wood, R., Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review*, 14(3), 361-384.
12. Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1-26.
13. Wilson, F., Kickul, J., Marlino, D. (2007). Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education. *Entrepreneurship Theory and Practice*, 31(3), 387-406.
14. Yang, H.L., Cheng, H.H. (2009). Creative self-efficacy and its factors: An empirical study of information system analysts and programmers. *Computers in Human Behavior*, 25(2), 429-438.
15. Tang, J. (2008). Environmental munificence for entrepreneurs: entrepreneurial alertness and commitment. *International Journal of Entrepreneurial Behaviour and Research*, 14(3), 128-151.
16. Hasan, I., Low, P.K.C., Islam, M.Z. (2013). Knowledge management, Knowledge Transfer and Corporate Social Responsibility (CSR). Springer link: *Encyclopedia of Corporate Social Responsibility*, 1555-1562.
17. Sparkes, J.R. and Miyake, M. (2000). Knowledge transfer and human resource development practices: Japanese firms in Brazil and Mexico. *International Business Review*, 9(5), 599-612.
18. Zhang, P., Ng, F.F. (2012). Attitude toward knowledge sharing in construction teams. *Industrial Management & Data Systems*, 112(9), 1326-1347.
19. Hansen, M.T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232-248.
20. Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal* 17(S2), 27-43.
21. Soo, C.W., Devinney, T.M., Midgley, D.F. (2007). External knowledge acquisition, creativity and learning in organisational problem solving. *International Journal of Technology Management*, 38(1-2), 137-159.
22. Laforet, S., (2013). Organizational innovation outcomes in SMEs: Effects of age, size, and sector. *Journal of World Business*, 48(4), 490–502.
23. European Commission (2010). Internationalisation of European SMEs. Brussels: Directorate-General for Enterprise and Industry, European Commission.

24. Love, J.H., Roper, S. (2015). SME innovation, exporting and growth: A review of existing evidence. *International Small Business Journal*, 33(1), 28-48.
25. Golovko, E., Valentini, G. (2011). Exploring the complementarity between innovation and export for SMEs growth. *Journal of International Business Studies*, 42, 362-380.
26. Hills, G.E., Lumpkin, G.T. and Singh, R.P. (1997). Opportunity recognition: Perceptions and behaviors of entrepreneurs. *Frontiers of Entrepreneurship Research*, 17, 168-182.
27. Chen, C.C., Greene, P.G. and Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *Journal of Business Venturing*, 13(4), 295-316.
28. Jimenez-Jimenez, D. and Sanz-Valle, R. (2011). Innovation, organizational learning, and performance. *Journal of Business Research*, 64(1), 408-417.
29. Yang, H.L., Cheng, H.H. (2009). Creative self-efficacy and its factors: An empirical study of information system analysts and programmers. *Computers in Human Behavior*, 25(2), 429-438.
30. Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L. (2006). *Multivariate Data Analysis*, 6th Edition, Pearson Prentice Hall, Upper Saddle River, NJ.
31. Cerny, C.A., Kaiser, H.F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate Behavioral Research*, 12 (1), 43-47.
32. Floyd, F.J., Widaman, K.F. (1995). Factor Analysis in the Development and Refinement of Clinical Assessment Instruments. *Psychological Assessment*, 7(3), 286-299.
33. Ho, R. (2006). *Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS*, Chapman & Hall/CRC, Taylor & Francis Group.

## **THE ROLE OF THE TRAVEL AGENCIES WITHIN THE POLICY OF BULGARIA**

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**Abstract:** Over the past ten years the travel industry has experienced considerable changes. Today's highly unpredictable and competitive environment is having a profound impact on the travel industry. Travel agencies are being increasingly confronted with a variety of changes. To survive, travel agency's managers need to develop innovative strategies and marketing programs which will enable them to buffer their organizations from perceived environmental threats and to exploit developing opportunities. The purpose of this paper is to analyze the tourism policy in Bulgaria as a destination, and to examine the role of the travel agencies in the destination management. That is why mainly the tourism development in the country, the problems and the difficulties which the travel agencies are faced with will be analyzed, and last but not least, some generalizations about the benefits of travel agencies and their role in the tourism sector in Bulgaria will be made.

**Keywords:** travel agencies, tourism management, Bulgaria, development, role

### **1. INTRODUCTION**

Identification of tourism potentials is closely related to the achievement of destination competitiveness on tourism market and future actions should be related to tourist products promotion within the regions, respect of principles for sustainable development, protection of natural environment, urgency of defined policy, priorities and activities [7]. There is an increasing interest in the destination management, as more and more places are striving to put their name on the map of the world tourism. On the other hand, tourists also become more demanding and looking for new and unique ways to experience the destination. Different factors influence their choice: price and quality correlation; green and sustainable footprint; collaborative consumption and authentic services, etc. The demand change directly affects the marketing mix of the destination and service economy which has been slowly transforming to experience economy.

This paper aims to analyze some main roles of destination management in Bulgaria and to generalize the importance of agencies in tourism policy in the country.

Travel agencies represent an industry market place where prospective travelers have the ability to shop for air, car and hotel products for leisure or business purposes. Travel agencies are one-stop shopping malls that have access to and can evaluate multiple suppliers as a potential solution for their clients. The function provided by travel agencies in terms of taking reservations, providing customer service for those reservations as well as fulfilling the ticketing requirements associated with those reservations are activities that airlines have consciously decided to outsource. This outsourcing initiative precipitated the creation of the

travel agency industry and has allowed airlines to focus on their core competencies associated with flying airplanes instead of processing reservations and tickets.

## **2. THE MAIN ROLES OF DESTINATION MANAGEMENT**

Destination management is the coordination and integration of all of the elements of the destination mix in a particular geographic area based upon a defined tourism strategy and plan. The destination mix elements are the attractions and events, facilities (hotels, restaurants, etc.), transportation, infrastructure, and hospitality resources [4]. In addition, destination management encompasses the image-making, branding, and marketing and communications of all that the place has to offer to tourists. Destination management organizations (DMOs) have the overall responsibility for the coordination and integration of the destination mix elements, and for destination marketing. They are scattered throughout the world and spanning many different organizational sizes and types. Many DMOs are government departments, while others are quasi-governmental. DMO structures vary according to local practices and governmental systems.

Destination management roles [3] are:

- Human resource development;
- Finance and budgeting management;
- Safety, security and crisis;
- Politics (government, non-governmental organizations, community relations and industrial relationships), policy and destination strategy;
- Monitoring service quality, standards and destination performance management.

In Bulgaria, the management of the destinations according to the Tourism Act is partly regulated by the so called - Regional tourism organizations, which are voluntary organizations that, through mutual assistance and cooperation in the interests of their members and in the public interest, carry out activities related to the formation of regional tourism products and the implementation of regional marketing and advertising on a certain territory - a tourist region.

The management of marketing tourism regions in Bulgaria embraces activities in three directions: creation of regional tourist products; regional marketing and advertisement; coordination and management of tourism on regional level; creation of tourist zones and organizations for their management – improving marketing, effective use of resources and coordinated activities [10].

Tourist destinations managing companies, representatives of national and local business organizations, investors and experts in tourism at national and local level should be familiar with the latest management trends. As well as systems for quality assurance and stability sustenance. Such preliminarily preparation, secured by factor analysis could be the basis on which on could model its competitiveness and increasing local, regional and national level. [8]

One of the major objectives of tourism management on national level is the promotion of Bulgaria as a tourist destination, predominantly on travel fairs. For this purpose, Bulgarian government allots 3,4 mln levs (1,73 mln euro) for promotion of tourism. During year 2010

Bulgaria is represented in 35 international tourist fairs and trade shows, which is 7 fairs less than the previous year.

There are three levels of administrative authority involved in tourism planning and management. At national level tourism in Bulgaria is governed by the Minister of Economy, Energy and Tourism. The regional governors implement the state policy on regional level, while the municipal councils and mayors of municipalities are bodies of local administration. The international level of tourism management relates to the membership of Bulgaria in different international organizations involved in tourism, such as World Tourism Organization (WTO), United Federation of Travel Agents' Association (UFTAA), International Air Transport Association (IATA), etc. Other organizations that take part in tourism management and planning are National Tourism Council, local, regional, national, professional and product associations which act as consultative institutions.

The vision for the development of Bulgaria as a successful tourist destination could be specified in logical sequence by the following priorities:

- Facing the segmented tourist market by all stakeholders;
- Leadership and investments of the public sector of Bulgaria for preservation of the tourist resources, modernization of the material and technical infrastructure and the elaboration of specialized production factors (personnel, technologies, etc.) as a basis and potential for competitive tourist development;
- Formation of a dialogue and a high level of partnership between public and private tourist sector of the tourist destination;
- Development of knowledge and skills in the subjects from the private sector for offering qualitative, specialized tourist products at competitive prices;
- Use of differentiated marketing mix for effective target segments of the international tourist market;
- Information positioning of Bulgaria as a desired brand of the tourist destination, implanted in the mind of every visitor as a permanent positive emotion for acquired great value for money.

Table 1. Strengths and Weaknesses of Bulgaria as a tourist destination

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>• Favorable geographic location, close to major generating markets;</li> <li>• Moderate climate, pronounced 4 seasons;</li> <li>• A variety of resources providing potential for sustainable development and strategic positioning of Bulgaria on the international tourist market</li> <li>• Presence of reliable potential for diversification and decentralization of the supply of the Bulgarian tourist product</li> <li>• Positive image of the country and its major tourist centers on the international tourist market</li> <li>• Good opportunities for entertainment and nightlife;</li> <li>• Existence of newly built and renovated bed base;</li> <li>• Markets already set up with a high reluctance to visit.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of a consistent positive image as a tourist destination;</li> <li>• Unsustainable and insufficiently efficient state tourism administration;</li> <li>• Lack of an effective national system for gathering, storing and distributing reliable statistical and marketing information about Bulgarian tourism;</li> <li>• Worst development of the common technical and social infrastructure;</li> <li>• Lasting imbalance between superstructure and tourism infrastructure;</li> <li>• Monostructural development of the Bulgarian tourism - strong seasonality - stagnation in the autumn, the spring season;</li> <li>• Strong territorial concentration of tourist production resources and products;</li> <li>• Unsustainable development of Bulgarian tourism;</li> <li>• Low degree of readiness to meet and service tourists;</li> <li>• Inefficiently functioning information system for management and regulation of the tourist development;</li> <li>• Imperfect and frequently changing regulatory framework in tourism;</li> <li>• Inefficient system for planning, selection, retention and professional development of the cadres in tourism;</li> <li>• Unsatisfactory, regionally unidentified tourism advertising;</li> <li>• Low rate of renovation, modernization and reconstruction of Bulgarian museums, galleries and tourist attractions;</li> <li>• Insufficient good interaction between the state and the tourist business;</li> <li>• Lack of adequate development plans and zoning in tourist areas.</li> </ul>



As can be seen in the above table, the weaknesses of Bulgaria as a tourist destination outweighs its strengths. One should carefully analyze all the aforementioned shortcomings and weaknesses of the country and, by proper analysis and research, to impose appropriate measures and trends for the successful development and imposition of Bulgaria as a quality tourist destination.

The main objective can be achieved by realizing the following strategic objectives:

- Promoting a positive image of Bulgarian tourism and increasing the recognition of Bulgaria as an attractive year-round destination with a distinctive national identity, preserved cultural traditions and preserved nature;
- Increasing the competitiveness of Bulgaria's destination on the world market by enhancing the quality of the tourist product, a strong brand of the destination and product specialization and diversification;
- Introduction of international standards and good European practices and implementation of innovative products, information and communication technologies in line with the requirements of tourism demand;
- Promoting the internal market - structuring policies to support the development and positioning of products responsive to domestic market trends;
- Stimulating the role of tourism as a decisive factor in the development of the labor market by enhancing the skills, productivity and adaptability of the workforce.

For the realization of the strategic objectives, prioritized should be the positioning of Bulgaria as a tourist destination in the higher class of the world tourist market, to increase the share of specialized types of tourism. It is necessary to stimulate the development of integrated regions in the country and to improve all tourist attractions and infrastructure. The employees in tourism industry should be trained and educated in line with the needs of the tourism sector and the development of the labor market. Last, but not least, it is very important that all local institutions and representatives of the tourism industry should cooperate with each other and create opportunities for partnership development on local, regional, national and international level.

### **3. THE ROLE OF TRAVEL AGENCIES WITHIN THE POLICY OF BULGARIA**

The number of travel agencies registered in Bulgaria amounts to 2984 [5] among which tour operators, travel agents and mixed tourist businesses. In terms of staff number and annual turnover, Tour operators fall within the category of small and medium size enterprises. Their number is significant in view of the domestic tourism market, increased competition from on-line travel intermediaries and increased sales of tourist services by Internet based suppliers.

One of the main purposes of Bulgarian tour agencies is not just to create an easy to sell product to the tourists, but to leave an unforgettable experience in them, which will contribute for their future holiday choice. Therefore, globalization, the economic, political, social and demographic situation in the country have serious impact on the development of tour agencies in Bulgaria - both in positive and negative aspects.

A survey of attitudes and perceptions of Bulgarians towards purchasing TA [3] services on-line shows that nearly 42% of respondents have not visited the tour operator's website for information but would prefer and trust the virtual sites of on-line travel intermediaries, suppliers of basic tourist services and on-line booking facilities.

The results of the survey indicate that the majority of tour agencies' look on their business as insecure, they lack confidence and tend to underestimate the potential of the present day distribution system. Over half of the respondents (52%) are reluctant to book tourist services on-line visiting the TA sites.

The above percentage can be explained with TA limited booking facilities and payment options on the one hand, and the need for expert advice and professional assistance (knowledge of products, destinations, etc.) offered by TA on the other. Addressing this need will help build desired trust in TA services and inspire customer loyalty. In addition, tour agencies' websites in Bulgaria seem to lack functionality as they failed to meet respondents' expectations in the provision of detailed and up-to-date information and reliability of on-line bookings and payments. The high percentage of respondents' opinions in this category points to low perception of the attractiveness of TA on-line services. TA communication messages to their potential audiences also seem to be ineffective since they fail to make their offers interesting and appealing to clients. In addition, tour agencies show limited use of innovations which could otherwise enhance efficiency of operations and encourage better customer relationships.

Galbraith [2] proposes three sets of proactive strategies for management of the organization's environment: independent strategies, cooperative strategies and strategic maneuvering.

1. Independent strategies may be employed by an organization to modify its competitive environment. For example, a travel agency may use its own resources and ingenuity to differentiate its services from those offered by the competition, thereby gaining a greater measure of control over its environment.

2. Cooperative strategies involve two or more organizations that have undertaken joint action designed at reducing their mutual uncertainties and enhance their relative power over the threatening environmental elements. Trade association activities designed to monitor the behavior of airlines or trade members or to influence favorable legislation are another examples.

3. Strategic maneuvering is involved in assessing the change and evaluating the risks. For example, an organization can attempt to alter the task environment rather than manage the environment. Merger and acquisition activities as well as those activities to create new or unique market niche are examples of strategic maneuvering.

Galbraith's strategies are based on trying to reduce the organization's dependency on external entities. These strategies certainly could be more beneficial to travel agencies because of their roles in the channel of distribution, which is their dependency upon the airlines and other travel suppliers for basic products and services. It is imperative that travel agents have available options for dealing with the external forces.

Herein below we shall focus on the more important findings and conclusions of the above survey [1], which reflects the attitudes of Bulgarian tourists and degree of loyalty to travel agencies:

- lack of sufficient promotional materials on TA's products and services;
- insufficient information on tourist services and holiday packages including last minute deals/offers;
- poor customer support services;
- TA staff have insufficient product knowledge and use inadequate sales techniques to promote tourism products and services;
- insufficient knowledge of clients' needs and market demand to provide expert advice on products on offer;
- poor communication with potential customers referencing them to a web site or other information facility;
- provision of limited or no advice on ancillary services such as travel insurance, car hire, terms of payment, etc.;
- poor knowledge of availability/available offers (about 45% of Bulgarian travel agents would ask the customer to call back for more details);
- influencing clients' decisions through personal preferences for TO holiday packages and choice of destinations.

The above conclusions reflect the complex customer attitudes to travel agencies which prove to be rather negative with consumers showing little commitment to standardized tourism packages on offer. Low customer perception which can be attributed to: lack of clear perspective and knowledge of customer needs, preferences and expectations; unawareness of consumer benefits from tourism products and services; ignorance of consumer intentions that can translate into purchase decisions; poor presentation of products specific features.

Brand loyalty to tourism products appears to be dependent on the fact that tourists are extremely price sensitive and they would switch to another TA providing the price is lower, contrary to TA policies to make use of specific competitive advantages. Perceived differentiation of tourism products and services is rather limited. Manifested trust in tour agencies in the country is low due to the limited or no experience with a given product brand resulting in unstable (disloyal) relationships with travel retailers and tour operators.

When travel agencies fail for one reason or another to meet the requirements of their clients and fail to reach the required level of satisfaction, they also break the image of the tourism services offered in the country. That is why it is necessary for all the units in the national policy, breaking the country's tourism industry, to co-operate and to jointly implement new innovative projects, ideas and practices through which Bulgaria will be presented as a leading destination in the tourism industry.

#### **4. CONCLUSION**

Tourism is a rather complicated activity that overlaps several different sectors of the society and economy. Without planning, it may create unexpected and unwanted impacts. Tourism is also still a relatively new type of activity in many countries. Some governments and often the private sector have little or no experience in how to develop tourism properly.

For countries that do not yet have much tourism, planning can provide the necessary guidance for its development.

Bulgaria is still a destination, which is yet to be imposed on the world tourist market and in which it is necessary to introduce drastic changes regarding the tourism management and the policy of the country as a tourist destination.

Travel agencies are a small part of the tourism industry in Bulgaria, but also an extremely important part - they contribute for providing quality products and services, service, presentation and development of the country in the tourism sphere.

Nowadays, each travel agency needs to be flexible, to takes risks with innovative and unconventional ideas and practices, and always to put its customers on the first place. If the customers of one agency are not satisfied, they will change it and not recommend it. The customer (tourist) is the main link in the successful development of a tourist destination.

## 5. REFERENCES

1. Andreeva, E. Mystery clients ranked Bulgaria last but one.  
<http://www.horemag.bg/show.php?storyid=98399>. (28.11.2010).
2. Galbraith, Jay R. (1977), Organization Design, Read, and Mass: Addison-Wesley.
3. Kazandzhieva V., Dissertation thesis, E-commerce and its influence on travel intermediaries and their operations in the Republic of Bulgaria. Department 'TM' at Varna University of Economics, October (in Bulgarian)
4. Morrison A., Destination Management and Destination Marketing: The Platform for Excellence in Tourism Destination, 2013, 2011, unpublished. Over the period 15.07.2010-20.02.2011
5. National Tourism Registry, <http://tourism.egov.bg/registers/TORregister.aspx>
6. Nestoroska I., Identifying tourism potentials in Republic of Macedonia through regional approach. Procedia - Social and Behavioral Sciences 44: 95-103, 2012.
7. Samuel Folorunso Adeyinka-Ojo et al. / Procedia - Social and Behavioral Sciences (2014) 151 – 163
8. Stankova, M., Vasenska, I., Competitiveness factor analysis of an operating tourist destination, available at : [www.researchgate.net](http://www.researchgate.net)
9. Strategy for Sustainable Tourism Development in Bulgaria 2014-2030
10. Terziev V., Arabska E., Grigorova Z., Management of agriculture and tourism in mountain region for sustainable development. Exclusive economic reforms in conditions of risk and uncertainty. Conference proceedings of International scientific and applied conference 31 January 2015, UFA – Aeterna, 3-14, 2015.

## THE AFFORESTATION STRATEGY OF THE REPUBLIC OF SERBIA IN TORRENTIAL FLOOD RISK MANAGEMENT

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**Abstract:** By setting the objective of increasing the afforestation level of the Republic of Serbia to 41.4% by 2050, the Serbian forestry has undertaken a number of tasks, among which afforestation, regeneration and improvement of the quality of existing forests are given the highest priority. The key criteria applied in the prior afforestation of barren land, as well as in amelioration of degraded and coppice forests were the scope of afforestation, i.e. the size of afforested areas and the highest possible wood mass yield obtainable in a short period.

The effects of different weather conditions, heterogeneous geological formations, topography, aspect and quality of forest ecosystems, as well as the negative impact of anthropogenic factors brought about intensive erosion processes in the previous period and occurrence of frequent torrential floods. They endangered human lives and caused losses to settlements, roads, agriculture, water management facilities, i.e. society in general. The results of the research performed in the area of Grdelička Klisura and Vranjska Kotlina confirmed significant effects of the performed erosion control works on the mitigation of the intensity of erosion and sediment yield and transport, and the necessity of a multidisciplinary approach to the questions of drainage basin erosion processes. The success of afforestation depends on the selection of suitable technical solutions (bench terraces and terraces), selection of suitable species, use of seedlings produced in the afforested area and the application of appropriate silvicultural measures in the established plantations.

The implementation of a new afforestation strategy, based on ecosystem preservation and sustainable development, will contribute to a more successful establishment of cultures and plantations and enhancement of other, generally beneficial forest functions.

**Keywords:** Serbia, risk management, afforestation strategy, torrential floods, erosion

### 1. INTRODUCTION

Afforestation, amelioration of forest habitats and reconstruction of degraded coppice forests, which were in the past decades carried out mainly through regular and often routine activities, were more or less successful. The main criteria were the scope of afforestation (the size of forested areas) and the highest possible wood mass yield obtainable in a short period. The selection of species was reduced to a few native or introduced species: Austrian pine on the southern aspects, sometimes Scots pine at higher altitudes, spruce on the northern aspects, Douglas-fir and eastern white pine at beech forest sites, locust at lower altitudes, while Euro-American poplar plantations were established in alluvial plains. This proved successful in the afforestation of barrens with Austrian and Scots pine, partially successful in ameliorations, while the conducted reconstructions had considerable negative effects on potentially

productive ecosystems of beech coppice forests, because they were carried out through mere substitution with pioneer species and spruce. Biodiversity centers of global importance were replanted with Scots and Austrian pines (Strešer, Besna kobila, etc). The habitats of rare endemic and relict plant species were destroyed in reforestation attempts to "shift up" the upper limit of vegetation. Recent years have seen the development of scientific theories that elaborate systems of afforestation and amelioration taking into account habitat conditions. Unfortunately, none of them have come to life in practice, which is still aimed at increasing the volume of work and improving the technology. Moreover, most theories are based on the selection of species, or even intraspecific taxa and provenances, according to individual habitat factors (altitude, aspect, parent rock, heat factor, etc.). None of them takes into account the entire complex - ecosystem or ecological unit, which is defined not only by its edifying species, but also by natural vegetation and soil.

Grdelička klisura was an example of successful protection of soil against erosion. The first erosion and torrent control works in Serbia began in the late 19<sup>th</sup> century, in the area of Grdelička klisura. The area had been almost fully restored by the end of the seventies of the 20<sup>th</sup> century. By the early nineties, biological and biotechnical works had been conducted to rehabilitate over 1,200,000 ha of barrens, gullies and degraded land. Technical works performed in the torrential beds included several thousand of different objects (sediment storage dams, retaining walls, torrential riverbed regulations, inlet structures, etc.).

## 2. STRATEGY CONCEPT AND OBJECTIVES

The objectives of The Afforestation Strategy of Serbia are the following: provision of professional and scientific basis for the establishment of 1,000,000 hectares of new forest plantations; environmental quality improvement; protection and rational utilisation of forests and other natural resources; erosion control and water security; reduction in the emissions of harmful gases; protection of the species and ecosystem components of biodiversity; biodiversity protection and preservation, etc. The Afforestation strategy is harmonized with the relevant international agreements and conventions, applicable laws, regulations and policies that are implemented in the EU (*Acquis communautaire*) in the field of environmental protection. It also complies with the laws and regulations of the Republic of Serbia. Specific objectives of the Afforestation Strategy are the following: Development of the operational planning systems – production of seedlings from source-identified seed (of recognised provenances) adapted the conditions of the selected habitat, with the choice of the best method of planting stock production and afforestation technology; Encouraging establishment of new forest plantations and enhancing the state of existing forests by applying the latest silvicultural measures aimed at conversion and reconstruction of coppice forests and anthropogenic scrubs into high forests; Minimising the conflicts between forestry and other land users.

Forest management planning should be aimed at preservation, protection and improvement of biodiversity at the level of ecosystems, species, genes, as well as at the habitat level. The maps and inventories of forest resources must include ecologically important habitats (protected, rare or sensitive forest ecosystems). Natural regeneration must be a priority. In afforestation, the priority is given to autochthonous species of the most appropriate provenances. Tending and felling should be conducted in accordance with environmentally-friendly management principles, which do not disturb ecosystem

functioning. Infrastructure construction must not cause damage to ecosystems (rare and sensitive, in particular) and genetic resources or threaten the habitats and migration routes of endangered and other important species.

In order to overcome the deficiencies of the current global climate forecasts, regional climate models and impact models are used. The results of these models are integrated into activities enabling timely adaptation to climate change and its mitigation (if possible) [1].

### **3. ENVIRONMENTAL CHARACTERISTICS OF POTENTIAL AFFORESTATION HABITATS**

The Strategy is based on a detailed study of habitat environmental characteristics (parent rock, soil, climate, habitat type, erosion condition, etc.), whose understanding is the key to successful afforestation. Special attention is paid to the following: sensitivity of forest ecosystems to climate change; impact of climate change on biodiversity; sensitivity of species to climate change; importance of global climate change and possible creation of new species and subspecies adapted to the modified climate conditions; occurrence of weed and invasive species, insects, plant diseases, etc.

The expected effects of climate change on forest ecosystems, forest communities and tree, shrub and ground vegetation species are the following:

- some forests will change their latitude boundaries and shift up altitude limits;
- some forests will probably 'lose the battle' or 'give up the race' and eventually disappear;
- some forests will change their composition (some species will disappear and others will emerge) with the changes in their multi-storey structure and social position;
- some species will change their shade-tolerance;
- forest communities will be more exposed to various adverse effects that are directly or indirectly caused by climate change.

The above-mentioned effects, considered cumulatively, will directly affect reservation of biological diversity as well as the feasibility and intensity of sustainable forest management. The total number of forest habitats in Serbia is 210. According to the climate model [2], a 1°C temperature increase would reduce the number of habitats to 198, while a 2°C temperature increase would bring the number of habitats down to 192. A 3°C temperature increase would reduce the number of habitats to 159, while a 4°C temperature increase would bring the number of habitats down to 131. A 5°C temperature increase would reduce the number of habitats to 116, or by 44.8%.

#### **3.1. BIODIVERSITY**

The Strategy stipulates that afforestation, in any of its segments, must not endanger ecosystem, species and genetic diversity. Potential afforestation areas must not endanger species and their survival or cause destruction or fragmentation of their natural habitats. Measures and activities aimed at biodiversity protection at species and ecosystem level (national and global interest) include the following: biodiversity monitoring and valorisation of the state in diversity centres; detection of endemic, relict, rare and endangered species and species of international importance, aiming at their more effective protection; study of natural populations, particularly from the aspect of conservation biology; proposal for appropriate

measures of protection aiming at preservation of biodiversity in diversity hotspots, where natural diversity is endangered (*in situ* and *ex situ* conservation).

### 3.2. SELECTION OF SPECIES FOR AFFORESTATION

Only autochthonous tree and shrub species should be used in afforestation and establishment of non-forest greenery. Allochthonous broadleaved and coniferous species may be used solely for the establishment of intensive plantations. It is necessary to prevent the spread i.e. to take measures for the suppression of invasive tree and shrub species which disturb natural forest and other ecosystems (*Acer negundo*, *Ailanthus glandulosa*, *Amorpha fruticosa*, *Celtis occidentalis* etc.). Furthermore, allergenic tree species should not be planted in the vicinity of residential areas. The use of cultivars and clones should be prevented in natural and partially-modified natural habitats. In the selection of afforestation tree species, a broad range of species has been made for each habitat. Principal, accessory and shrubby tree species have been defined – edifying species of potential communities on a given area. Forest fruit tree planting also contributes to the revitalisation of forest ecosystems. Serbia has 122 fruit species, classified into 23 families and 38 genera in its natural, primarily forest ecosystems. The territory of Serbia is assumed to be a PRIMARY GENE CENTRE of most fruit tree species grown today, which is indicated by their large presence in natural, mostly forest ecosystems.

The Strategy takes a habitat as the basic unit of afforestation together with all the changes that will occur in future as a result of the changes in climate factors. Its aim is to eliminate the causes of destruction and extinction of certain species and their habitats:

- destruction of entire natural habitats which are then replaced by secondary or artificial habitats, unfavourable for the survival of native species of primary ecosystems;
- fragmentation of natural ecosystems;
- partial disturbances that change the structure and functions of an ecosystem;
- excessive exploitation of species;
- direct or indirect pollution of water, air, and soil;
- introduction of allochthonous plant and animal species, which changes the composition of autochthonous fauna, flora and ecosystems.

### 3.3. SEED SOURCES AND PRODUCTION OF SEEDLINGS FOR AFFORESTATION

According to data from the Register of Seed Sources (Ministry of Agriculture and Environmental Protection, The Republic of Serbia), there are 310 seed sources in Serbia, occupying the area of 2,954 ha, which accounts for 0.095% of the total forest area. There are 95 registered conifer seed stands. The largest number of seed stands belongs to Norway spruce (*Picea abies*) - 24, followed by fir (*Abies alba*) - 23, Austrian pine (*Pinus nigra*) - 12, Scots pine (*Pinus silvestris*) – 11 and Serbian spruce (*Picea omorika*) - 6. Among broadleaves, the most numerous are the seed stands of species appreciated for high wood mass yield (pedunculate oak, sessile oak, beech etc.); there is also a significant number of allochthonous species whose seedlings are used for afforestation (Douglas-fir, eastern white pine, cedar) or for the production of ornamental planting stock (cypress, thuja, sequoia, etc).



The structure of the species represented in the seed stands doesn't correspond to habitat changes caused by climate change; therefore, it is necessary to: Determine the adaptability of species and genotypes in given climate conditions, the limits of their mobility, and the development of climate-based seed characteristics in the zones that will change over time [3], [4]; Provenances should be tested on the boundaries of their ecological range of distribution, with a proper understanding of relevant physiological processes [5]; Grow specific genotypes with higher resistance to pests and a greater tolerance to climate extremes [6-7]; Grow forest fruit trees. Certain forest fruit species will disappear from forest ecosystems due to changes in climate conditions. As they represent the basis for normal ecosystem functioning, genotypes that are resistant to changes should be found [8].

The Register of Forest Fruit Seed Sources accounts for only a small part of the entire resource of autochthonous Serbian dendroflora. The Strategy envisages amending the Register by adding populations of autochthonous tree and shrub species with low value in use, as they also contribute to the stability and biodiversity of forest communities and ecosystems. Therefore, these species should be used intensively in the reconstruction of potential vegetation. The Strategy does not rely only on the resources of state-owned forests, as in some parts of Serbia resources of privately-owned forests are more diverse and abundant in terms of flora.

Nursery production in Serbia is characterised by fragmentation of production areas, weak links between producers of planting stock and potential users, frequent lack of morphological and physiological characteristics of seedlings necessary for specific habitats and a small share of broadleaved species. Production of tree and shrub planting stock based on the use of seed of recognised provenances and cultivars considerably improves afforestation success, adaptability and productivity of forest plantations.

### 3.4. AFFORESTATION TECHNOLOGY IMPROVEMENT

If we want to halt degradation and reduce degraded land surface area, we must apply afforestation technology that guarantees success with low investment. However, such terrains have highly variable orographic and pedological characteristics that differ even at short distances. Therefore, seedling properties, planting techniques, planting schemes and the number of plants per unit of surface area must be planned for each individual locality.

The most important criteria in the selection of seedling production technology are the following: seed genetic quality, nursery conditions and the type of habitats for afforestation. The study of environmental characteristics of barrens that are planned for afforestation represents the basis for the selection of the most suitable seed source, adequate seedling production technology, terrain preparation for planting, planting scheme preparation, planting, and selection of tending and protection measures that suit the established plantations.

In afforestation, particularly of eroded terrains, radical changes of potential ecosystems and their main edifying species should not be made. Natural progressive succession should be encouraged as much as possible. It can be achieved by introducing suitable, primarily broadleaved species.

## 4. ACTION PLAN

### 4.1. POTENTIAL AFFORESTATION AREAS

The Strategy uses the suitability classification based on the following structure of land suitability (FAO 1976): Suitability orders reflect kinds of suitability; Suitability classes reflect degrees of suitability within orders; Suitability subclasses reflect kinds of limitation and suitability units reflect minor differences within subclasses.

For decision-making on optimum land use, the following data are necessary: Agriculture: soil quality classes I-V, surface area use (cultures); Landscapes: national beauty landscapes, landscapes of regional significance; Nature protection: nature reserves, natural monuments, memorial natural monuments, surrounding area of immovable cultural monuments, forest parks, natural history collections; Recreational activity/tourism: tourist routes, viewpoints; Drainage basins: river basins, spring areas, major rivers and courses, reservoirs and reservoir areas, canals; Infrastructure: urban areas, roads; Forestry: existing forests (by form, type, mixture and function); Socio-economic information: population trends; Administrative areas: municipalities, cadastral municipalities, forest management areas, management units.

### 4.2. PRINCIPLES OF AFFORESTATION AREA SELECTION

The Action Plan designates municipalities in which the process of afforestation must be initiated. They are: Novi Pazar, Sjenica, Tutin, Raška, Vranje, Bujanovac, Preševo, Trgovište, Bosilegrad, Surdulica, Vladičin Han and Belgrade.

Table 1. Potential afforestation areas and their dynamics [9]

Municipality	Year										Total (ha)
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
Novi Pazar	100	100	200	200	200	200	200	200	200	200	1800
Sjenica	500	700	700	800	800	1000	1000	1000	1000	1000	8500
Tutin	100	100	200	200	200	200	200	200	200	200	1800
Raška	100	100	200	200	200	200	200	200	200	200	1800
Surdulica	300	300	300	350	350	400	400	400	400	400	3600
Vladičin Han	20	30	30	30	50	50	50	50	50	50	410
Vranje	50	50	50	50	50	50	50	50	50	50	500
Bujanovac	50	50	100	100	150	150	150	150	150	150	1200
Preševo	50	50	50	50	50	50	50	50	50	50	500
Trgovište	100	100	100	100	100	150	150	150	150	150	1250
Bosilegrad	200	200	200	250	250	300	300	300	300	300	2600
Belgrade	200	300	400	400	500	500	500	500	500	500	4300
TOTAL	1770	2080	2530	2730	2900	3250	3250	3250	3250	3250	28620

A detailed terrain analysis was performed in order to select the most suitable areas for afforestation. Particular attention was paid to non-productive pastures, areas of low-fertility

soil unsuitable for agriculture and erosion-affected areas (soil fertility classes V, VI and VII). Non-productive rocky grounds were not taken into consideration, as their revitalization would require large investments with entirely uncertain outcomes [9]. In order to preserve biodiversity of natural habitats, we didn't include all the areas of the above-mentioned soil categories. Some were left to natural succession of vegetation. The Strategy envisages afforestation of 28,620 ha over the 2015-2024 period (Table 1).

## 5. EROSION AND TORRENTIAL FLOODS IN SERBIA

The areas affected by medium, slight and very slight erosion must be considered as areas of potential danger since their erosion processes can easily be intensified. Generally, the occurrence and the intensity of erosion in Serbia increase from the north to the south and from the west to the east, reaching its peak in eastern and southeastern Serbia. Over the 1950-2014 period, torrential floods took over 80 lives and caused losses of several billion Euros. The frequency of torrential flooding, its intensity and distribution pose a constant threat which can have consequences in ecological, economic and social spheres [10]. In July 1999, torrential floods in the basins of the main tributaries of the Great Morava took 8 lives and damaged tens of thousands of residential buildings and a few hundred commercial properties. The greatest damage was done in Smederevska Palanka, Velika Plana, Jagodina, Batočina, Kragujevac, Arandelovac, Rekovac, Kruševac, Kraljevo, Mladenovac etc. The watercourses in the Lepenica basin caused soil erosion and polluted the water sources. In the period from April 10<sup>th</sup> to April 17<sup>th</sup> 2006, the Danube water levels through Serbia exceeded historical maximums. The river Sava also exceeded the 1981 maximum reaching 738 cm. The floods affected a total of 213 settlements and about 1,000 people were evacuated. In the area of Belgrade, the Danube flooded Zemun, New Belgrade and the river Sava flooded the areas of the quay in New Belgrade, Sajam, Nebojša tower at Kalemegdan, Čukarica and Ostružnica. It further caused the occurrence of landslides. A total of 3069 landslides were registered in Serbia and they directly threatened 966 settlements. They mostly occurred in the basins of the Morava and Kolubara rivers, and partly in the river basins of the Sava tributaries in Mačva district. Landslides damaged 2,300 housing units, 639 roads and 17 bridges in central Serbia. On May 15<sup>th</sup> 2010, Trgovište was hit by devastating torrential flooding of the river Pčinja. Two people were killed... A series of floods and torrents of catastrophic proportions hit the country in 2014. In the period from May 14<sup>th</sup> to May 17<sup>th</sup>, the territory of the Republic of Serbia received great amounts of rainfall, which first caused torrential floods of all tributaries of the Drina and Kolubara Rivers, and then of the Great Morava, Mlava and Pek. Obrenovac had the most devastating floods. In September 2014, floods in eastern Serbia destroyed Tekija, Podvrška, Velika Kamenica, Grabovica, Rečica, Bor and Majdanpek [11].

"The devastating effects of torrential floods of May 2014 could have been substantially lower if preventive measure had been taken in the last twenty years. This refers to the concept of integrated management of torrential basins, which includes the design and construction of the following measures: technical (dams, thresholds, regulations, micro-reservoirs, retention basins, embankments), biotechnical (rehabilitation of gullies, slope protection), biological (afforestation, amelioration of degraded forests, meadows and pastures, orchard establishment on terraces) and administrative (management rules, land use and its protection in affected catchments). Furthermore, the existing systems of protection against torrents and erosion (riverbed cleaning of sediment, vegetation and debris, repairs of damaged

structures) were not maintained, which significantly reduced their effectiveness "[10].

#### 5.1. AN EXAMPLE OF SUCCESSFUL TORRENTIAL FLOOD RISK MANAGEMENT – GRDELIČKA KLISURA AND VRANJSKA KOTLINA

The mid-20<sup>th</sup> century was the period in which the area of Grdelička klisura and Vranjska kotlina had the lowest percentage of forest cover in its history. If we take into account that other forests were also highly degraded, this was clearly the period of the highest deforestation and degradation of forest ecosystems. After World War II, especially in the period of agrarian reform from 1950 to 1960, the ecological balance was disturbed again, resulting in new intensifying erosion processes. Since the sixties, there has been an increase in forest cover caused by a number of factors: the fight against erosion, reforestation, planned forest management, forest tending, protection, migration from mountainous areas etc [12].

Table 2. Structure of land use before performing ECW [13]

Grdelička klisura and Vranjska kotlina	Area (ha)	Share (%)
Forests	53864.83	31.1
Arable land	51419.21	29.7
Pastures	38474.88	22.2
Meadows	12131.11	7.0
Fruit orchards	1777.82	1.0
Vineyards	2231.92	1.3
Rocky ground, gullies	13360.84	7.7
Total	173260.61	100.0

Biological and biotechnical works conducted in Grdelička klisura in the period from 1947 to 1977 covered 2251.7 ha (1041.2 ha were forested, 1210.5 ha were covered by grass).

Table 3. Structure of land use in 2012 [13]

Grdelička klisura and Vranjska kotlina	Grdelička klisura		Vranjska kotlina	
	Surface area ha	Share %	Surface area ha	Share %
<b>Productive areas</b>				
Forests	23526.18	99.43	58456.61	96.41
Degraded forests	134.36	0.57	2177.52	3.59
Forests	23660.5	54.97	60634.13	46.56
Meadows and pastures	10772.61	100.00	23828.97	85.75
Degraded pastures	-	-	1358.08	4.89
Alpine meadows and pastures	-	-	2601.88	9.36
Meadows and pastures	10772.6	25.03	27788.93	21.34
Arable land	2727.59	6.34	28069.24	21.55
Vineyards	68.26	0.16	1121.67	0.86
Fruit orchards	127.75	0.30	2001.01	1.54
House yards and gardens	1296.97	3.01	5669.73	4.35
Total	4220.57	89.80	125284.71	96.20
<b>Non-productive areas</b>				
Settlements (construction zone)	698.37	1.62	3052.93	2.34
Gullies	-	-	52.99	0.04
Rocky ground	23.79	0.06	208.31	0.17
Gravel	81.96	0.19	45.68	0.04
Road networks and waterways	3586.16	8.33	1572.00	1.21
Total	4390.28	10.20	4931.91	3.80
Total	43044.00	100.00	130216.62	100.00

In the same period, Vranjska kotlina had 4409.7 ha forested and 3258.3 ha covered by grass [13]. The works were carried out in the areas which were under excessive and severe erosion, especially on the slopes of the upper and middle parts of the torrential catchments. The data on land use for 2012, obtained from the map of land use made by dividing the area into homogeneous plots (7100 plots were determined), showed that 54.97% of Grdelička klisura was forested [14]. Vranjska kotlina had slightly lower percentage of forested area that amounted to 46.56% (Table 3). Therefore, the Strategy envisaged greater intensity of afforestation in the area of Surdulica, Vranje and Bujanovac (Table 1).

Table 4. Intensity of erosion in 1953 and 2012 [12]

Category of destructiveness	The intensity of erosion processes	Mean value of The coefficient of erosion $Z_{sr}$	Share in the total area			
			1953		2012	
			(km <sup>2</sup> )	%	(km <sup>2</sup> )	%
I	Excessive	1.25	492.63	28.44	2.34	0.14
II	Severe	0.85	544.93	31.45	13.08	0.75
III	Moderate	0.55	441.99	25.51	129.26	7.46
IV	Slight	0.30	32.47	1.87	783.25	45.21
V	Very slight	0.10	220.58	12.73	715.60	41.30
Total			1732,60	100.00	1643.51	94.86
The value of the coefficient of erosion			$Z_{sr} = 0,78$		$Z_{sr} = 0.24$	

The data on the erosion before the mass erosion control works were conducted in the area of Grdelička klisura and Vranjska kotlina are shown in Table 4. Excessive erosion affected 28.44% of the total surface area. There were numerous gullies and landslides, and in some places layers of soil were stripped away exposing the parent rock. Processes of severe erosion (with gullies of up to 50 cm deep and a lot of fine and coarse skeletal material on the surface, landslides on deforested areas) affected 544.93 km<sup>2</sup> (31.45%).

The map of erosion [13] provides data on spatial distribution and intensity of erosion processes (Table 4). Severe erosion affected 0.75% of the total surface area. It affected Grdelička klisura between the villages of Dankovci and Repište, near the villages of Garinje and Kalimance. It was also recorded in Vranjska kotlina around the villages of Klašnjice, Sobina, Balinovac, north of Vranje, Soderce, Bunuševca, Milivojce, Beli Breg, Dubnica, from the village of Gornji Vrtoško and Lopardince to Veliki Trnovac. Excessive erosion processes affected smaller areas of Vranjska kotlina.

The mean coefficient of erosion was  $Z_{\text{mean}} = 0.78$  (severe erosion) in 1953, and it was  $Z_{\text{mean}} = 0.24$  (slight erosion) in 2012. Excessive erosion processes in 1953 affected 28.44% of the area, and only 0.14% in 2012. Erosion processes of moderate intensity affected 25.51% in 1953, and this percentage decreased to 7.46% in 2012. These results prove that the effects of the conducted erosion control works contributed to the reduction in the intensity of erosion and suggest that the works should be continued.

According to data of the Republic Bureau of Statistics from 2013, the most intense erosion in Serbia is right at the periphery of Vranjska kotlina, in the valley of the river Pčinja, in Grdelička klisura, in the Vlasina basin and in the valley of the river Lim, in the upper stream of Ibar and in the hilly area of Šumadija.

Despite these facts and findings, key documents that would make the basis for prevention have not been developed. These documents include: the National Strategy for soil erosion control and protection against torrential flooding; Maps of erosion in Serbia; Register of torrential flows in Serbia; Register of conducted works; Maps of flood zones, etc. Such documents were last made in the seventies, so they cannot be considered relevant today.

## 6. CONCLUSIONS

Apart from providing the principles necessary for the identification of the areas for afforestation and contributing to the preservation of habitats and biodiversity, the expert system developed within the framework of the Strategy enables timely preparation for afforestation and initiation of operational works - the production of seedlings of recognized provenances that suit habitats and their characteristics, along with the selection of the optimal method of seedling production and afforestation technologies. Application of GIS will provide new information obtained by combining databases at different levels. Spatial models will be used to predict direct and indirect consequences before making a final decision on the land use.

The adoption of the aforementioned principles of afforestation area designation, the use of appropriate techniques and technologies of biological and biotechnical works in catchments and the proper selection of species will contribute to the continuation of the `battle` against erosion, torrential flows, landslides, mudslides and ecological disasters.

Application of a new strategy, based on the ecosystem preservation and sustainable development, will contribute not only to the greater success of the established cultures and

plantations, but also to the improvement of other forest functions. The implementation of the Afforestation Strategy of Serbia is expected to significantly reduce the risk of torrential floods in the affected areas.

## REFERENCES

1. National Afforestation Strategy of the Republic of Serbia (2014-2018), Institute of forestry, Belgrade, 2013, (in Serbian: Nacionalna strategija pošumljavanja u R.Srbiji)
2. Ratknić, M., Rakonjac, Lj., Veselinovic, M., The climate change and forest ecosystems, International Scientific Conference `Forest ecosystems and climate change` – Plenary lectures, March 9-10<sup>th</sup>, Belgrade, Serbia, 2010, 91-115.
3. Parker, W.C., Colombo, S.J., Cherry, M.L., Flannigan, M.D., Greifenhagen, S., McAlpine, R.S., Papadopol, C.S., Scarr, T., Third millennium forestry: what climate change might mean to forests and forest management in Ontario. *Forestry Chronicle* 76, 2000, 445–463.
4. Ratknić, M., Šmit, S., Demarcation of agricultural and forest land and optimum use of areas in forestry - the example of the Pešter plateau, Monograph, PE Srbijašume-Institute of Forestry, Belgrade, 1999, 1-124.
5. Tyree, M.T., Hydraulic limits on tree performance: transpiration, carbon gain, and growth of trees. *Trees* 17, 2003, 95–100.
6. Wang, Z.M., Lechowicz, M.J., Potvin, C., Responses of black spruce seedlings to simulated present versus future seedbed environments. *Canadian Journal of Forest Research* 25, 1995, 545–554.
7. Namkoong, G., Strategies for gene conservation. In *Plant gene resources: a conservation imperative*, Yeatman, C.W., Kafton, D. (editors). American Association for the Advancement of Science, Selected Symposium 87, Boulder, 1984, 79–89.
8. Ratknić, M., Sustainable use of forest fruits of the forest ecosystems of Serbia, Directorate of Forests, Belgrade, 2005 (in Serbian Održivo korišćenje šumskih voćkarica u šumskim ekosistemima Srbije)
9. Ratknić, M., Rakonjac, Lj., Braunovic, S., Miletic, Z., Ratknić, T., The Republic of Serbia's afforestation strategy with an action plan. International Scientific Conference `Reforestation challenges 2015`, 3-6 June, Belgrade, Serbia, 2015, 13-22.
10. Ristić, R., Serbia and torrential floods in May 2014. *The magazine forests* 5, (2014) (in serbian: Srbija i bujične poplave maja 2014. Revija šume)
11. Stefanović, M., Gavrilović, Z., Bajčetić, R., Local communities and the problem of torrential floods. OSCE, Mission to Serbia, Belgrade, 2014 (in Serbian: Lokalna zajednica i problematika bujičnih poplava).

12. Kostadinov, S., Effect of vegetation cover on the distribution and intensity of water erosion in the watershed. International Symposium INTERPRAEVENT, Garmisch-Partenkirchen, Germany, 1996, 225-234
13. Braunović S., Effects of erosion control works on the state of erosion In Grdelička klisura and Vranjska kotlina. Doctoral dissertation. University of Belgrade, Faculty of Forestry, Belgrade, Serbia, 2013, (in Serbian: Efekti protiverozionih radova na stanje erozije u Grdeličkoj klisuri i Vranjskoj kotlini, doktorska disertacija)
14. Braunović, S., Ratknić, M., The Change of Land Use - Impact on the Distribution And Intensity of Water Erosion in the Watershed. Conference on water observation and information system for decision Support BALWOIS 2012, Ohrid, Macedonia



## **METHODOLOGY FOR EVALUATION AND ANALYSIS OF THE COMPETITIVENESS OF SMALL AND MEDIUM –SIZED ENTERPRISES**

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**Abstract:** The multifaceted character of the business competitiveness concept has sparked off intense scientific debates over selecting the most appropriate markers (indices) and evaluation indicators, the best ways of their quantitative representation, summarizing and logical interpretation, which, in turn, assures the provision of a sound basis for a wide range of possibilities to enhance SME competitiveness. The paper probes into and gives an in-depth analysis of current methodologies for measuring enterprise competitiveness, as well as determining the factors for its enhancement. However, the lack of a methodology for evaluating the role of the support program for competitiveness enhancement poses some difficulties in determining the approach to its impact assessment and evaluation. Accordingly, the primary purpose of the present paper isto advance a methodology for evaluation and analysis of the impact of the support program on SME competitiveness.

**Keywords:** support program, competitiveness, small and medium-sized enterprises, methodology, evaluation, analysis.

### **1. INTRODUCTION**

The scientific publications on enterprise competitiveness provide different attitudes as to the very essence of this concept and consequently, there is still no precise or universally accepted definition for it. This leads to significant discrepancies of opinion as regards the methods for its assessment and factors for its enhancement.

The models for theoretical analysis of competitiveness offer managers the possibility for systematic studies into the effects of the competitive environment which may serve as a basis for further development of effective plans and programs for achieving competitive advantage. Some of the more popular models for competitiveness analysis are: Michael Porter's model for analyzing the structure and intensity of the competitive environment in a given sector of economy, the model of the key business success factors, the value-chain model (value chain). All of the models listed above are generally accepted in the literature and are looked upon with little or no considerable disparities by different authors.

### **2.OVERVIEW OF THE METHODS FOR ANALYSIS AND ASSESSMENT OF SME COMPETITIVENESS**

*Michael Porter's model* for analyzing the structure and intensity of the competitive environment in a given sector of the economy serves as a reference point for conducting some

diagnostic checks of the state of competitiveness in the given industry and for identifying the company's particular strengths and weaknesses, as well as the facilitative or conducive factors and threats of the environment. The 5 groups of factors (or forces) distinctly specified by Porter (new entrants (companies) in the industry, the force of rivalry among the existing competitors, the force of buyer bargaining power, the force of supplier power, the threat of substitute products) affect the level of competitive intensity and strength of competition [1, 2, 3].

*Model of key business success factors* – is built upon the basis of the key factor hierarchy for gaining competitive advantage. At the core of the model is the assumption that the objective of every enterprise is the maintenance and improvement of its market position, which is manifested in the market share indicator. The market share can be represented as a function of the following factors - quality, price of products, distribution, production capacity [2, 3].

The model can be represented by the so-called hierarchy of the factors of the company's competitiveness:

- ✓ *First level* - priority has been given to the factors related to capacity for development (quality and price of products), manufacturing and commercial power;
- ✓ *Second level* – competitiveness is determined by the company's diversification strategy to develop a new product or expand into a new market making use of cutting-edge technology;
- ✓ *Third level* – competitiveness is dependent upon the ability of senior management to make such decisions that can implement in practice the factors specified at the first level;
- ✓ *Fourth level* – competitiveness is contingent upon the functioning of the company over the period that has elapsed and upon the accumulated positional advantages and potential for competitiveness. In this respect, the higher the profit, the greater the level of competitiveness and vice versa.

Another model is *the value-chain model (value chain)*. The main thesis in the construction of this model is that enterprises perform a wide range of business activities which are valued at the customers' payments upon the purchase of goods and services. These activities can be grouped under nine main headings [1, 3, 4, 5].

The first five groups of activities are primary (basic): inbound logistics, manufacturing operations, distribution and movement of goods, marketing and sales, customer service.

The second group of activities is referred to as supportive (sustaining): company infrastructure, human resources management, technical development (innovation activity), supply (procurement).

This is the model that enables the enterprise to decide upon the activities that should be discontinued or strengthened in order to enhance its business competitiveness. All activities that add value would be beneficial to the enterprise. The principal assessment

criterion is the required amount of all the necessary costs or expenditures. If the change results in lower operating costs, economy (restrained use) of investments in long-term (fixed) assets, etc., the rationalization of activities, then, will lead to an increase in the company's competitiveness.

*Assessing competitiveness using key competitive variables [3].*

This methodology was developed by *M. Porter* for a company situation analysis of the internal environment and is part of his theory of competition. According to the methodology the level of competitiveness is determined through ascertaining the relative competitive forces of the company as to its key competitors. Pursuant to this methodology the act of assessing the company's competitiveness is carried out on the basis of 7 key competitive variables, for which assessments are made on a five-point scale (1-very poor; 5-extremely strong). The analysis is conducted in the following sequence: analyzed are the strategic performance indicators across the period under study; provided is an assessment of the relative competitive forces as to the key competitors; established is the company's competitive position against its key competitors, with the total rated force being calculated as an arithmetic or arithmetic weighted average of all the assessments for the separate key competitive factors; identified are the major strategic issues facing the company and set are the priorities upon which the company will focus in the future.

The method under study, being relatively easy to use, is well applied in practice and serves as a basis for developing other tools for assessing business competitiveness. A readily identified disadvantage, though, that needs to be pointed out is the predominant use of qualitative data which is likely to reduce the objectivity of the given assessments. It can also be assumed that the seven-point scale under consideration has insufficient number of criteria (factors) and provide partial assessment of competitiveness in today's highly dynamic business environment.

*Assessing competitiveness through a system of factors and resultative benchmarks [2]*

This tool for measuring and assessing competitiveness comprises 10 factors and resultative indicators, characterising, on the one hand, the level of the company's competitive potential (kinetic competitive advantages), while on the other hand – the level of performance indicators (position advantages). Indicators for measuring and assessing company's competitiveness are grouped under two headings:

- 1) factors of competitiveness – are entirely conditioned upon the assessment of the degree of the organizational management maturity;
- 2) the end results of the activities of the organization - convey the extent of its efficient and effective operation (functioning).

Every group of factors and results contains a separate system of indicators and benchmarks to construct a broad outline of its contents. Each benchmark of a given group is to be assessed with marks from 1 to 5 (1-very poor; 5-very good). Based on assessments of individual indicators and benchmarks obtained is the average score (mark) for the separate groups of factors or results as an arithmetical average value. Weights are given for each group of factors or results in order to calculate the total (summative) arithmetic weighted average assessment to represent the level of business competitiveness. It should again be pointed out that the most serious disadvantage is associated with the predominant use of qualitative data,

and the related evaluation under the scale from 1 to 5 cannot always provide a sufficiently precise assessment to account for the individual shades of meaning as regards the benchmark being assessed [5].

*Assessing competitive force based on Rubin's system of indicators*

The assessment of competitiveness is performed on the basis of 37 benchmarks and some of them are: quality of research being undertaken, opportunities for innovation in the production process, opportunities for a new product development, the level of absorption of existing technology, low cost of production, product quality, higher capacity utilization rates, advantageous and attractive location, access to qualified and skilled manpower, higher labour productivity, extensive network of distributors, existing patents, access to financial markets, level of the information system and others. The above-mentioned indicators serve as a basis for providing an assessment of the level of management as a whole and of the individual functional areas, through the use of accepted rating scale for assessing the level of each indicator. The rating scale is from 1 to 5, where 1 stands for very poor and 5- extremely strong.

*Models for assessing the effect of EU funds absorption upon the economy of the EU member countries and candidate countries for EU membership [2,3].*

Over the last few decades the ongoing European policies and the coordination of structural instruments in the EU member countries and candidate countries for EU membership are assessed through macroeconomic modelling of their net effects. Assessing the impact of the different economic policies is one of the greatest challenges in the empirical economic research. Starting point in these analyses is the theoretical framework which builds up the empirical model. The most challenging aspect, then, is to construct, on the basis of the achievements in the formal and precise macroeconomic modelling, an adaptive framework best suited to the economy under study and which could also be tested empirically.

The econometric models relate to a set of tools designed to recreate and simulate the basic mechanisms of a given regional, national or international economic system. Most models for impact assessment tend to be referred to as econometric, and yet in practice, due to frequently encountered restraints in the data, the methods for evaluating their coefficients involve not only econometric procedures, but also other methods such as expert evaluation and assumptions based on the economic theory and values of these coefficients in corresponding economies (calibration).

Econometric models have an ever increasing role in assessing the impact, although very few of them are actually specifically designed to assess a concrete program. In most cases, the experts try to adapt a suitable model that has been developed for another case, since the construction of a completely new model and its proper assessment is believed to be excessively time and resource consuming. Adaptation of such models is done for the purpose of carrying out simulations which are to provide a quantitative assessment of the net effects of certain policies and programs upon selected macroeconomic variables.

Part of the regression models are based on the theory of economic growth and convergence. In such cases their purpose is to examine the influence the structural funds have in reducing regional disparities and promoting economic growth in the member countries. These approaches are often favoured because of their more simplified form and the possibility for more easy and rapid assessment of the direct relationship between the macroeconomic indicators and European funds. An alternative approach to the regression models is the

combination between the econometric assessment and calibration with the purpose of simulating a separate part or an entire economy. These models are based on various macroeconomic theories about the functioning of the economy and may also involve tracking the effects of the Structural Funds, the Cohesion Fund, and others. The basic models currently employed for corresponding impact assessment are HERMIN, QUEST and QUEST II, E3ME, REMI and ECOMOD. Such a modified model is the model LATFUN for the Latvian and Czech economy. In addition to the member countries, the approach under discussion has been applied to the Turkish economy as well.

The aforementioned models for assessing the impact of the of EU funds absorption upon the economy recognize their impact upon the macroeconomic benchmarks (interest rates, GDP, index of consumer prices, employment benchmarks, the consumers' total costs or expenditures, balance of payment, exchange rates) but they fail to consider the level of the enterprise and the effect of the acquired funds (resources) for enhancing its competitiveness.

The choice of indicators and benchmarks for assessing SME competitiveness is of paramount importance for giving careful consideration of the impact of the support program and making sound management decisions as regards better targeting of investments to ensure higher business competitiveness. Failure to examine the impact of the support program upon the individual indicators hinders the proper planning and allocation of the resources as to the key priorities and maximizing business results is thus rendered inconceivable. Consequently, it can be said that a uniform system of benchmarks for assessing SME competitiveness is not feasible. Determining concrete benchmarks that can be used as indicators for assessing SME competitiveness is related to the established socio-economic priorities. The majority of the studies centered upon the relationship between the support program and SME competitiveness, represent the relationship between these categories at the national level. In some of the sources the relationship between the insufficient financial resources and competitiveness at a company level is presumed to be "predetermined and undisputed" and is therefore rarely examined in detail. Models for assessing the effect of EU funds absorption upon the economy of the EU member countries and candidate countries for EU membership take account of their impact on the macroeconomic benchmarks but they fail to consider the level of enterprise as well as the effect of the acquired funds upon the enhancement of their competitiveness.

### **3. METHODOLOGY FOR ANALYSIS AND ASSESSMENT OF SME COMPETITIVENESS ACHIEVED THROUGH SUPPORT PROGRAM**

Given the subject of the report, proposed could be the following indicators for impact assessment of the support program as a key factor to enhance SME competitiveness:

- ✓ Product competitiveness;
- ✓ Innovativeness;
- ✓ Business Management;
- ✓ Financial results;
- ✓ Institutional support.

The main stages of the algorithm to determine the impact of the support program upon SME competitiveness are (fig. 1):

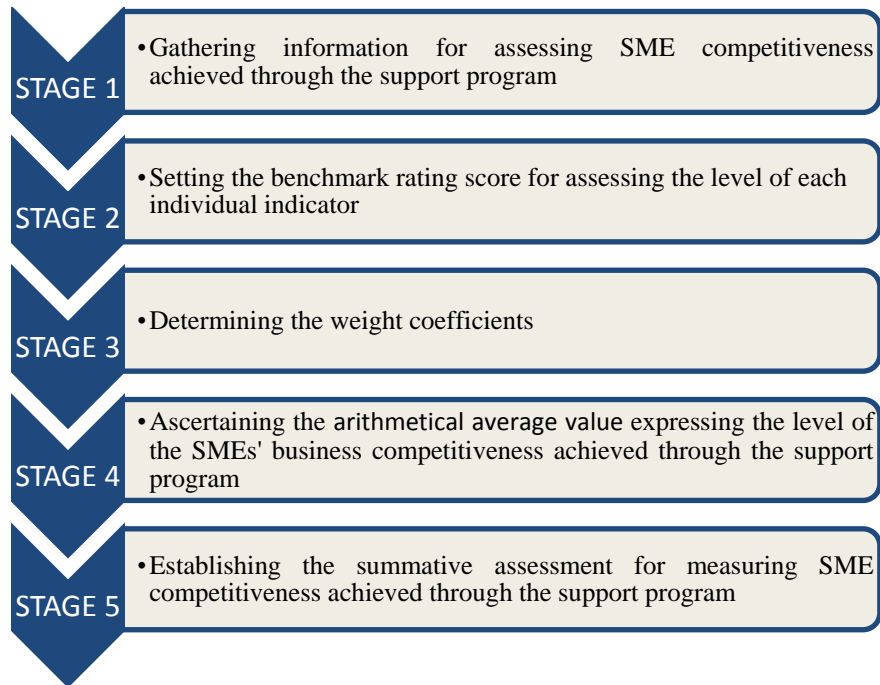


Figure 1.1. Basic stages of the algorithm for assessing the level of SME competitiveness achieved through the support program

**Stage 1: Gathering information for assessing SME competitiveness achieved through the support program**

*This stage* relates to the gathering of relevant information necessary for assessing SME competitiveness achieved through financial resources absorbed under various operational programs. The main sources of information are the accounting and statistics data of the enterprises and the National Statistical Institute and Information system for management and monitoring (ISMM) of EU funds. Carried out, for the purposes of the assessment, is an opinion survey among the managers (experts) of the enterprises. The measurement is done on the basis of self-assessment. The managers determine a rating score, in line with the level of the results obtained through the support program. The score for the particular enterprise the manager is responsible for as regards the respective benchmark is set in the range 1 to 5. The lowest score such as 1 shows a complete lack, whereas the highest 5-excellent level of the positive impact of the support program (very high level).

**Stage 2: Setting the benchmark values for assessing the level of each individual indicator**

*The second stage* refers to the “arrangement” of the benchmark values for assessing the level of each individual indicator characterizing the level of competitiveness achieved as a result of the absorbed financial funds. Assessments from 1 to 5, as a direct result of the conducted survey, are set against all the 5 benchmarks (competitiveness of manufactured

product, innovativeness, business management, financial results and institutional support) that constitute the impact assessment of the support program upon the SME competitiveness.

The proposed set of indicators and benchmarks for their quantitative assessment are **summarized** in the table below:

Table 1.1. Indicators and benchmarks for assessing the support program impact upon SME competitiveness

Indicators	Benchmarks
<b>1.Competitiveness of manufactured products</b>	-Market share; -Implemented quality standards for the manufactured products; -Access to raw materials; -Registered trademarks and patents; -Improvements in the technical and technological features of the manufactured products;
<b>2.Innovation activity</b>	- Introduced product innovations; -Implemented process innovations; -Technological innovations; - Organizational and managerial innovations; -Introduced innovations as a result of R&D; -Implementing best practices.
<b>3.Financial results</b>	-Increase in sales volume; -Increase in labor productivity; -Increase in gross profit and net turn over; -Decrease in manufacturing costs per unit; -Investments in long-term (fixed) assets;
<b>4.Quality of business management</b>	-Implementing business strategies (achieving cost advantages and/or economies of scale); -Workforce qualification; -Interaction between management and functional units of the enterprise; -Participation in clusters; -Management of the financial resources
<b>5.Institutional support</b>	-support from the state; -municipal support; -industry (branch) organization support; - EAPSME(Executive Agency for Promotion of Small and Medium-Sized Enterprises) support; -link between SME and higher education institutions (HEIs).

### Stage 3: Determining the weight coefficients

The *third stage* refers to determining the weight coefficients of all the indicators for the individual benchmarks for business competitiveness. They are determined on the basis of the assessments provided by the managers and the importance coefficient of every single indicator. Managers have been offered a number of variants for the *importance coefficient* as to the different benchmarks and indicators. Considered are the variants with the highest recurrent rates. The sum total of the assessments for the characteristics must be equal to 1,

i.e. the overall assessment is distributed among all the parameters. The final assessment (FA) of the separate indicators is determined by the formula:

$$(FA \text{ of } i - \text{the enterprise}) = \sum \text{of the assessments of the enterprises} \times Cim.i, \quad (1)$$

where:

FA- final assessment of the level of the enterprise competitiveness;

$\sum$  of the assessments of the enterprises–sum of the assessments set by the managers in line with the surveyed indicators in absolute amount;

Cim.- importance coefficient (weight) of the separate benchmarks in the overall assessment.

**Stage 4: Ascertaining the arithmetical average value expressing the level of the business competitiveness of SMEs through support program.**

The fourth stage is associated with ascertaining the arithmetical average value of the separate indicators. The arithmetical average value ( $\bar{X}$ ) is the benchmark for the average level most commonly used in research practices. It is calculated using the following formula:

$$\bar{X} = \frac{x_1 + x_2 + \dots + x_n}{N}, \quad (2)$$

where,

$x_1, x_2, x_n$  are the individual values of the indicators;

$N$  – number of the surveyed enterprises.

**Stage 5: Establishing the summative competitiveness assessment of SMEs through the support program.**

At the fifth stage the obtained arithmetical average values for the business competitiveness over the period under study are summarized by types of enterprises and are correlated to the proposed assessment scale for measuring their competitiveness. The assessment of the business competitiveness is done on the basis of proposed assessment scale:

Table 1.1. Assessment scale for establishing the level of SME competitiveness as a result of the support program

Assessment	Competitiveness
1,00	Lack
1,01 – 2,00	Low
2,01 - 3,00	Moderate
3,01 – 4,00	High
4,01 – 5,00	Very high



The proposed assessment scale is consistent with the characteristics of the EU support program targeted at member-countries and the candidate countries for EU membership and includes in its scope the intermediate values with the purpose of a more objective observation of the changes at the level of competitiveness as a result of the EU support program. SMEs have low level of competitiveness with the value rate in the range from 1, 01 to 2. At the value rates from 2, 01 to 3 it is assumed that the level of competitiveness is moderate whereas from 3, 01 to 4, high. For a very high level of competitiveness in SME accepted are the values from 4, 01 to 5.

#### 4. CONCLUSION

As a result of the conducted analysis of the criteria and benchmarks for assessing SME competitiveness the following **conclusions** can be drawn:

- ✓ In present theory and practice, however, generally recognized criteria for assessing SME competitiveness are yet to be established;
- ✓ Determining the specific benchmarks to be used as indicators for assessing SME competitiveness is closely linked to the identified socio-economic priorities;
- ✓ In a very limited number of cases, the indicators for determining the competitiveness are conditioned upon sector benchmarks, for which no forecasts are produced. In such cases, setting the target values is done on the basis of economic modelling (through statistical, econometric and other methods) and/or the provision of an expert assessment.
- ✓ The proposed basic methods for assessing business competitiveness, the scale or the rating scores, on the basis of which it is assessed, fail to consider the intermediate values. The final assessment is always an integer (whole) number, which does not give in itself an objective assessment for the advancement or the achieved level of business competitiveness.

#### REFERENCES

1. Velev M., Assessment and analysis of the company's competitiveness, Sofia, 2004
2. Nenov T., Minkov I., Management of competitiveness and growth, Varna: Science and Economics Publishing House, 2015
3. Porter M., Competitive advantage of nations, Sofia, 2004
4. Rubin Yu., Theory and practice of business competition, Moscow, 2003
5. Kaplan R., D.Norton, System of indicators for measuring the results, Sofia, 2003
6. Kaplan R., D.Norton, Strategic cards-to turn intangible assets into tangible results, Sofia, Center for Entrepreneurship and leadership development, 2006

## UTILIZING WEB AND CLOUD-BASED TECHNOLOGIES TO SUPPORT CORPORATE BUSINESS OPERATIONS

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**Abstract:** Doing business in the era of modern technologies faces numerous challenges, so it is required that all of the employees are analytic, well organized, that they manage their time in a proper way and always have all of the important information at the right time. They are responsible for doing a number of different tasks on a daily basis, and meeting all of the above provided expectations can sometimes be a problem in a dynamic working environment. However, the application of ICTs (Information and communication technologies) significantly simplifies numerous business processes in today's corporations. This paper presents a way to utilize modern web technologies and possibilities of cloud computing to automate and facilitate the job of HR managers through the process of creating a web application that is flexible, extensible, easy to maintain, scalable, available and reliable. After identifying the advantages that cloud computing offers, compared to the traditional way of hosting the applications, it is explained how to deploy the created system to a cloud server.

**Keywords:** web technologies, cloud computing, automating business

### 1. INTRODUCTION

It's hard to imagine running a modern business without adequate technological support, regardless of whether that business is a corporation employing thousands of people, a small family owned shop, or an individual that decided to test his entrepreneurial skills by founding a start-up. Benefits that are acquired through using new technologies consist of saving time and money, easier access to information, simplifying business processes, better communication with clients etc. A lot of today's technologies extensively rely on the Internet, which is becoming more and more available worldwide. Figure 1 shows an increase in number of worldwide internet users since 1993., and that number today amounts to over 3.4 billion, and it keeps increasing [1].

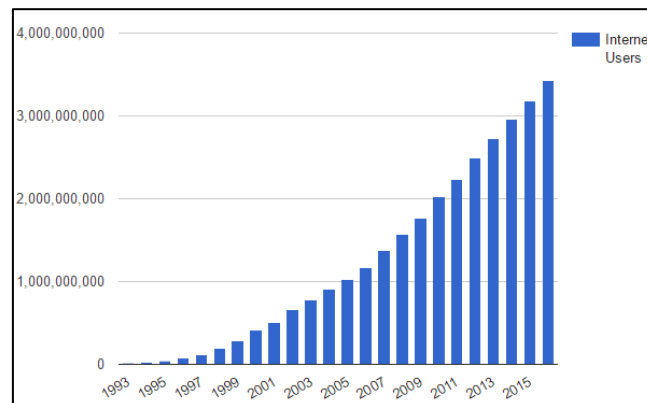


Figure 1. Number of Internet users worldwide [1]

Apart from simple access to the Internet, another important point that should be mentioned is the quality of the Internet connection. One of the most easily measured characteristics of the Internet connection is speed. Figure 2 shows an increase of average internet connection speed in Serbia, as well as in a few other countries. Average Internet speed worldwide is 7.0 Mbps, according to the "State of the Internet / Connectivity Report", published by the company Akamai Technologies in the fourth quarter of 2016.

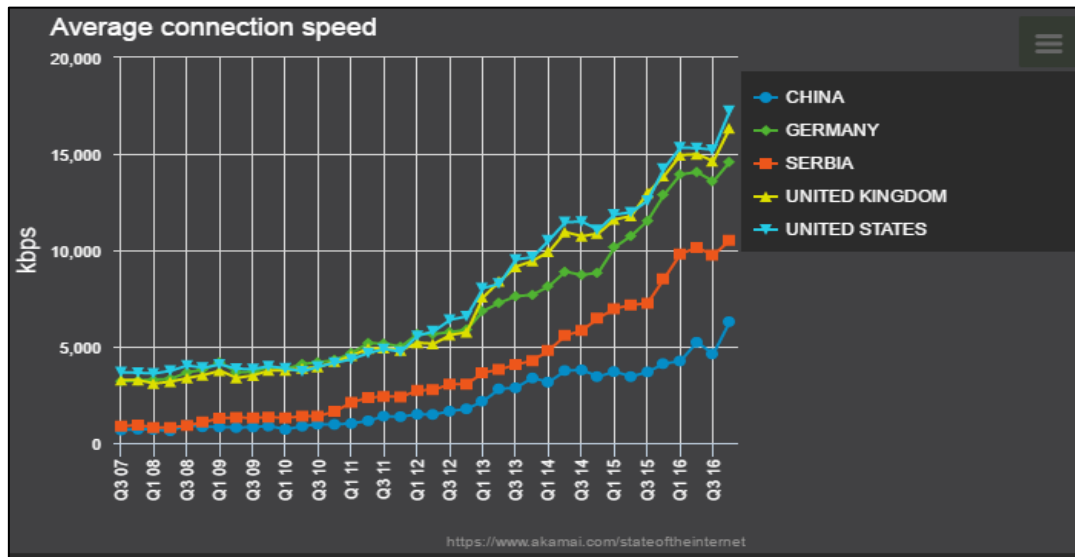


Figure 2. Average Internet connection speed since 2007 to Q4 2016 [2]

Since the time when the Internet was used for displaying static web pages, until today, possibilities progressed significantly. Now it's possible to use a wide variety of online services to help us complete everyday tasks like managing e-mails, completing work duties, taking care of personal finances, keeping track of training or nutrition plans, attending free foreign language courses, accessing multimedia content on the web or simply connecting with our friends through social networks.

This is done through using various web applications. In order to define what a web application is, it can be said that it's a client-server application, which displays the user interface in a web browser. Any website that offers a certain level of interaction to its' users, a rich user experience and a possibility to complete a certain task or a group of tasks online is considered to be a web application. For every problem that we may encounter in everyday life, there's a good possibility that (at least one) suitable web application already exists, helping us facilitate and automate the process of solving that specific problem.

The advantages of web applications over desktop-oriented applications are reflected in the following features:

- Web applications are platform independent,
- they are independent of the hardware specifications of the user's PC,
- they can be accessed from any location (with a precondition of an Internet connection),
- the burden of deploying the app to each individual user is avoided,
- users don't have to worry about versions of the app, or how to update it,

- all of the data is centralized and
- customization is easier.

Developing web applications in order to support business operations is just one part of the idea presented in this paper. Even more benefits can be gained by deploying them in the cloud, instead of using traditional hosting.

The first reference to cloud computing by the term "the cloud" happened in 1996, in a business plan of the company called Compaq [3]. Today, that term stands for delivering different computing resources and services, located "in the cloud", to a user, through the Internet. The definition of cloud computing given by the NIST (National Institute of Standards and Technology) recognizes five key aspects of cloud: On-demand self-service, broad network access, resource pooling, rapid elasticity and measured service. Those key characteristics are at the same time the key benefits that cloud computing offers.

There are three main cloud computing service models: SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service). Figure 3 shows comparison of the traditional IT infrastructure model and mentioned cloud computing models.

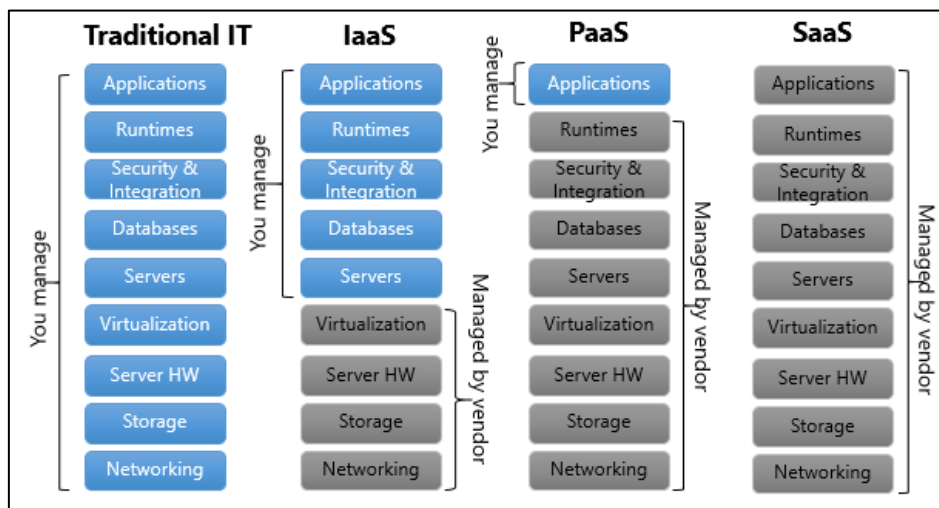


Figure 3. Comparison of the traditional IT infrastructure to cloud computing service models [4]

Infrastructure as a service offers on-demand usage of the complete cloud infrastructure, and that includes servers, databases, network and operating systems. Rather than opting for capital investment in these resources, especially if the required volume is volatile, the user can always rent the exact volume of resources, and never pay for more than he is using.

Platform as a service is a model that offers developing environments and suite of tools needed for fast and convenient development, testing and delivering of software. In this model, the cloud provider is in charge of the network, servers, OS and databases, while the user of cloud services only takes care of deployed applications. Cloud benefits like scalability, flexibility, multi-tenant architecture and on-demand usage are present in this model as well.

Software as a service delivers an application to a wide number of users through a web browser, while the cloud provider takes care of the complete cloud infrastructure and the platform that the application runs on.

## 2. CURRENT STATE IN THE AREA

The IT market records constant growth in the amount of investments, generated revenue and the number of people employed in the IT sector. News in Serbian media about the shortage of a few thousand programmers, system architects, DevOps engineers or project managers specialized in IT are common. Although most of the employees in this industry work for foreign clients, the number of newly founded IT companies is growing each year. It is safe to say that the IT industry in Serbia is rapidly evolving, and the supply for executing all of the technical improvements that can help automate corporate business operations is abundant.

### 2.1. CONTEMPORARY WEB TECHNOLOGIES

As a direct consequence of the increase of the number of Internet users, we are witnesses of an increased number of web applications, as well as an increased of the technologies available for the development of those applications. All of these technologies are striving for providing best possible performances, user experience, visual attractiveness.

There are a lot of criteria that can be observed to assess whether a certain technology is contemporary. The criteria chosen in this paper to pick out "the most modern" technology are the quantity of web applications developed by it, as well as the opinion of the entire online community using that technology.

According to the research conducted by the company BuiltWith [5] that specializes in keeping track of Internet trends, it is shown that the most commonly used software frameworks for building modern web applications are PHP and ASP.NET, followed by J2EE, Shockwave Flash Embed, Adobe Dreamviewer and Ruby on Rails.

Since the quantity alone isn't enough to pick the technology we might want to use, and since the opinion of the online community has an important role in web development and IT in general, it is taken into account as well. The website HotFrameworks.com presents a ranking of today's top software frameworks based on:

- the number of stars the git repository for a source code of a framework has on GitHub,
- the number of questions on Stack Overflow that are tagged with the name of the framework.

In order to combine these two very different criteria and present more realistic results, an overall score that combines the importance of both of these factors is calculated. Top rated frameworks by using this method are presented in figure 3.

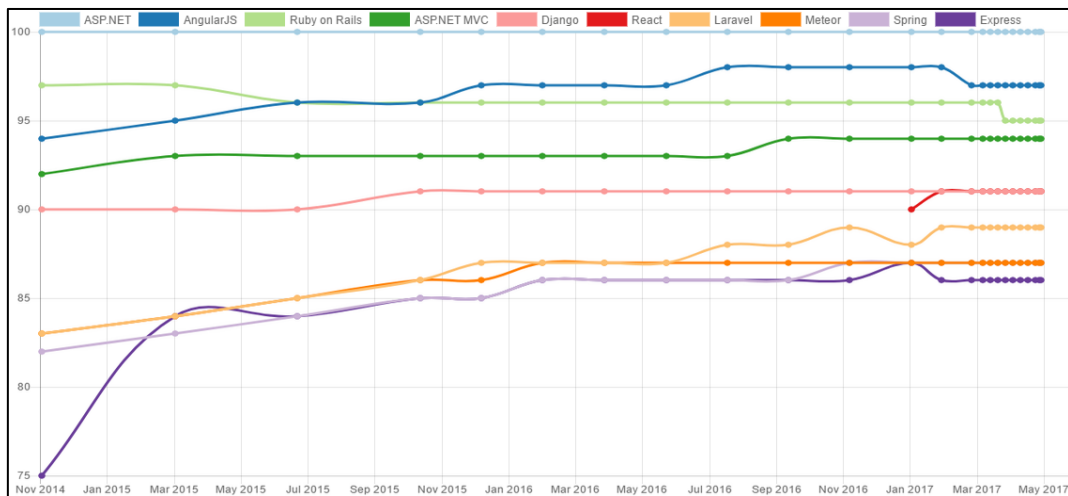


Figure 4. Overall score of the top 10 software frameworks [6]

## 2.2.CLOUD COMPUTING MARKET GROWTH AND TRENDS FOR 2017

Considering the advantages that cloud computing services provide, the fact that the cloud market is one of the fastest growing markets nowadays isn't surprising. There's an increase in the number of users, the number of cloud service providers and the entire cloud computing market.

Gartner, one of the world's leading IT companies specialized in research and consulting, according to its Q4 2016 forecast of the cloud market growth, predicts 18% growth of the cloud market in 2017, to a total of \$246.8 billion. As reported, this year's SaaS market is expected to grow from \$38.5 to \$46.3 billion, the IaaS market to \$34.6 billion (\$25.3 in 2016) and PaaS to \$8.8 billion (\$7.2 in 2016) [7].

When it comes to trends in the cloud industry, both cloud computing users and providers are carefully tracking them in order to have as much information as they possibly can, needed for making business decisions. RightScale, a company that primarily does business in the SaaS sector and offers software for managing the cloud infrastructure, is also engaged in cloud computing analytics and publishes yearly reports about the upcoming trends in the market. The latest report provided by this company, published in January this year is based on a survey that was completed by more than 1000 professionals across a broad cross-section of organizations. The same report states that 95% of the companies covered by this survey are using cloud services [8]. It is interesting to observe how the benefits of cloud services grow in time for the companies that are using them, and Figure 5 is corroborating that assumption. On the other hand, challenges and concerns about implementing cloud computing services in everyday business operations decline as users gain more experience and cloud maturity increases. This is presented on figure 6, which lists the top cloud challenges for this year.

Initiatives that will be launched in 2017 by surveyed companies are concentrated around actions to optimize existing cloud usage and cost savings, moving more workloads to the cloud, expanding public cloud usage and usage of containers [8]. The top public cloud service providers, used in both enterprise and small business segments, are AWS, Azure, Google and IBM [8].

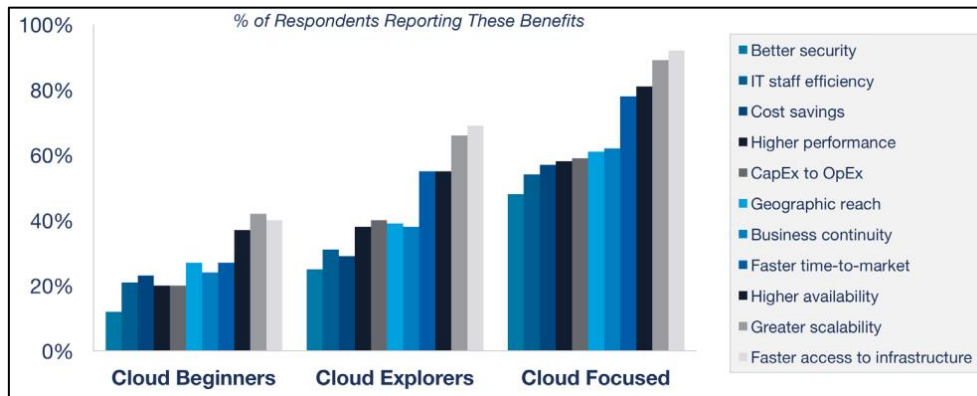


Figure 5 - Growth of benefits that organizations are experiencing from using cloud computing as they mature [8]

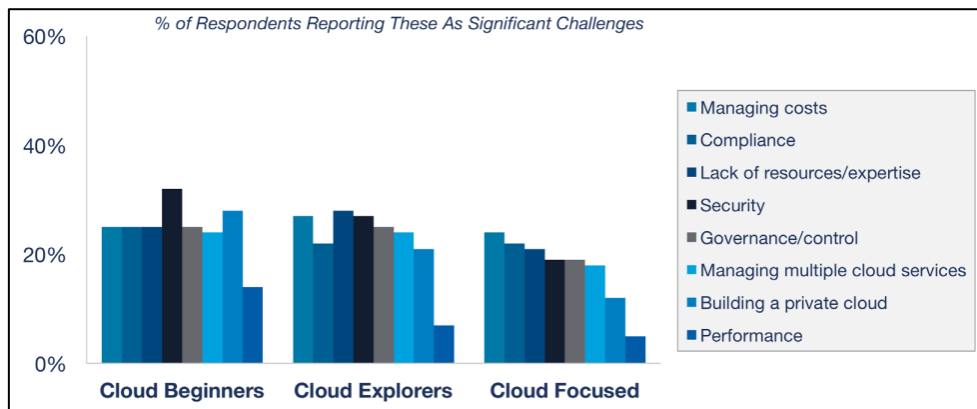


Figure 6 - Top cloud challenges for 2017, perceived by the companies of different level of cloud maturity [8]

### 3. DEVELOPMENT OF THE MULTI-TIER WEB APPLICATION

In order for a modern company to succeed, various departments of it must cooperate, exchange information and be up to date with current goals, expectations, resources and results. Each of these departments can be improved and their job automated through the implementation of an information system to support their business operations. This paper shows an example of doing this, by applying the concept to the domain of human resources.

HR managers today encounter numerous challenges and they're responsible for various activities in a company, including the development and implementation of that company's HR strategy, creating a positive and pleasant work environment, interviews and selection of potential employees, periodic evaluations of employees, and a variety of other administrative tasks. To be successful in that many different activities, HR managers must be analytic, organized, their time management must be excellent and they must have all the right information at the right time.

There are multiple commercial solutions on the market, available for purchase in order to automate the job of an HR manager. What's common to all of them is that, although they

possess a wide range of features, they all cost money. If investing money in a cause like this isn't an option, a solution might be to choose simpler software that is free, or to develop a new one, and then improve it in time, as much as possible.

### 3.1.SOLUTION ARCHITECTURE

N-tier architecture is the architecture type chosen for this solution. In this architectural model, there's a clear distinction between the application layers, according to the role they have in the whole system. The basic, three-tier architecture model, in this manner separates the presentation layer (user interface) that presents the results of user actions in the appropriate form, the business logic layer that incorporates algorithms used in business processes and the data layer, which is actually a database server which stores the data. In the case of further decomposition of the middle layer, three-tier architecture becomes n-tier architecture, while maintaining the characteristic of separating layers by their functionalities.

The structure of the components and their position in the architecture of proposed system is displayed in figure 7.

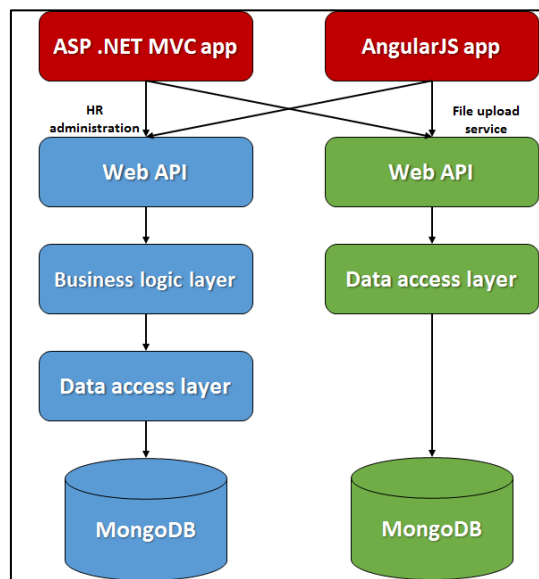


Figure 7. Architecture of the proposed system

There are two separate services – an HR administration service and a file upload service. They are developed independently in order for the file upload service to be reusable by other applications as well, if needed. Both of those services are exposed via Web API, so they can be used by different kinds of web applications. To prove that these services are independent of the technology that is using them, two applications are developed – ASP .NET MVC application and AngularJS application.

#### 3.1.1. Database and data access layer

All of the data generated by this system needs to be permanently stored in a database. The solution proposed in this paper used MongoDB, an open-source DBMS (database



management system) that is document-oriented and provides a NoSQL mechanism for storage and data retrieval. In MongoDB, the data is stored in BSON (binary JSON) document format and all of the documents are, by their structure, organized into collections. The main advantages of MongoDB and document-oriented databases in general are efficiency, flexibility, horizontal scalability and good performance.

In the database designed for the needs of the HR administration part of the system, the following collections are identified as the most important ones, and then created: employees, teams, departments, absences, absence types and public holidays. The other database, dedicated to a file upload service, needs only one collection which stores all of the files that need to be permanently saved.

A data access layer for both databases is created by using publicly available NuGet packages for the Visual Studio development environment. This layer provides methods that are used for communication with the database, and through those methods, the user can retrieve, add, modify or delete the data.

### 3.1.2. Business logic layer

The business logic layer represents the behaviors that are built in the application. All of the application logic and business decisions should be concentrated in this layer, and completely separated from the presentation layer and data access layer. If independence of business logic layer is achieved, it's possible to easily replace any of the surrounding layers with minimal to no changes to this layer whatsoever. This independence is generally desirable and represents good practice in software development. Isolated code is easier to modify, easier to test, and the stability of the whole system is on a higher level.

With the complexity of the system, this layer has more responsibilities, more code, and, if it's required, it can be separated into multiple layers. In this case, besides the main task to define and implement different features in the application, this layer also took care of data validation and data mapping. All of the data entered into the application first had to be validated, and this is done with the help of a .NET library called Fluent Validation. This layer contains its own DTO (data transfer object) models which need to be serialized/deserialized while communicating with the database, and this is accomplished by using the Newtonsoft.Json framework. Also, the same DTO models need to be adapted to the domain model of the application using them.

### 3.1.3. Web API

API (Application Programming Interface) represents a set of rules and specifications that define the communication between different software components in the system. Every API defines a list of methods of a specific service that can be used, and all of those methods should be explained in detail in the documentation of that API. A lot of commonly known web applications publicly expose some of their services through API, e.g., Facebook, Twitter, Instagram, YouTube, Google.

ASP.NET Web API is a software framework that can be used to create HTTP (HyperText Transfer Protocol) services intended to be used by various clients (different web browsers, tablets, mobile phones...). Also, this framework is a good choice for creating RESTful applications. REST (Representational State Transfer) is an architectural pattern that

is using HTTP methods like GET, POST, PUT, DELETE for executing CRUD (create, retrieve, update, delete) operations. The World Wide Web is based on the same architectural principles. Requests and responses in REST APIs are not limited to a specific format, and the one used in this solution is JSON.

Following these principles, both HR administration and file upload service were exposed by a separate API that was created, and those APIs can be used as entry point to the logic of the service, by any kind of application that calls the API in a proper way (in this case, the ASP.NET MVC application and the AngularJS application).

#### 3.1.4. ASP.NET MVC and AngularJS applications

ASP.NET MVC and AngularJS are fundamentally diverse technologies used for the development of web applications. According to the research done in section 2.1, they are at the very top of web technologies available today, hence they are used in this solution.

ASP.NET MVC is an application based on the MVC (Model-View-Controller) principle, which provides clear separation of roles and responsibilities, and provides code reusability, simple integration with different JavaScript frameworks, and convenience for applying the TDD (Test Driven Development) approach. The views in this application are created in Razor – a markup language for constructing dynamic web pages. In order for the MVC application to communicate with the API, a library called RestSharp is used.

After developing both Web APIs according to the REST principles, so they are reusable and independent of the technology that is using them, another application is created. AngularJS SPA (Single Page Application) was made to prove it. SPA applications are driven by the idea to move the user interface and application logic to the client part of the application, and load them all initially, when the first request occurs. This ensures improved user experience, since every following action will only partially refresh the page, which will happen instantly.

### 4. DEPLOYMENT OF THE APPLICATION TO A CLOUD SERVER

Following the development of all required components, the entire system was hosted on Microsoft IIS (Internet Information Services) local web server. After testing and confirming that the application is working as expected, the next step was to deploy it on a cloud server. AWS (Amazon Web Services) is a global platform launched by Amazon in 2006. with the intention to provide different cloud computing services. Today, AWS offers more than 70 services in 16 different regions of the world, and provides support in all cloud computing segments.

To host the solution presented in this paper somewhere "in the cloud", an account was registered on the AWS website. The service that was used is called EC2 (Elastic Computer Cloud) and it provides a virtual machine of certain technical specifications, located in one of the AWS regions, that becomes available to be utilized as needed. All virtual machines that AWS offers can be leased for a longer period of time, or used simply whenever it's necessary while paying for them by the hour. Also, for a number of AWS services, there are free tiers, that allow users to try these services for free. The steps of leasing an EC2 instance are choosing the region, size and operating system for the virtual machine, followed by optional

steps of choosing a multiple number of instances, setting up the private network and IP address, adding additional storage disks, setting the security rules. In this case, the nearest and hence the most convenient region was EU central (Frankfurt), the size of the machine that was chosen is t2.micro and AMI (Amazon Machine Image) selected for it was Microsoft Windows Server 2012 R2 Base.

After acquiring control of the virtual machine in the cloud, all of the software required for running the system can be installed on it, and the application can be deployed and configured to work in the cloud.

## 5. RESULTS

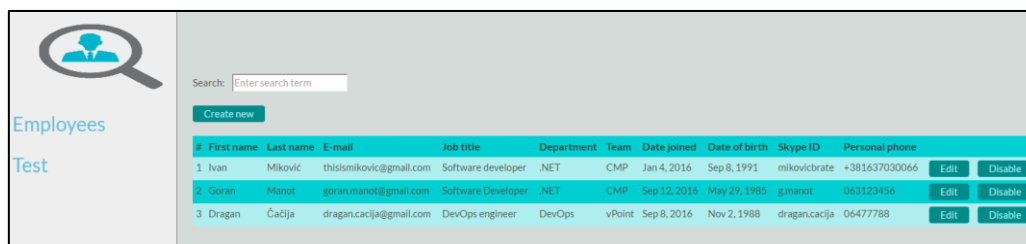
As a result of the research in the field of web technologies, two amongst the most popular ones were chosen to be used in order to support the HR department of any corporate business. Both the ASP.NET MVC web application and the AngularJS application use HR administration and file upload services through Web APIs that are exposed. All of the data is saved in BSON format, in document-oriented NoSQL databases.

Provided functionality includes entering and managing all of the employee data, keeping track of existing teams and departments inside of a company and all of their information, showing a calendar of employees' personal leaves and collective non-working days, such as public holidays. Across the whole application it's possible to search and sort the data by specified criteria. Also, a separate file upload service is developed to support storing employees' pictures, CVs, copies of various documents and other files. Figures 8 and 9 show the appearance of both of these applications.

Although simple, the application is built on the architectural principles that enable it to be expanded and upgraded easily. Benefits achieved in this example include: flexibility of the system and code reusability, extensibility and ease of maintenance, scalability, high availability and reliability.

Image	First name	Last name	E-mail	Job title	Department	Team	Date joined	Date of birth	Skype ID	Personal phone	
	Dragan	Čačija	dragan.cacija@gmail.com	DevOps engineer	DevOps	vPoint	08. Sep 2016.	02. Nov 1988.	dragan.cacija	06477788	<a href="#">Update</a>   <a href="#">Details</a>   <a href="#">Disable</a>
	Goran	Manot	goran.manot@gmail.com	Software Developer	.NET	CMP	12. Sep 2016.	29. May 1985.	g.manot	063123456	<a href="#">Update</a>   <a href="#">Details</a>   <a href="#">Disable</a>
	Ivan	Miković	thisismikovic@gmail.com	Software developer	.NET	CMP	04. Jan 2016.	08. Sep 1991.	mikovicbrate	+381637030066	<a href="#">Update</a>   <a href="#">Details</a>   <a href="#">Disable</a>

Figure 8. Employees page of the ASP.NET MVC web application



#	First name	Last name	E-mail	Job title	Department	Team	Date joined	Date of birth	Skype ID	Personal phone		
1	Ivan	Miković	ihisimikovic@gmail.com	Software developer	NET	CMP	Jan 4, 2016	Sep 8, 1991	mikovicbrate	+381637030066	Edit	Disable
2	Goran	Manot	goranmanot@gmail.com	Software Developer	NET	CMP	Sep 12, 2016	May 29, 1985	g.manot	063123456	Edit	Disable
3	Dragan	Čačija	dragan.cacija@gmail.com	DevOps engineer	DevOps	vPoint	Sep 8, 2016	Nov 2, 1988	dragan.cacija	06477788	Edit	Disable

Figure 9. Employees page of the AngularJS web application

## 6. CONCLUSION

Modern business and continuous progress in IT are responsible for increased possibilities, but also increased client expectations. Efficiency, effectiveness, ease and convenience of problem solving are crucial and web applications can offer that, which is the main reason that makes business owners move their focus to them, using their advantages to automate their business operations. On the other hand, engineers that develop applications are interested in technical characteristics such as maintainability, testability, the level of code reusability, application scalability, security, availability, reliability.

The development of cloud computing, its wide availability, affordable pricing models and the possibilities it offers make cloud technologies a standard, an indispensable architectural part of any web application we use every day. Using cloud services is simplified to the extent of leasing and configuring a virtual machine located anywhere in the world in a matter of minutes.

Combining these technologies provides significant improvements in any business sector and can be applied in order to automate business operations, save time and money.

## REFERENCES

1. Internet live stats, <http://www.internetlivestats.com/internet-users/#trend>, 2016, accessed on 29.04.2017.
2. Akamai Technologies, Internet connection speeds and adoption rates by geography, <https://www.akamai.com/us/en/about/our-thinking/state-of-the-internet-report/state-of-the-internet-connectivity-visualization.jsp>, 2017, accessed on 29.04.2017.
3. A. Regalado, Who coined 'Cloud computing?', Technology Review (MIT), 2011.
4. M. Ali, What is cloud computing stack (SAAS, PAAS, IAAS), <http://www.maziglobal.com/blog/cloud-computing-stack-saas-paas-iaas/>, 2014, accessed on 30.04.2017.
5. BuiltWith, Framework Usage Statistics, <http://trends.builtwith.com/framework>, 2017, accessed on 01.05.2017.
6. HotFrameworks, Framework Rankings, <http://hotframeworks.com/#rankings>, 2017, accessed on 02.05.2017.
7. Gartner Inc, Forecast: Public Cloud Services, Worldwide, 2014-2020, 4Q16 Update, 2017.
8. RightScale Inc., State of the Cloud report, 2017.

## **RISK ANALYSIS BASED ON BAYESIAN NETWORKS AND A MULTI-CRITERIA DECISION-MAKING METHOD - SELECTION OF CIRCUIT-BREAKERS FOR THE 110KV SUBSTATIONS**

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**Abstract:** Literature that deals with risk analysis in energy sector shows that the use of Bayesian networks, as one of the methods for risk assessment in this context, is well recognized. Therefore, authors of this paper are using Bayesian networks and Analytic Hierarchy Process, which is also considered to be one of the most widely used multi-criteria decision-making methods, to determine the optimal circuit-breaker - oil, vacuum or SF<sub>6</sub> – for the 110kV substations with regard to safety, economic and ecological risks. Comparing the alternatives (circuit-breaker) in relation to the criteria (safety, costs, environment), the authors determined which circuit-breaker should be used in order to obtain the lowest possible risk.

**Keywords:** risk, Bayesian networks, Analytic Hierarchy Process, circuit-breakers

### **1. UVOD**

Dobra procena rizika i adekvatno donošenje odluka u mnogim kompleksnim i neizvesnim situacijama pruža nam jasniji pogled u budućnost. Najjednostavnije rečeno, rizik se odnosi na buduće događaje i njihove posledice [1].

U zavisnosti od naučne discipline koja proučava rizik, u literaturi se najčešće sreću sledeće definicije [2-3]:

- Rizik je jednak očekivanom gubitku;
- Rizik je verovatnoća nepovoljnog ishoda;
- Rizik je kombinacija verovatnoće nekog događaja i njegovih posledica;

Odgovori na pitanja:

- Šta može poći naopako?
- Koliko je verovatno da se takav događaj desi?
- Ako se desi, koje su njegove posledice?

ukazuju nam na prirodu rizika [4]. Iako ova pitanja deluju jednostavno, odgovori i dalje predstavljaju prave izazove u vezi sa identifikacijom rizika, procenom verovatnoće i posledica.

Prema ISO standardu, rizik je definisan kao kombinacija verovatnoće nekog događaja i njegovih posledica [3]. Ovako definisan rizik omogućava da se verovatnoća i posledice mogu predstaviti numerički, odnosno omogućava se predstavljanje rizika i kvantitativno i kvalitativno.

Pojava rizika je događaj koji ima negativne posledice na jedan inženjerski sistem. Pritisci u vezi sa troškovima, rasporedom i tehničkim performansama su realne stvari koje dešavaju svakodnevno u kompleksnim energetskim sistemima. Kako su trafostanice jedan od ključnih delova energetskog sistema, u ovom radu je izvršena detaljna analiza rizika upotrebe tri najviše korišćena tipa prekidača u energetskim postrojenjima i transformatorskim stanicama (TS) 110kV. Izbor najboljeg tipa prekidača izvršen je pomoću Bajesovih mreža i metode višekriterijumskog odlučivanja.

## 2. IZBOR PREKIDAČA U POSTROJENJIMA 110KV

U cilju sagledavanja svih bitnih faktora koji utiču na rizik upotrebe određenog tipa prekidača u TS 110kV, kao i za opis međusobnih veza između tih faktora, u ovom radu koristimo tehniku dijagrama uticaja [5]. Korišćenjem dijagrama uticaja omogućava se uticaj svakog pojedinačnog faktora kako na pojedinačni rizik tako i na ukupan rizik. Bajesove mreže predstavljaju alat na kojem se zasniva rešavanje dijagrama uticaja. Korišćenjem Bajesove teoreme određuju se ulazne i izlazne vrednosti čvorova u dijagramu uticaja. Kako raste broj posmatranih faktora koji utiču na jedan događaj, odnosno, kako se broj promenljivih povećava, tako se povećava i složenost izračunavanja izlazne promenljive jer se rešenje određuje kao jedna od svih mogućih kombinacija razmatranih faktora. Kako bi se problem velikog broja kombinacija sveo na prihvatljivu meru, umesto verovatnoća, za rešavanje dijagrama uticaja koristi se fazi logika [6-7]. Tehnika rešavanja problema odlučivanja zasnovana na fazi logici naziva se fazi dijagrami uticaja [6-7]. Kod tehnike fazi dijagrama uticaja, odgovarajućim fazi skupom se predstavlja svaki čvor u dijagramu uticaja. U ovom radu, odlučivanje je bazirano na Bajesovoj formuli za izračunavanje posteriornih verovatnoća  $x$ , na osnovu poznatih verovatnoća stanja prirode  $f$ . Izraz za verovatnoću da će se desiti stanje  $x$ , ukoliko se ostvarilo stanje  $f_i$ :

$$P(x \setminus f_i) = \frac{P(x) \cdot P(f_i \setminus x)}{P(x) \cdot P(f_i \setminus x) + P(\bar{x}) \cdot P(f_i \setminus \bar{x})}. \quad (1)$$

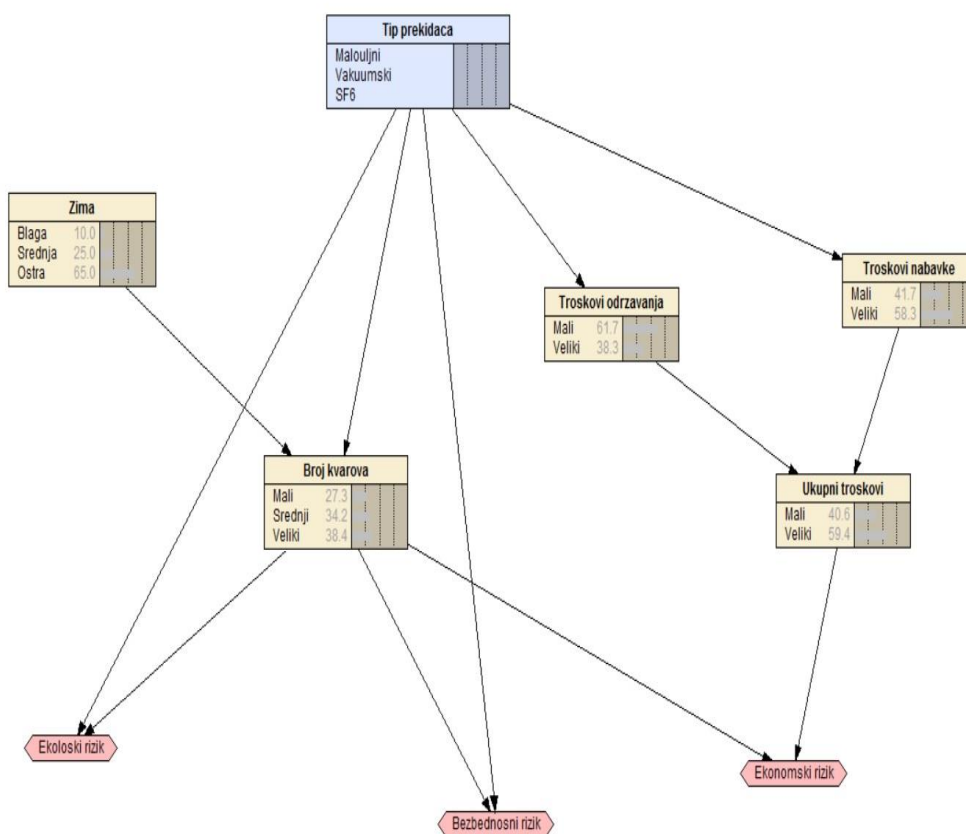
Očekivana vrednost kriterijuma  $EV(C)$  je:

$$EV(C) = \sum_{i=1}^n P(x_i) \cdot C(x_i). \quad (2)$$

Na Slici 1 prikazan je dijagram uticaja za izbor optimalnog tipa prekidača u TS 110kV. Razmatramo tri najčešće korišćena tipa prekidača: malouljni, vakuumski i SF6. Kako je prekidač jedan od najvažnijih delova svake TS 110kV tako je i značaj izbora optimalnog tipa prekidača najveći. Vrednost pojedinačnih kriterijuma određen je na osnovu ekspertskog znanja i analize. Primer za određivanje vrednosti kriterijuma bezbednost prikazan je u sledećoj tabeli.

Tabela 1. Vrednost kriterijuma *bezbednost*

Broj kvarova	Troškovi održavanja	Bezbednost
mali	mali	7
mali	srednji	8
mali	veliki	10
srednji	mali	4
srednji	srednji	5
srednji	veliki	6
veliki	mali	1
veliki	srednji	3
veliki	veliki	2



Slika 1. Dijagram uticaja za izbor optimalnog tipa prekidača u TS 110kV<sup>2</sup>

Malouljni prekidači su naslednici najstarije vrste prekidača, uljnih prekidača, koji se više ne proizvode. Sastoje se od komore malih dimenzija sa malom količinom ulja. Usled kvara na ovom tipu prekidača, piralensko transformatorsko ulje može da ima veliki negativan

<sup>2</sup> Vrednosti izlaznih promenljivih određene su korišćenjem programskog paketa *Netica*

uticaj na čoveka i životnu sredinu. Takođe, u poređenju sa vakuumskim i SF6 prekidačima, većih su dimenzija i stvaraju znatno veću buku pri radu.

Osnovna prednost vakuumskih prekidača jeste njihov dugi rok trajanja i što skoro da ne zahtevaju održavanje jer je komora hermetički zatvorena. Takođe, dimenzije prekidača su male i karakteriše ih bešuman rad. Kod SF6 prekidača gašenje luka se obavlja pomoću SF6 gasa. U poređenju sa vakuumom, SF6 gas ima 3.5 puta manju probojnu čvrstoću.

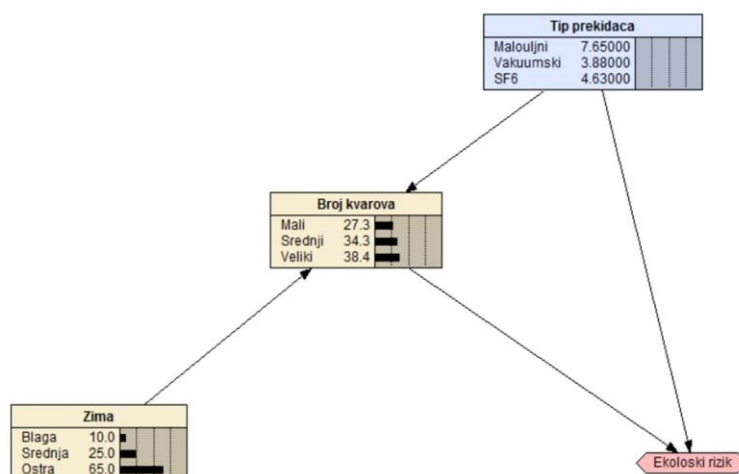
Posmatrajući potencijalne štetne uticaje na čoveka i životnu sredinu, odnosno opasno dejstvo električne struje na čoveka, mehaničke povrede prilikom zamene ili redovnog održavanja, uticaj elektromagnetnog zračenja i količinu proizvedene buke prilikom rada, SF6 prekidači imaju najmanji negativan uticaj u odnosu na vakuumске i malouljne prekidače.

Kao što je prikazano na Slici 1, izbor optimalnog tipa prekidača u TS 110kV u pogledu najmanjeg ukupnog rizika određuje se kao kombinacija ekološkog rizika, bezbednosnog rizika i ekonomskog rizika.

U ovom slučaju, pod ekološkim rizikom podrazumeva se rizik koji može izazvati korišćenje određenog tipa prekidača u TS 110kV na životnu sredinu. Pod bezbednosnim rizikom smatra se rizik po zdravlje ljudi zaduženih za održavanje TS 110kV, dok se pod ekonomskim rizikom posmatraju ukupni troškovi održavanja i nabavke prekidača.

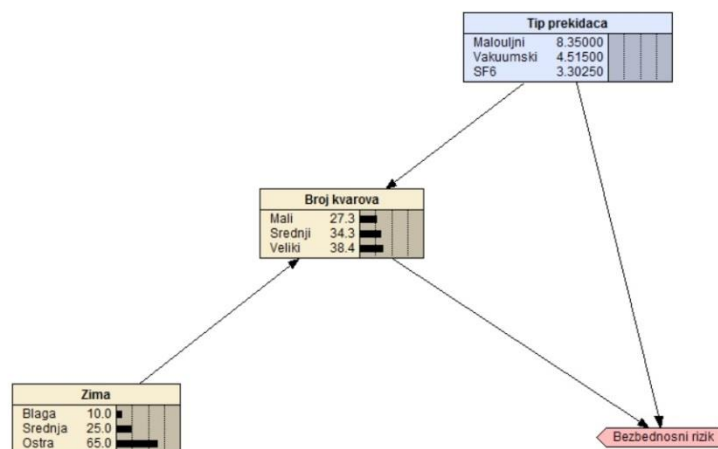
U primeru prikazanom na Slici 1, može se uočiti da se za ekološki, bezbednosni i ekonomski rizik razmatraju pet promenljive i to: ukupni troškovi koji zavise od troškova nabavke i troškova održavanja, kao i broj kvarova na koji utiču vremenski uslovi (u ovom slučaju zima). Promenljive ukupni troškovi, troškovi održavanja i troškovi nabavke predstavljene su fazi skupovima mali i veliki. Promenljiva broj kvarova karakteriše se fazi skupovima mali, srednji i veliki, dok je promenljiva zima prikazana kroz fazi skupove blaga, srednja i oštra.

Na osnovu fazi pravila koja se zasnivaju na ekspertskom znanju, iskustvu i dostupnim podacima, određuje se izlazna promenljiva. Vrednosti izlaznih promenljivih prikazane su na Slikama 2-4.

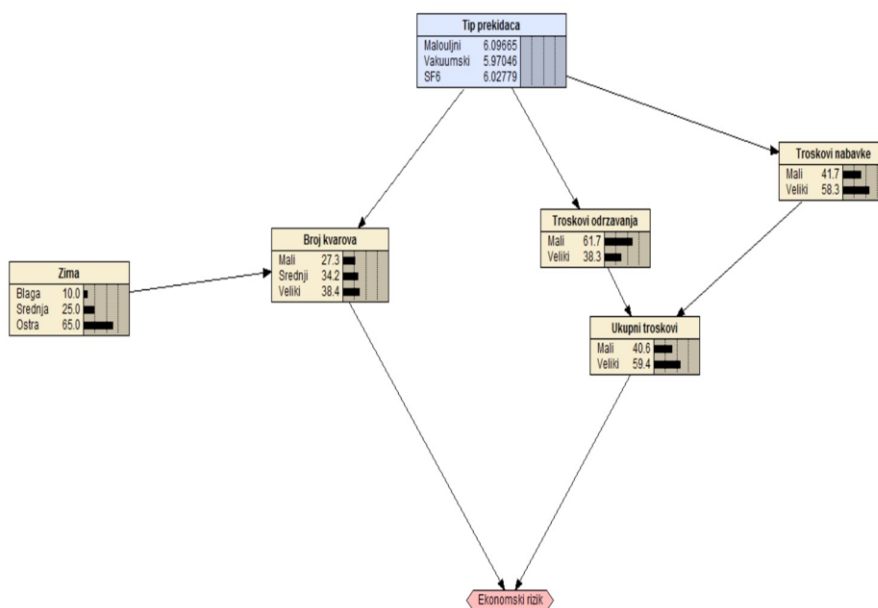


Slika 2. Dijagram uticaja za izbor optimalnog tipa prekidača u TS 110kV za ekološki rizik



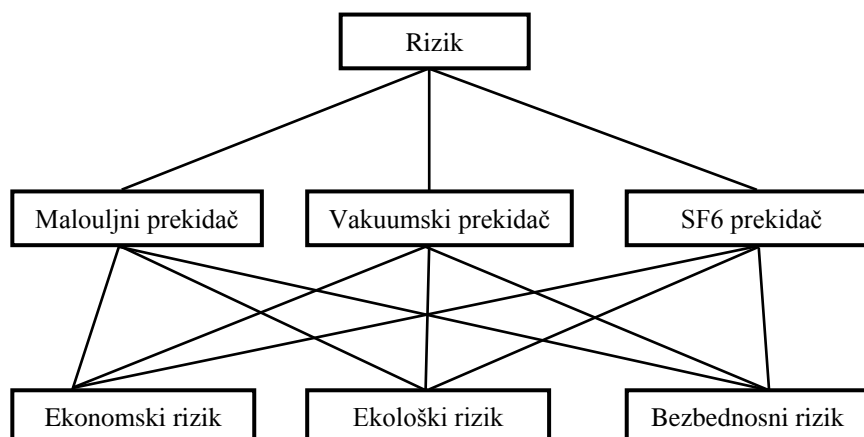


Slika 3. Dijagram uticaja za izbor optimalnog tipa prekidača u TS 110kV za bezbednosni rizik



Slika 4. Dijagram uticaja za izbor optimalnog tipa prekidača u TS 110kV za ekonomski rizik

Na ovako dobijene vrednosti izlaznih promenljivih, primenjujemo analitički hijerarhijski proces (AHP). Pomoću ove višekriterijumeske metode moguće je posmatrati problem razložiti na hijerarhiju radi pojednostavljenja analize. Kod AHP metode, svi delovi hijerarhije su međusobno povezani, što pomaže kod praćenja direktnog uticaja bilo kod parametra u hijerarhiji na ostale delove stabla. Na Slici 5 prikazana je hijerarhija problema koji razmatramo u ovom radu.



Slika 5. Hijerarhija problema

Satijeva skala služi kako bi se izvršilo poređenje među elementima hijerarhije [8]. Formiranjem odgovarajućih matrica poređenja određuju se vrednosti vektora težinskih koeficijenata [9].

Stepeni konzistentnosti, težine kriterijuma i alternativa, kao i matrice upoređivanja parova formirane korišćenjem Satijeve skale prikazane su u Tabelama 2-5.

Tabela 2. Matrica poređenja kriterijuma u odnosu na cilj.

	Ekonomski rizik	Ekološki rizik	Bezbednosni rizik	Težine
Ekonomski rizik	1	1/3	1/5	0.1047
Ekološki rizik	3	1	1/3	0.2583
Bezbednosni rizik	5	3	1	0.6370
$\lambda_{\max} = 3.0385$		CI = 0.0193	CR = 0.0332 < 0.10	

Tabela 3. Matrica poređenja alternativa u odnosu na kriterijum *ekonomski rizik*.

	Malouljni	Vakuumski	SF6	Težine
Malouljni	1	1/3	1/2	0.1634
Vakuumski	3	1	2	0.5396
SF6	2	1/2	1	0.2970
$\lambda_{\max} = 3.0092$		CI = 0.0046	CR = 0.0079 < 0.10	

Tabela 4. Matrica poređenja alternativa u odnosu na kriterijum *ekološki rizik*.

	Malouljni	Vakuumski	SF6	Težine
Malouljni	1	1/5	1/3	0.1047
Vakuumski	5	1	3	0.6370
SF6	3	1/3	1	0.2583
$\lambda_{\max} = 3.0385$		CI = 0.0193		CR = 0.0332 < 0.10

Tabela 5. Matrica poređenja alternativa u odnosu na kriterijum *bezbednosni rizik*.

	Malouljni	Vakuumski	SF6	Težine
Malouljni	1	1/3	1/6	0.0953
Vakuumski	3	1	1/3	0.2499
SF6	6	3	1	0.6548
$\lambda_{\max} = 3.0183$		CI = 0.0092		CR = 0.0158 < 0.10

Veličinama  $\lambda_{\max}$ ,  $CI$  i  $CR$  definisane su maksimalna sopstvena vrednost matrice poređenja, indeks konzistentnosti i stepen konzistentnosti.

Indeks konzistentnosti ( $CI$ ) jednak je:

$$CI = \frac{\lambda_{\max} - n}{n - 1}, \quad (3)$$

gde je  $n$  red matrice, odnosno broj kriterijuma/alternative. Maksimalna sopstvena vrednost matrice poređenja određuje se pomoću izraza:

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^n \frac{(AW)_i}{w_i}. \quad (4)$$

Količnik indeksa konzistentnosti ( $CI$ ) i slučajnog indeksa ( $RI$ ) određuje stepen konzistentnosti ( $CR$ ):

$$CR = \frac{CI}{RI}. \quad (5)$$

Vrednosti slučajnog indeks ( $RI$ ) definisane su u [8]. Kao što se može uočiti iz Tabela 2-5 rezultat ocenjivanja je dovoljno tačan jer je stepen konzistentnosti ( $CR$ ) manji od 0.10.

Nakon određivanja svih težinskih koeficijenata i provera konzistentnosti, vrši se određivanje najdominantnijeg kriterijuma:

$$\begin{bmatrix} 0.1634 & 0.1047 & 0.0953 \\ 0.5396 & 0.6370 & 0.2499 \\ 0.2970 & 0.2583 & 0.6548 \end{bmatrix} \cdot \begin{bmatrix} 0.1047 \\ 0.2583 \\ 0.6370 \end{bmatrix} = \begin{bmatrix} 0.1049 \\ 0.3802 \\ 0.5149 \end{bmatrix}. \quad (6)$$

Na osnovu dobijenih rezultata može se zaključiti da je najbolje koristiti SF6 prekidače (0.5149) kako bi ukupan rizik bio najmanji.

### 3. ZAKLJUČAK

Korišćenjem tehnike dijagrama uticaja i višekriterijumske metode odlučivanja analitičkog hijerarhijskog procesa, u ovom radu je izvršen izbor optimalnog tipa prekidača u trafostanicama 110kV u odnosu na ukupni rizik. Ukupni rizik je posmatran kroz bezbednosni, ekonomski i ekološki rizik. Na osnovu dobijenih rezultata, pokazano je da SF6 prekidači predstavljaju optimalno rešenje u poređenju sa malouljnim i vakuumskim prekidačima.

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### REFERENCE

1. Aven, T., Risk analysis, Assessing uncertainties beyond expected values and probabilities, Chichester, Wiley, (2008).
2. Aven, T., Renn, O., On risk defined as an event where the outcome is uncertain, Journal of Risk Research, 12, (2009), 1-11.
3. ISO/IEC, Guide 73, Risk management - Vocabulary - Guidelines for use in standards, (2002).
4. Kaplan, S., The words of risk analysis, Risk Analysis, 17, (1997), 407-417.
5. Howard, R., Matheson, J., Influence Diagrams, Decision Analysis, 2(3), (2005), 127-143.
6. An, N., Liu, J., Bai, Y. Fuzzy Influence Diagrams: An Approach to Customer Satisfaction Measurement. Fourth International Conference on Fuzzy Systems and Knowledge Discovery, Haikou, (2007), 493-497.
7. Janjić, A., Stanković, M., Velimirović, L., Multi-criteria Influence Diagrams – A Tool for the Sequential Group Risk Assessment, Chapter in “Granular Computing and Decision-Making Studies in Big Data”, Springer, 10, (2015), 165-193.
8. Saaty T. L., The analytic hierarchy process. McGraw-Hill Inc, 1980.

9. Saaty T. L., Decision Making for Leaders: The Analytic Hierarchy Process for Decisions in a Complex World, Pittsburgh: RWS Publications, 1992.

## THE LEARNING ORGANIZATION IN SERBIAN ACADEMIC SETTING: A FAD OR AN ECHO?

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**Abstract:** In management science, today is possible to spot some management tools and theories, often contradictory, with a trivial and short-time impact on the management practice. Such theories are called management fads. One of the most documented and researched fads is the learning organization. Learning organization which lacks practical operational advice, has no tools to measure its achievements, and it is simplistic, poorly researched and conceptualized, hopelessly unrealistic, and even without clear definition. Our main goal was to conduct the content analysis of the learning organization concept in a Serbian academic setting. The content analysis of the articles covering the concept of learning organization in Serbian journals has been performed with the aim to evaluate the scientific knowledge in one economically underdeveloped country. We discovered that learning organization was detected as a management fad in Serbian academic journals even 17 years after its detection in international academic journals. We also stated that this late detection in Serbia is perhaps more determined as an echo from the world leading journals, not as the result of a critical analysis of the learning organization concept from the Serbian academic journals.

**Keywords:** management fads, learning organization, academic journals, content analysis, Serbia

### 1. INTRODUCTION

The second decade of the 21<sup>st</sup> century will likely be remembered in science for discovering of the Higgs boson at CERN research center. The importance of Higgs boson or "God particle" in physics is that the existence of this particle confirms the validity of the standard model. Namely, if it was discovered that the Higgs boson does not exist, this would cause the fall of the standard model, and the scientists should look for another model. The emphasis is on the fact that there can be only one model, no matter how it is called.

In management, which is neither a science nor a profession, manager work in practice is quite different from what the books say [1]. Therefore, we could not argue that there is one standard business model. If we exclude the fact that a competitive nature of the market may never allow one business model, we wonder whether the management scholars agree at least about one desirable way of doing business. In this paper, we argue that in the management science exist, perhaps more than in the management practice, a lot of wandering and sideways, which generate theories that are unnecessary and sometimes harmful. Such theories are called management fads.

We will put the emphasis on the learning organization. After defining, what management fad is and its consequences in business practice, we will give the evidence that the learning organization is recognized as one of the few documented management fads. We

will present the basic theories and the roots of this concept, which led to a boom of this theory in the middle of the last decade of the 20<sup>th</sup> century. Many critics of this concept were divided into critics from the perspective of postmodernism and critics from the perspective of critical realism.

Hereinafter we will present the research on the phenomenon of learning organizations in Serbian academic journals. The research methodology is based on content analysis, more specifically on the analysis of abstracts of the articles where a title, abstract or keywords are appeared as "learning organization". In conclusion, we will present our attitude that studying the learning organization is questionable, as well as our criticism of the contemporary Serbian academic researches on learning organization.

## 2. MANAGEMENT FADS

In marketing, there are three special categories of the product-life cycles, distinctive from its usual bell-shaped curve [2], and these are: style, fashion and fad. Fads are the fleeting fashions. They come quickly into the market, their acceptance cycle is short, they experience peak in demand very early, and then quickly falls and disappears. Fads do not survive because they usually do not satisfy the strong need. Fads attract those consumers who are longing to be different from others, but they quickly forget an old fad, as soon as some new and unusual fad arises.

Management fads can be defined as relatively transitory collective belief, disseminated by management fashion setters [3]. While business consultants are guilty for producing the most fads, and derived from that for their sale and application [4], the biggest fads propagators are, in addition to consultants, management gurus [5]. In fact, it is difficult to discern who is more interested in fads, whether the academics who write about them, whether the consultants who sell them, or the managers who use them [6]. In any case, managers, who are always eager for something new and innovative, are the target audience. How does it work shows us the following example: *To review just a few of the options: you can, if you wish, flatten your pyramid, become a horizontal organization, and eliminate hierarchy from your company. You can empower your people, open your environment, and transform your culture. You can listen to your customers, create a customer-focused organization, and commit to total customer satisfaction. You can do the "vision thing," write a mission statement, and put together a strategic plan. You can improve continuously, shift your paradigms, and become a learning organization. You can devote yourself and your company to total quality management. Or you can reengineer your corporation, with the intent, in the words of the original reengineers, of creating a "business revolution."* [7]

There is no definitive list of management fads. Besides learning organization, which is in focus of this paper, we can recognize Cultural Change Programs, Total Quality Management, Business Process Reengineering [8] and Benchmarking [5] as management fads. There is the list of management fads of the 20<sup>th</sup> century sorted by decade when they have had the pick of popularity [3]: Management by Objectives in 1950s, Sensitivity Training in 1960s, Quality Circles in 1970s, Total Quality Management in 1980s and Self-managed or Self-directed Teams in 1990s.

Gibson & Tesone [3] argue that the decline of a management fad is usually associated with the development and popularity of a new one and that the life cycle of fads can be displayed in a bell-shaped curve and in five stages. The first stage is the discovery stage; the

second is the wild-acceptance stage, the stage when the fad becomes very popular. Stage three, the digestion is on the top of a bell-shaped curve, fad reaches its peak, but also it appears critics that the fad cannot be a universal panacea. The fourth stage is the disillusionment stage, when large audiences realize that problems exist with the fad. The hard core is in the last stage, when the fad disappears from the wide use, and retains only the staunch supporters loyal to the fad. The last decade of the 20<sup>th</sup> century was the decade of arrival of a *plethora* of management tools and theories, often contradictory, and the question arises [9] if the modern management theory is nothing more than an accumulation of contradictory fads? Those accumulation of fads cause that practicing managers should check through trial-and-error the value and application of many management theories, because rigorous scientific methodology seems as it is not present in the modern management theory. More and more, fads seem to be getting a negative reputation and it is a common view that the fads are a waste of time [6].

It is a major problem a time gap between the discovery of fad in management theory and detection of fad in management practice. The vast majority of managers, even 96% of them, were familiar with Total Quality Management (TQM) technique, which in theory had been recognized as a fad, while 94% of them felt that TQM was still applicable for use [6]. A global survey in 2002 of 708 companies from five continents found that managers were using more tools than ever [9]. Of the 25 different management tools used, on average the companies used 16 such tools, with the greatest emphasis on compass-setting tools as mission and vision statements and strategic planning, while managers as ineffective rejected tools such as stock buybacks, corporate venturing and merger integration teams.

The general public tends to believe that true knowledge replaces false conceptions and that science is supposed to be universal and objective, in contrast to subjective and short-lived fads. Regrettably, that is not always the image of scientific study today [10]. Scholars are under pressure to produce research that will be ranked highly for impact factors. The peer-review system often forces scholars to select “hot” concepts and theories, to satisfy editors and peers and to get published. Journals are becoming conservative and more and more concepts and theories are “out”. There is ample evidence to demonstrate an increase of articles referring to existing concepts, which indicates an increasing emphasis on exploitation of a shrinking scope of theories and concepts at the cost of exploring new concepts and theories [10]. In this way, fads could find their way into science.

Fads will be always present in management research community. The main reason is that nobody can make a perfect evaluation of each idea *ex ante*. Of urgent importance, would be the higher degree of criticism, both among academics and among practicing managers.

### 3. LEARNING ORGANIZATION

The roots of the learning organization concept some authors [11] placed in distant year 1947, however, a leading promoter of this concept is Peter Senge. In his book *The Fifth Discipline: The Art & Practice of the Learning Organization*, Senge [12] laid the foundations of learning organization. Per him, the basic disciplines that organization should meet to be consider as learning organization are systems thinking, personal mastery, mental models, shared vision and team learning. Fantasy Theme Analysis, a dramatically based method of rhetorical criticism developed by Ernest Bormann, could be used for suitable explanation of Senge’s *The Fifth Discipline* success [11]. Senge’s irresistible dramatically interpretation of



reality and rhetorical vision proved to be very successful, as it has inspired followers. Social foundations of his work were successful in inspiring followers, i.e. workers in organizations, in terms of their beliefs and convictions that the fate of the company will be in their hands, if they are actively engaged in building a learning organizations. After *the Fifth Discipline*, learning organization becomes a fad in management. In 1995, a year after the publication of Senge's book, learning organization reaches its peak as a fad, measured by learning organization's hits in the *ProQuest* database [13], and interest in learning organization began to fall sharply in the coming years.

We could observe the critics of learning organization from the perspective of postmodernism and from the perspective of critical realism, excluding the perspective of positivism as disadvantageous in this case (and in many others). Whilst a positivist tends to conclude his final judgment on just one phenomenon, even though the reality may be a result of interaction of many phenomena, a social constructivist does not see the reality, he constructs the reality in his mind, and therefore it is possible that there are as many realities in social constructivism as there are researchers. Unlike them, for a critical realist the reality is important, and he believes that there is only one reality. A critical realist does not seek the quantification of the reality, but the understanding of it, and he selects those phenomena, which best explain and best decode that one reality [14].

Postmodernists perspective is twofold [15], either the studying of learning organization as a Utopian sunshine or a Foucauldian gloom. For first postmodernist learning organization is an ideal that is close to a dream, for second one it is a nightmare for its members. This split is particularly apparent with regard to the following dimensions [15]: (1) control, (2) ideology, and (3) potentially painful employee experience. The first community presents learning organization as a new workplace paradise, while the second community presents learning organization as a negative ideology, as another way to exploit workers, locking them into „physic prison“ to serve the interests of those in power. Knowledge is power. Foucault argues that governance was achieved by knowledge, knowledge that came from subjugation and surveillance [16]. The basis of governance and management processes is the maximum utilization of company resources in quest to competitive advantage. That utilization asks for control of company's resources and workforce is one of the main resources of each company. Therefore, the role of knowledge in companies is problematic. Empirical studies [16] has shown that the organizations where knowledge is of primary importance are far from the ideal emancipated workplace. When an employee holds the knowledge that is valuable for the organization, it is rational to use that knowledge in his own interest to secure a better position in organization for himself, rather than for some rival employee in the organization, even for all employees.

Learning organization is an innovation of the post-industrial era. It's a postmodern approach to work that requires paradigm change in the organization, but all postmodernist theses based on the paradigm change are problematic [16]. The emergence of this concept occurs at the moment when Britain's companies show a lack of competitiveness, lack of skills and poor industrial relations, and as the panacea aroused learning organization, as an idealistic image of cooperation, harmony and flexibility of the satisfied and fulfilled employees. Learning organization is a state of humanistic unitarism, in which the charismatic leader empowers followers, giving them power and reduce its own. It is simply a not possible state; the charismatic leader certainly has no aspiration to minimize his power [17]. Indeed, economists on both sides of the Atlantic concluded [16] that better economic performance is the direct result of the leaders' success, along with sophisticated organizational restructuring.

It is also important to understand that the present era in which we are living, without going into debate how the postmodern can exist in modern time, does not make a fundamental shift in the political economy. Most work is still happening in a context of selling the labor to employers whose primary goal is to make a profit, certainly not to make an ideal organization for labor.

From the perspective of critical realism, the idea of a learning organization should be abandoned, because this imaginative idea has not even "run of steam", but it never had any [18]. Learning organization has failed to meet three objectives which are essential for any well-founded theory [18]: (1) a clear definition, (2) practical operational advice which managers can use, and (3) tools and assessment instruments to measure their achievements. The concept of learning organization ignores the ways of rewarding and punishing in organization, because it not recognizes the fact that management rewards those who contribute to the success and punishes those who make the damage, the terms measurable in financial form. How to quantify in financial terms the rewarding of those who learn more and the punishing *vice versa*; if it were possible to quantify these behaviors, the best companies would imply only PhD staff, and companies like that are extremely rare, if there are any.

Learning organization did not last very long due to the way in which learning in learning organization was understood and enacted [19]. The emphasis was on individual learning and individual change, but the organization itself, its management structure and business practices have remained unchanged. Learning in learning organization has been studied as an epistemological process, while the situational and social context was not the issue, and the learning process cannot be seen outside the situational and social context. A key argument against, in this context, is a democratic deficit in today's organizations [20]. The concept of learning organization is naively apolitical [18]. The political question is related to the fundamental question: for whose interest does the business organization exist, whether the interest of workers or the interest of capital? The answer is very straightforward. The legitimacy of managerial authority is a function of maximizing efficiency and effectiveness in the interests of capital. Imagine a potential scenario: if manager needs to lower labor costs, would he start to build a learning organization, which is expensive, or would he start to release the redundant workers? The interest of capital demands second option. In a contemporary social context where capital dominates, learning organization is pleading for a fluid, flexible, and adaptable postmodern future-oriented organization. That is simply impossible in the modern business environment. Therefore, we can point that this postmodern theory fails to recognize the limitations of its own paradigm [18].

It's easy to dismiss the idea of learning organization: simplistic, poorly researched, poorly conceptualized, and hopelessly unrealistic [21]. Learning organization is not only vaguely conceptualized theoretically, but problem lies in the lack of its exact definitions [15]. Field that covers learning organization is murky, with little systematic and cumulative research, with limited agreement on basic concepts and with little connection between normative prescriptions, on the one hand, and underlying concepts and research, on the other hand [22]. Learning organization treats organizations as they are human beings, it helps heuristic for thinking about organizational learning, however, that particular deficiency mystifying this phenomenon [23].

Although we are critics of learning organization, this does not mean that we are enemies of learning organization. The idea of learning is important and deserves attention. It may be of a central importance in efforts to manage change and achieve better performance in organizations [21]. The idea of learning merits attention and such attention should overcome

the limitations of the idea of learning organization. Business organizations are complex and complicate systems, very vulnerable to impacts of uncertain and unpredictable changes in the turbulent environment today. Simplified recipes, such as learning organization, are not helpful for modern organizations.

#### **4. CONTENT ANALYSIS OF THE LEARNING ORGANIZATION CONCEPT IN SERBIAN ACADEMIC JOURNALS**

In this empirical section, we analyzed the articles from the Serbian scientific journals, to determine whether the learning organization in the community of Serbian academic researchers is still a topical issue, or it is recognized as fad, as it is recognized in (English speaking) academic world. We analyzed the content of those articles that cover the topic of learning organization in April 2016. For content analysis, we used the Serbian national citation index or SCIndeks. It can be found on Internet at <http://scindeks.ceon.rs>. SCIndeks is the Serbian national citation index, developed to serve as an add-on to the international (Thompson-ISI) citation indexes. It is indexing locally published journals classified as periodicals of scientific character. There are 1,140,882 references from 78,388 articles, 35,348 of which are available as full text, published in Serbian journals from 2000 on, in humanities from 1996 on, and in social sciences from 1991 on.

In order to allocate the articles which cover the subject of learning organization in the Serbian national citation index (SCIndeks), we searched the whole database by using the search field “in article titles, abstracts and keywords” and by using the following terms: (1) učeća organizacija (Serbian); (2) organizacija koja uči (Serbian); (3) learning organisation (British standard) and (4) learning organization (American standard). Serbian terms represent the same concept, but for the security reasons we used also the English terms, because many of the articles contain an abstract in English. From the database, we allocated 264 articles (učeća organizacija: 8, organizacija koja uči: 29, learning organization: 13, and learning organization: 204), which in article title, abstract or keywords contained the term "learning organization". We restricted the search to the “social science: economics” discipline, because this discipline includes the articles from the field of management, which is the focus of our research. Thus, we narrowed down the number to 76 articles. When we removed the duplicates because of a duplication of terms, the number of articles has been reduced to 64. From the above mentioned 64 articles, as some journals are only available in English, six articles, or nine percent, have been published in English only. We sorted all the articles for further analysis by year of publication (Table 1). The result detected that in years 2011 and 2012 were the highest numbers of published research articles covering the subject of learning organization. That was the top, the maximum point of a typical bell-shaped curve of a management fad. Before and after year 2011 and 2012 data indicated that the number of published articles was lower.

Table 1. Number of articles covering the subject of learning organization per year

<b>Year</b>	<b>Number of hits</b>
2000	1
2001	1
2002	3
2003	3
2004	3
2005	6
2006	5
2007	6
2008	3
2009	4
2010	6
2011	8
2012	8
2013	3
2014	2
2015	2
<b>TOTAL</b>	<b>64</b>

Graphical representation of results indicates a positive trend (Figure 1), with an equation  $y = 0.15x + 2.725$ . 2011 and 2012 are years with the maximum number of papers published, eight per year. On the other hand, the first two years and the last two years, produced the lowest number of papers. Clearly, the results indicated that the number of articles that emphasize the learning organization phenomenon was absolutely increased before 2011 and 2012, with a sharp fall in year 2013 and onwards. Therefore, we can conclude that learning organization is detected as a management fad in Serbian language academic journals 17 years after it is detected in English language academic journals. It is interesting that there is not a single paper about the learning organization from the period when this concept was well-established phenomenon in English literature, but this period was the same period when UN sanctions against Milošević's Yugoslavia banned any academic cooperation between Serbia and the West.

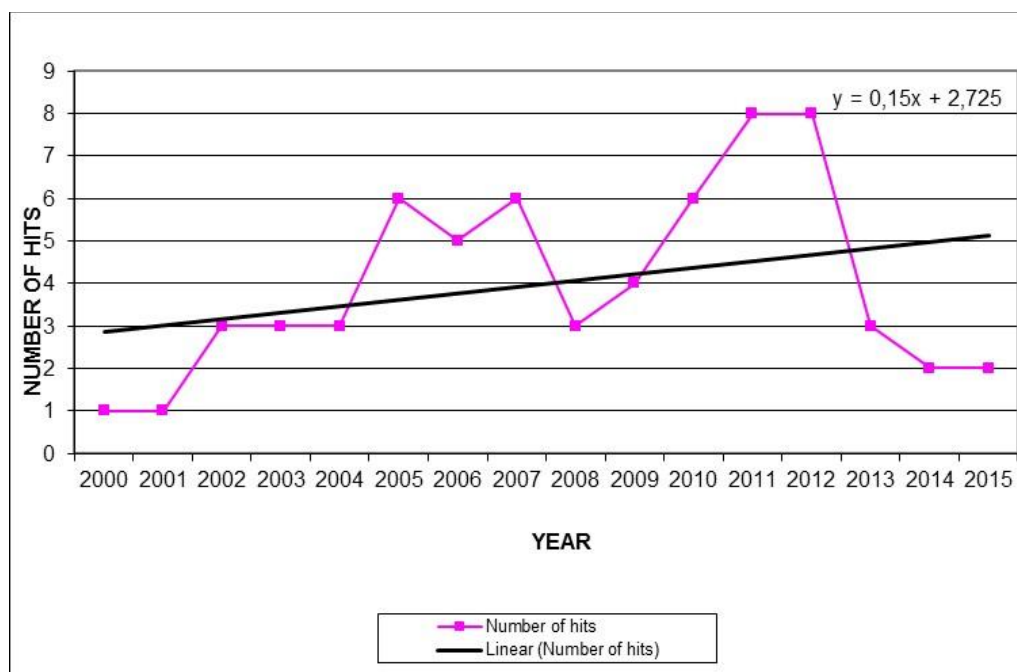


Figure 10. Number and trend line of learning organization hits in Serbian journals per year

To obtain more comprehensive results, we sorted the articles per the authors' attitudes against learning organization, either an affirmative attitude (positive articles) or a critical attitude (negative articles). How these articles are not only committed to the learning organization exclusively, we discovered several articles with a neutral attitude, as well. From the abstracts of these articles, we cannot find out whether the authors' attitudes against learning organization are positive or negative. We also sorted the articles as only theoretical in nature, or, if they include a business case, as more of practical use.

As we can see from the table (Table 2), the content analysis of abstracts of articles pointed that over half of articles positively evaluated the concept of learning organization, 34 of 64, or 53%. There were 30 articles that have neither a positive nor a negative attitude and none of the articles had a critical attitude towards learning organization. That is an alarming fact for the Serbian academic community. Criticisms of the learning organization in the English language journals are present for more than two decades, but Serbian authors intend to glorify the learning organization phenomenon. Further, the number of articles that cover only theoretical aspects of the researched subject is extremely high, 57, or almost 90%. We could notice that four of seven remaining practical articles have an affirmative approach to the subject of this study, the learning organization. Since the number of practical articles was very low, we could argue that the articles from our research have little or no practical value or impact.

Table 2: The content analysis of Serbian articles covering the subject of learning organization

No.	ARTICLES	YEAR	POSITIVE	NEGATIVE	NEUTRAL	THEORETICAL	PRACTICAL
1	Korporativno preduzetništvo, organizaciono učenje i implementacija znanja. Eric-Nielsen Jelena. Ekonomski horizonti, vol. 17, br. 3, str. 203-217, 2015	2015			YES	YES	
2	Organizacije bazirane na upravljanju znanjem. Manev Gjordji, Jakimovski Jorde. Škola biznisa, br. 1, str. 34-46, 2015	2015	YES			YES	
3	Odluke menadžmenta u savremenim kompanijama. Marković Jovka, Pavlović Marko. Ekonomija: teorija i praksa, vol. 7, br. 2, str. 86-113, 2014	2014			YES	YES	
4	Znanje intelektualni kapital - izvori konkurentne prednosti srske poljoprivrede. Vasiljević Zorica, Savić Bojan. Ekonomski vidici, vol. 19, br. 1, str. 11-24, 2014	2014	YES			YES	
5	Komparativna analiza konkurentnosti sektora malih i srednjih preduzeća republike Srbije i Bosne i Hercegovine. Beganović Admir I. Poslovna ekonomija, vol. 7, br. 2, str. 151-174, 2013	2013			YES	YES	
6	Teritorijalni inovacioni sistemi i njihov uticaj na privredni razvoj. Novaković Igor. Ekonomika, vol. 59, br. 1, str. 162-169, 2013	2013			YES	YES	
7	Učenje u virtualnoj organizaciji. Micić Radmila. Ekonomika, vol. 59, br. 4, str. 56-65, 2013	2013	YES			YES	
8	Evolucija i razvoj inovativne organizacije. Đorđević Branislav. Ekonomika, vol. 58, br. 1, str. 1-10, 2012	2012			YES	YES	
9	Izbor menia i optimalna vrednost inovacija u Srbiji. Marković Sanja, Arsić Ljiljana, Micić Radmila. Inovacije i razvoj, br. 1, str. 27-38, 2012 Jačanje kompetencija ljudskih resursa u cilju smanjenja nezaposlenosti. Urošević Srećana, Pejić Bojana, Kočeža Gordana. Ekonomski vidici, vol. 17, br. 3, str. 421-436, 2012	2012			YES	YES	
10		2012	YES				YES
11	Kontinualno učenje, poboljšanje i inovacije - case study: ENTEL. Raković Radoslav. Kvalitet i izvrsnost, vol. 1, br. 5-6, str. 23-27, 2012 Učeca sportska organizacija kao izraz novog preduzetništva u sportu. Nešić Milan, Nešić Branimir. Poslovna ekonomija, vol. 6, br. 1, str. 443-462, 2012	2012			YES	YES	
12		2012	YES			YES	
13	Strategija smanjenja troškova uvođenjem e-učenja u visokoškolskim obrazovnim institucijama. Ilić Blijana, Jovanović Violeta. Serbian Journal of Management, vol. 7, br. 1, str. 131-148, 2012	2012	YES			YES	
14	Uticaj organizacione kulture na organizacionu strukturu. Micić Radmila. Ekonomika, vol. 58, br. 2, str. 59-67, 2012	2012	YES				YES
15	Strategija smanjenja troškova uvođenjem e-učenja u visokoškolskim obrazovnim institucijama. Ilić Blijana, Jovanović Violeta. Serbian Journal of Management, vol. 7, br. 1, str. 131-148, 2012	2012			YES	YES	
16	Brendiranje i korporativna kultura. Claessens Roger. Bankarstvo, vol. 40, br. 7-8, str. 104-121, 2011	2011			YES	YES	YES
17	Promošavanje jaza učenja na tržištu visokog obrazovanja - e-learning i državna subvencija. Adel Ben Youssef, Le Texier Thomas, Ludovic Ragni. Economic Analysis, vol. 45, br. 3-4, str. 1-11, 2011	2011			YES	YES	
18	Procena velicina i znanja stečenih tokom konsalting intervencije. Mihailović Branko, Simonović Zoran, Paraušić Vesna. Ekonomika, vol. 57, br. 2, str. 102-111, 2011	2011			YES	YES	
19	Promene sistema ljudskih resursa pri realizaciji menadžmenta poslovnih procesa. Zakić Nebojša, Vukotić Svetlana. Ekonomika, vol. 57, br. 2, str. 137-145, 2011	2011			YES	YES	
20	Promene tradicionalne ka novoj paradigmati menadžmenta. Ničić Milica, Miletić Slavomir, Jovanović Duško. Ekonomika, vol. 57, br. 3, str. 74-83, 2011	2011	YES			YES	
21	Uticaj faktora organizacionog ponašanja i organizacione strukture na produktivnost zaposlenih u preduzeću Kraš. Dokić Aleksandar, Macura Rajko, Vujović Sklavoljub. Ekonomika, vol. 57, br. 3, str. 15-24, 2011	2011			YES		YES
22	Uticaj nacionalnih kultura na stil liderstva u internacionalnim organizacijama. Krasulja Nevena, Gajanca-Radojević Ivana, Cvjetanović Dušan S. Ekonomika, vol. 57, br. 3, str. 33-47, 2011	2011	YES			YES	
23	Znanje i perspektiva organizacionog učenja kao faktor inovativnosti i unapređenja performansi lanca snabdevanja. Cvetković Miodrag. Poslovna politika, vol. 40, br. 1-2, str. 58-62, 2011	2011	YES			YES	
24	Liderstvo u organizaciji koja uči. Micić Radmila. Ekonomika, vol. 56, br. 3, str. 45-54, 2010	2010	YES			YES	
25	Menadžment znanja. Stanojević Dražena. Anali Ekonomskog fakulteta u Subotici, br. 23, str. 207-217, 2010	2010	YES			YES	
26	Model organizacije koja uči u radiodifuznoj industriji Republike Iran. Najafbagy Reza, Doroudi Homa. Serbian Journal of Management, vol. 5, br. 2, str. 213-225, 2010	2010	YES				YES
27	Obrazovne institucije kao organizacije koje uče - potreba za promenom paradigme. Zovko Vatroslav, Šimović Vladimir, Nježić Zoran. Anali Ekonomskog fakulteta u Subotici, br. 23, str. 15-21, 2010	2010	YES			YES	
28	Strategic innovation throughout reorganization of existing business-production model in the context of developing complex ICT structure with high standards. Šimović Vladimir, Nježić Zoran, Zovko Vatroslav. Strategic Management, vol. 15, br. 2, str. 32-38, 2010	2010			YES	YES	
29	Unapređenje poslovne konkurentnosti razvojem klastera. Stanković Ljiljana, Đukić Suzana. Ekonomika preduzeća, vol. 58, br. 3-4, str. 131-139, 2010	2010			YES	YES	
30	Implications of the balanced scorecard on organizational behaviour. Janjčević Nebojša. Strategic Management, vol. 14, br. 1, str. 3-15, 2009	2009			YES	YES	
31	Knowledge management and intellectual capital management coupled to quality management system lead to business success. Živojinović Stevan, Stanićević Andrej. International Journal for Quality Research, vol. 3, br. 1, str. 17-25, 2009	2009	YES			YES	
32	Menadžment, marketing koncept i intelektualni kapital. Mihajlović Dragan, Trandafilović Igor, Vidanović Marija. Marketing, vol. 40, br. 1, str. 45-49, 2009	2009	YES			YES	
33	Razvoj ljudskih resursa kao strateški faktor konkurentne prednosti preduzeća. Vemč-Durković Jelena. Facta universitatis - series: Economics and Organization, vol. 6, br. 1, str. 59-67, 2009	2009	YES			YES	
34	Menadžment ljudskih resursima kao deo poslovne izvrsnosti. Petronjević Miloš. Kvalitet, vol. 18, br. 11-12, str. 68-72, 2008	2008			YES	YES	
35	Pravo na grešku - učeca organizacija prema zahtevima standarda ISO 9004:2008. Kukrić Milan. Kvalitet, vol. 18, br. 9-10, str. 51-52, 2008	2008	YES			YES	
36	Procesni pristup i demokratski menadžment. Perović Milan J. Kvalitet, vol. 18, br. 7-8, str. 9-12, 2008	2008	YES			YES	
37	Kreiranje učeca organizacije kao jedan od savremenih izazova menadžmenta. Đukić Maja. Ekonomika, vol. 53, br. 5-6, str. 61-67, 2007	2007	YES			YES	
38	Menadžment organizacije u lancu snabdevanja sa dinamičnim efektom organizacionih pravila. Vodopivec Robert, Kristov Ljupčo. Facta universitatis - series: Economics and Organization, vol. 4, br. 2, str. 91-107, 2007	2007	YES			YES	
39	Obuka i razvoj zaposlenih u učeca organizacija. Vemč Jelena. Facta universitatis - series: Economics and Organization, vol. 4, br. 2, str. 209-216, 2007	2007	YES			YES	
40	Ocenjivanje upravljanja operativnim rizicima u bankarstvu koji potiču od informacionih i komunikacionih tehnologija. Đurković Jovica, Ristić Žvan, Trninić Jelica, Prokić Mirjana. Strategijski menadžment, vol. 12, br. 3-4, str. 2-5, 2007	2007			YES	YES	
41	Upravljanje rizicima implementacije koncepta Six Sigma. Anđelković-Pešić Marija. Strategijski menadžment, vol. 12, br. 3-4, str. 140-143, 2007	2007			YES	YES	
42	Uticaj strategijskog reagovanja na rizike - simulacija tržišnog učeca i pozicioniranja. Jovović Radislav. Strategijski menadžment, vol. 12, br. 3-4, str. 92-97, 2007	2007			YES	YES	
43	Human resources and high performance in Romanian companies. Preconceptions and realities. Abrudan-Pop Denisa. Strategijski menadžment, vol. 11, br. 1-2, str. 70-75, 2006	2006			YES	YES	
44	Kreiranje učeca organizacije kao jedan od savremenih izazova menadžmenta. Đukić Maja. Poslovna politika, vol. 35, br. 9, str. 62-65, 2006	2006	YES			YES	
45	New dimensions of management in Romanian organizations: High performance organizations. Abrudan-Pop D, Novac E. Serbian Journal of Management, vol. 1, br. 2, str. 115-121, 2006	2006	YES			YES	
46	Permanentni razvoj ljudskih resursa - uslov razvoja preduzeća. Radovanović Vladimir. Kvalitet, vol. 16, br. 9-10, str. 95-97, 2006	2006			YES	YES	
47	Poslovno-tehnološke osnove menadžmenta znanja. Banjanin Mikrod K., Petrović Latinka. Poslovna politika, vol. 35, br. 4, str. 58-62, 2006	2006	YES			YES	
48	Europa znanja - organizacija koja uči i sustav upravljanja kvalitetom. Avelni-Holjevac Ivanka. Kvalitet, vol. 15, br. 3-4, str. 38-41, 2005	2005	YES			YES	
49	Praktična primena modela izvrsnosti. Trajković Vladimir. Kvalitet, vol. 15, br. 5-6, str. 40-42, 2005	2005			YES	YES	
50	QMS/TQM/CIE novi pristup upravljanju procesima. Perović Milan J. Kvalitet, vol. 15, br. 11-12, str. 35-38, 2005	2005			YES	YES	
51	Razvoj zaposlenih kao osnova organizacionog razvoja. Pržulj Žilka. Strategijski menadžment, vol. 10, br. 1-2, str. 65-68, 2005	2005			YES	YES	
52	Uloga i značaj učenja u procesu strategijskog menadžmenta. Janošević Stevo. Strategijski menadžment, vol. 10, br. 1-2, str. 3-7, 2005	2005	YES			YES	
53	U skladu sa nematerijalnim aktivima u interm procesima i strategijom preduzeća. Jovović Radislav. Strategijski menadžment, vol. 10, br. 1-2, str. 105-110, 2005	2005	YES			YES	
54	Poljika bezbednosti rada u zdravstvenim ustanovama - poseban osvrt na bezbedan rad MRI centara. Jakovljević Blijana, Stvanović Jasmina, Penđić Rajko, Jakovljević Bojana, Penđić Zoran. Kvalitet, vol. 14, br. 9-10, str. 86-90, 2004	2004	YES			YES	
55	Učenje na daljinu i nove mogućnosti obrazovanja za kvalitet zaposlenih. Papić Ljubisa, Ristić Miroslava R, Mihunović Sida. Kvalitet, vol. 14, br. 1-2, str. 93-96, 2004	2004			YES	YES	
56	Uticaj zainteresiranih strana na uspešnost organizacije. Mileković Rudolf. Kvalitet, vol. 14, br. 11-12, str. 50-53, 2004	2004			YES	YES	
57	Intelektualni kapital i uvaretoženi pokazatelji uspeha. Marković Nenad. Kvalitet, vol. 13, br. 1-2, str. 88-91, 2003	2003	YES			YES	
58	Obuka i usavršavanje zaposlenih kao element strategije razvoja organizacije. Zubanov Violeta. Strategijski menadžment, vol. 7, br. 4, str. 99-102, 2003	2003	YES			YES	
59	Osnova znanja kompanije. Orlić Ranko. Poslovna politika, vol. 32, br. 6, str. 45-48, 2003	2003	YES			YES	
60	Kombinovanje modela dobivenih tehnikom data mining. Ristić Žvan, Balaban Nedo. Strategijski menadžment, vol. 6, br. 4, str. 14-20, 2002	2002			YES	YES	
61	Regionalna strategija integracije realnog sektora u EU - želje, mogućnosti i izazovi - slučaj Vojvodine. Adžić Sofija. Ekonomski, vol. 55, br. 3, str. 93-103, 2002	2002			YES	YES	
62	Značaj nove paradigmati menadžmenta. Đorđević Branislav. Ekonomski pogledi, vol. 2, br. 1-2, str. 15-30, 2002	2002	YES				YES
63	Neke dimenzije i izazovi upravljanja promenama u procesu transformacije preduzeća. Janošević Stevo. Strategijski menadžment, vol. 5, br. 1, str. 56-60, 2001	2001			YES	YES	
64	Znanje u funkciji strategije organizacije koja uči. Đorđević Branislav. Strategijski menadžment, vol. 4, br. 2, str. 39-44, 2000	2000	YES			YES	
<b>TOTAL</b>			<b>34</b>	<b>0</b>	<b>30</b>	<b>57</b>	<b>7</b>

How to explain these findings? We stated that learning organization was recognized as a management fad in Serbia too, with a time-lag of 17 years, because data clearly indicated a bell-shaped curve. However, if there is an absence of the negative articles, i.e. articles with a critical tone towards learning organization, can we presume that the trend of declining of the articles covering learning organization subject is just produced as an echo from the world's contemplative science? Maybe the sharp decline of popularity of this concept was reaction of the editors from Serbian academic management journals and perhaps they are not interested in that topic anymore. Quite possible is that researchers also noticed the absence of that topic as an additional echo, as well.

## 5. CONCLUSION

In the title of this paper we asked if the learning organization today is a fad. A variety of arguments that the learning organization is a management fad we provided in our text. It is a fad, which hit its peak in the mid-last decade of the last century. Today this concept in contemporary management literature more and more is vanishing, as many scholars provided the ample evidence of its uselessness.

However, the Serbian academic community presents a different picture of the learning organization concept. The Serbian academic community is a small community of researchers who publish the articles mainly in Serbian, which is not the international language of the research community, and therefore those articles are not a part of the massive world knowledge corpus in English language. Unlike the contemporary world practice, the Serbian citation index indicated that the study of learning organizations stayed vivid in Serbian academic area 17 years after the detection of this concept as a fad in the international literature. The percentage of the affirmative articles, as well as a small number of articles of practical use, is disturbing. Our conclusion, based on the empirical evidence from this research, is that Serbia is lagging the contemporary knowledge in management science for nearly two decades, and that this gap will not positively affect a development of the Serbian management theory and practices.

The content analysis of the articles covering the phenomenon of learning organization in Serbian journals has been performed with the aim to compare the scientific knowledge in one economically underdeveloped country with the world's contemporary scientific knowledge in area of management. The countries that are economically underdeveloped do not have sufficient funds to invest in science and these countries have a science that is lagging the world, which further has the devastating feedback effect on the economy and, at the end, the society at whole. Unfortunately, Serbia is one of these.

Is learning organization a fad? We argue, without hesitation, that learning organization a fad is. Does contemporary Serbian science recognize that this concept is a management fad? The answer is a positive one, but we still have a doubt if this is more a result of an echo from the international academic community, than a result of the domestic research findings. Is the study of learning organization concept still needed today in Serbia, a concept which is not recognized in contemporary management science? It is not needed. We argue that learning organization should be left where it belongs, in the history with all other concepts proven to be the unproductive fads. Study of the learning organization today in Serbia or elsewhere is a pure waste of time.

## REFERENCES:

- [1] H. Mintzberg, The manager's job: folklore and fact, *Harvard Business Review*. 53 (1975) 49–61.
- [2] P. Kotler, K. Keller, *Marketing Management*, 13th ed., Prentice Hall, 2008.
- [3] J.W. Gibson, D.V. Tesone, Management fads: Emergence, evolution, and implications for managers, *The Academy of Management Executive*. 15 (2001) 122–133.
- [4] R. Williams, Management fashions and fads: Understanding the role of consultants and managers in the evolution of ideas, *Management Decision*. 42 (2004) 769–780.
- [5] P.A. Furnham, *Management and Myths: Challenging the Fads, Fallacies and Fashions*, Palgrave Macmillan, 2004.
- [6] J.W. Gibson, D.V. Tesone, C.W. Blackwell, *Management Fads: Here Yesterday, Gone Today?*, S.A.M. *Advanced Management Journal*. 68 (2003) 12–17.
- [7] E.C. Shapiro, *Fad Surfing In The Boardroom: Managing In The Age Of Instant Answers*, Basic Books, 1996.
- [8] J. Balogun, V.H. Hailey, *Exploring Strategic Change*, 2nd ed., Financial Times Management, 2003.
- [9] K.K. Naidoo, Fundamental concepts: The solution to contemporary management problems--A sine qua non or non sequitur?, *South African Journal of Business Management*. 35 (2004) 47–55.
- [10] S. Bort, A. Kieser, Fashion in Organization Theory: An Empirical Analysis of the Diffusion of Theoretical Concepts, *Organization Studies*. 32 (2011) 655–681. doi:10.1177/0170840611405427.
- [11] B.G. Jackson, A fantasy theme analysis of Peter Senge's learning organization, *The Journal of Applied Behavioral Science*. 36 (2000) 193–209.
- [12] P.M. Senge, *The Fifth Discipline: The Art & Practice of the Learning Organization*, 1st ed., Doubleday Business, 1994.
- [13] J. Loermans, Synergizing the learning organization and knowledge management, *Journal of Knowledge Management*. 6 (2002) 285.
- [14] S. Adžić, Uticaj kritičkog realizma na istraživačke procedure u menadžment istraživanjima ili Moja britanska iskustva o metodologiji u menadžmentu, in: D. Ristić (Ed.), *Metodologija poslovnog istraživanja: monografija*, Fakultet za menadžment, Sremski Karlovci, 2012: pp. 15–36.
- [15] M. Driver, The learning organization: Foucauldian gloom or Utopian sunshine?, *Human Relations*. 55 (2002) 33–53.
- [16] G. Symon, Consilio manueque: The learning organization paradigm and the problem of unity, *Tamara : Journal of Critical Postmodern Organization Science*. 2 (2003) 36–54.
- [17] Z. Sajfert, S. Adžić, J.M. Cvijanović, *Korporativno liderstvo*, Tehnički fakultet "Mihajlo Pupin," Zrenjanin, 2012.
- [18] J. Grieses, Why we should abandon the idea of the learning organization, *The Learning Organization*. 15 (2008) 463–473. doi:http://dx.doi.org.proxy.kobson.nb.rs:2048/10.1108/09696470810907374.
- [19] B. Elkjaer, The learning organization: An undelivered promise, *Management Learning*. 32 (2001) 437–452.



- [20] J. Coopey, The Learning Organization, Power, Politics and Ideology Introduction, *Management Learning*. 26 (1995) 193–213. doi:10.1177/135050769502600204.
- [21] G. Salaman, A response to Snell: The learning organization: Fact or fiction?, *Human Relations*. 54 (2001) 343–359.
- [22] W.M. Snyder, T.G. Cummings, Organization learning disorders: Conceptual model and intervention hypotheses, *Human Relations*. 51 (1998) 873–895.
- [23] V.J. Friedman, R. Lipshitz, M. Popper, The Mystification of Organizational Learning, *Journal of Management Inquiry*. 14 (2005) 19–30. doi:10.1177/1056492604273758.

## QUALITY OF SPORT AND RECREATIONAL SERVICES IN TOURISM OF STRUGA REGION (R. MACEDONIA) - APPLICATION OF ADOPTED SERQUAL MODEL

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**Abstract:** The needs of the modern tourist did segment the tourist services whose tendencies is to offer quality of the stay that will be defined as value for money, as well as value of time. The loyalty towards the selected destination is determined also with the sense of satisfaction, which in turn undoubtedly is derived and connected with the quality of the services offered (Chen & Chen, 2010; Chen & Tsai, 2008; Hutchinson, Lai, & Wang, 2009).

Maintaining the pace with the intense competition implies the necessary inclusion of services that reflects the processes of awareness of sport & recreational activities on one side, and continuous evaluation of the processes on the other side.

An adopted SERQUAL questioner was distributed to 150 tourists with different socio-demographical characteristics, users of sports & recreational services based on the natural – geographical features visiting the region of Struga (Republic of Macedonia), as one of the leading tourist destination in the country. Testing the difference of arithmetic factors perceived and expected quality of service (T-test for large depended samples), has revealed the emergence of gap in the direction of higher expectations in all five factors, four with significant statistical gap. Biggest gap has appeared at the tangibility factor which indicates intervention in the physical qualities of the service (hygiene and slurs on the ground, availability of printed information), while the empathy factor was the lowest ranked which shows a selection of sports instructors based on emotional intelligence. After all, due to non-specific activities in the field unknown to the users, this factor of empathy occurs as the highest ranked perceptual quality of service. The findings should help in process of innovation of services offered in order to build a satisfied and loyal tourist, and thus the sustainability of the tourist destination

**Keywords:** Service quality (SERQUAL), sport tourism, tourist destination, Republic of Macedonia, factors.

### 1. INTRODUCTION

The needs of the modern tourist did segment the tourist services whose tendencies is to offer quality of the stay that will be defined as value for money, as well as value of time.

The loyalty towards the selected destination is determined also with the sense of satisfaction, which in turn undoubtedly is derived and connected with the quality of the services offered (Chen & Chen, 2010; Chen & Tsai, 2008; Hutchinson, Lai, & Wang, 2009).

Maintaining the pace with the intense competition implies the necessary inclusion of services that reflects the processes of awareness of sport & recreational activities on one side, and continuous evaluation of the processes on the other side.

Instrumentation and standardization of the quality evaluation services is a subject of discussion in the scientific circles on which there is no consensus. For some the quality it is tied to the concept of perceived satisfaction with the service, and for the others it is a theory of disconfirmation (comparison between expectations and actual performance - Dabhalkar at all, 2000, cited by Madzar, T at all, 2016). The evaluation of the quality of service is not only due to the beneficial effect of the service offered, but also as result of the whole process of services offered (Parusaraman at all, 1985). Therefore „successful service quality requires a dramatic shift in focus by service providers from transaction orientation to relationship building. The true success of this relationship depends on genuine interaction at a personal level, with an authentic understanding of customer requirements in order to be successful”. (Tseane, L., 2006).

SERQUAL is the most exploited research model designed by Parusaraman at all (1991) for measuring of the quality of the services offered who's function is to determine what companies should do to be perceived as high – quality service delivers (cited by Tseane, L, 2006). The model defines five dimensions of the quality: tangibility, reliability, responsiveness, assurance and empathy. The level of importance of each of the mentioned dimensions varies from one activity to another activity. Therefore, the model it is criticized when used in different activities for its applicability; therefore, other dimensions are extracted as important.

Pantouvakis (2010) in the quality of the service finds the physical and interactive dimension, and it's criticizing the SERQUAL model stating that does not reflect the importance of the physical quality of the service (cited by Madzar at all, 2016).

The form and method of use of physical exercise result in a multidimensionality of sports forms that produce a different variety and forms of sports tourism services that place the tourist in the position of active and paciven user of the services offered. In context, Chelladurai (1992) classified sport services into two broader sets: (1) participant services; and (2) spectator services (cited by Chiu at all, 2012).

This specification has resulted in a proliferation of proposals of measuring service quality in sport environments (Jasiusnas at all, 2013, Serrano at all, 2013).

In addition, Howat et al. (1996) developed the Centre for Environmental and Recreation Management-Customer Service Quality (CERM-CSQ) scale to measure four dimensions of service in public sport and leisure centers. These dimensions are: (1) core service, including program information, range of activities, facilities comfort, value for money, and quality equipment; (2) staff quality, including staff responsiveness, staff knowledge, and officials; (3) general facility, including safe parking and facility cleanliness; and (4) secondary service, including food and drink and child minding.

Theodorakis at all (2001), has modified the SERQUAL method and naming it as SPORTSERV and used in basketball clubs, considered five factors: access, reliability, responsiveness, tangibles and security (Moreno at all, 2016). While analyzing the quality of the outdoor, the same author (Theodorakis at all, 2015) posit three-dimension assessment of outdoor leisure services: outcome quality, interaction quality, and physical environment quality. “Outcome quality” relates to the fulfillment of a customer's expectations after participating in an activity. “Interaction quality” refers to customers' experience with activity personnel. “Physical environment quality” relates to service components, such as ambient conditions, social factors, and design of the activity. Kouthoris & Konstantinos (2005) also have pointed out the discussion for applicability of the SERQUAL for recreational sport – tourist activities based on natural resources. The justification for this statement is represented

in the knowledge that the offerer of such sport service has no authority to control all dimensions that this model measures. In retrospective of this, the other sports and recreational activities in tourism although they are a conglomerate of individual services, the tourist experiences sports tourism product as a whole and any intervention in the quality of the services must be shared by all parties that are part of it.

The specifics of the sports services on the type of physical activities rarely as the other services depends on the willingness of the provider to place the user in the role of testing its abilities, moving their borders and recognizing and learning of the different skills that differ of the stereotyped daily physical dynamics. Therefore, some of the dimensions are ranking higher when compared to others. In this regard, Lee at all (2001) carried out segmentation of the satisfaction in golf services by gender with application of SEQUAL questionnaire testing the adaptability in the same time with this type of outdoor activities. The dimensions of empathy and tangibles are the most important for determining satisfaction of both male and female. Female golfers tended to pay more attention to physical representations, cleanliness and appearance of service encounters.

In terms of repositioning the map of competitiveness, Struga region as one of the leaders of Macedonian tourism in which the intensity of international tourist trade grow, includes sports activities based on the natural resources as an integral part of tourist offer. Experiences show that the sports services provider are the sports clubs that exist and operate on that particular territory and the level of the connection of the activities it is a step forward in terms of the prior absolute independence of the activities. This results in more applicative actions in the development of the sports tourism as a form through which subsequently has established itself as a modern tourist destination. The idea of this paper is to evaluate the sports services offered and accurately model the SERQUAL to detect space for intervention in those dimensions that are or are not under the direct control of the provider of the services in this case the sports clubs and in the context of raising customers/tourists satisfaction.

## **2. METHODOLOGY OF RESEARCH**

SERQUAL model according Blesic, Romelic i Bradic (2009), with 24 variables it is applied to 150 tourists with different social-demographic characteristics. The very same model was adopted for the activity that is subject of this study – outdoors sports activities. The questionnaire was distributed before and immediately after participation in the outdoors sports activities. The first questionnaire it is defined as expectation and the second questionnaire as perceptions of the service. Tourist were evaluating each variable in the questionnaire using the Likert scale of 1 to 5 (Table 1).

Table 1. Meaning of the evaluation by Likert scale

Grade	Meaning for the grade of evaluation of the table expectation	Grade	Meaning for the grade of evaluation of the table perception
1	Completely irrelevant	1	Completely disagree
2	Almost irrelevant	2	Partially disagree
3	No particular importance	3	Neither disagree nor agree
4	Almost important	4	Partially agree
5	Completely important	5	Completely agree

Source: Belicic, I., Romelic, J., Bradic, M.: The use of modified SERQUAL model in evaluation of the quality of the hotels services in West Morava region, 2009.

Based on the processed data the heterogeneous structure of the tourists it is visible in each category. Males are more common, the majority of the tourists or 42% are aged from 19 to 25, with predominantly secondary or higher education and an average monthly income in the country of origin. Weekly physical activity it is joined to the characteristics by the reason that is important for the subject of the study and the representativeness of the sample. Given that 70% of them practice physical activity recreationally, it meets the criterion of representativeness.

**The main objective** of the paper is to evaluate the quality of outdoor sport services in Struga region. To achieve the objective the **following tasks** are imposed:

- To determine SERQUAL gap level of individual, determinant and system level;
- To determine the difference between expected and perceptive mean of determinants of the quality of sports – recreational services;

Based on the defined subjects, purpose and objectives the **following hypotheses is extracted** and defined as expected:

X1: Negative gap is expected on the determinants of quality as well as the systematic with expression of mild dissatisfaction with regards of the expectations with largest gap at the tangibility determinant.

X2: Statistically significant difference is expected on the expected and perceptual arithmetic mean of all determinants of quality of service;

Data processing was performed with the statistical package “Statistica 7.0”, and with use of basic descriptive statistical parameters of central tendency and dispersion. Testing the difference between the arithmetic means of the expectations and perceptions of the quality of service for tourists will be tested by t-test for large dependent samples.

### 3. RESULTS AND DISCUSSION

The difference between perception and expected quality of the service is negative in all of the determinants of quality (**table 2**). Tourists have highest expectations for determinates of **safety and responsibility**, which is followed by the determinants of **reliability and empathy**. Taking into account the small differences in the arithmetic mean between the determinants it can be concluded that all are equally important to users of sports

– recreational services. Higher are the expectations for tangibility variable associated with the physical qualities service regardless of its rank of 5 in the others expectations.

Table 2. Difference between expected and perceptive quality of sports – recreational service (SERQUAL gap)

Determinants of quality	Perception (X)	Rank	Expectations (X)	Rank	SERQUAL gap
<b>Tangibility</b>	4.09	<b>5</b>	4.83	<b>5</b>	-0.74
<b>Reliability</b>	4.74	<b>2</b>	4.97	<b>3</b>	-0.23
<b>Responsibility</b>	4.66	<b>3</b>	4.99	<b>1</b>	-0.33
<b>Safety</b>	4.65	<b>4</b>	4.99	<b>1</b>	-0.34
<b>Empathy</b>	4.83	<b>1</b>	4.97	<b>3</b>	-0.14
Total SERQUAL gap	<b>4.59</b>		<b>4.95</b>		<b>-0.36</b>

Assessments of perception of quality are the highest among the determinants for **empathy**, followed by **reliability and responsibility**. The absolute difference in the arithmetic means of determinants it is still high and is reflecting the quality, in this case is small. The lowest-rated quality perception has determinant tangibility (4:09), which is not surprising taking into account the physical qualities of the terrain and the equipment offered for implementation of sports services (configuration, hygiene, security and stigmatization of the field of service, quality of sports equipment, prospectuses, brochures, and other voting service in general, etc.). For that reason, SERQUAL gap is greatest in this determinant (-0.74). It is a reflection of the attitude of the society in general to sports activities as culture of living. The lowest gap it has registered in the determinant empathy indicating readiness of sports instructor for the same

The total SERQUAL gap was negative and amounted to -0.36 which means that there is a global disparity between expectations and perceptions of the quality of the service offered. Over this average is only variable tangibility emphasized above, whose gap is greatest while all other determinants are smaller gap than the global. **This confirms the first hypothesis.**

Table 3. The most important questions about the expectations of the consumers about the quality of sports - recreational service

	Questions	Determinant	X
1	The terrain should be available and have good configuration	Tangibility	5
2	The provider of sports – recreational services should respect the agreed services from the beginning of the service until its completion	Reliability	5
3	The provider of sports – recreational services should always be ready to help the users of the service	Responsibility	5
4	At the request of users of the service sports animator needs to act quickly and without any delay	Responsibility	5
5	Sports animator should have adequate vocational training, knowledge and meets the professional requirements in fulfilling the needs of users of the service	Safety	5
6	Users of the service should feel safe while using the services provided (personal and material security)	Safety	5
7	Sports instructor should pay individual attention to each client	Tangibility	5
8	The provider of sports - recreational service should show understanding of the problems facing the user of the service	Reliability	5
9	The provider of sports and recreational services should be accessible and always ready to answer the questions of users of the service	Responsibility	4.98
10	Sports instructor should be polite to users of the service	Safety	4.96
11	Sports instructor should refer to users of the service in sincere and sympathetic manner	Tangibility	4.96
12	Sports instructor should understand the specific needs of each user of the service	Tangibility	4.96

From **Table 3**, it is evident that users of the service have equally high expectations regarding the issues of all determinants of quality. After all, of the allocated top 12 of the 24 questions the lowest expectations is for the determinant tangibility, although the number of issues it is the most dominant determinant. When providing the sport - recreational service the burden as opposed to other types of services falls on sports instructor therefore not surprising that the highest expectations is tied with the activities of timeliness, commitment, vocational training, skills, managing change, quick response, etc. and with an average value of absolute expectation (5.00).

The **table 4**, is showing and addresses the issues with highest SERQUAL gap, and it is clear that all belong to the determinant tangibility. Despite lower expectations for this determinant by users compared to other determinant, still assessing the perceived quality of services has given the greatest gap. After all of these questions in offering sports - recreational services, most of the interventions should be made in that direction in order to improve the service. It is primarily the investment in visual information media such as brochures, leaflets, topographic maps, then marking the field, hygiene and spacious furnishing and safety.

Table 4. Top five questions with greatest SERQUAL gap

	Questions	Determinant	SERQUAL gap
1	Prospectuses, brochures, topographic maps to be visually appealing	Tangibility	-1.45
2	The terrain should be visually appealing (info boards, arrows, directions, symbols, buoys)	Tangibility	-1.28
3	The environment should be collated, clean and secured	Tangibility	-0.87
4	The terrain should be available and have a good configuration	Tangibility	-0.77
5	The provider of sports - recreational service should be able to organize entertaining activities outside the event	Tangibility	-0.67

The general conclusion is that all determinants are equally important to users of the service with the most problematic are those outside the full domain of influence of service providers. Because analyzed sports - recreational services are tied to the natural configuration of the terrain, and its arrangement is associated with institutions responsible on municipal and central level, coordination in all interventions in matters which have proven with the questions with the largest gap should be the relationship of service providers - municipal - central level.

Table 5. T - test samples dependent on expectations and perception among the determinants of the quality of sports - recreational service

Determinants of quality		X	Sd	t - test	Q (p-level)
Tangibility	Expectation	4.83	0.18	7.7	0.00
	Perception	4.09	0.48		
Reliability	Expectation	4.97	0.3	6.35	0.00
	Perception	4.74	0.2		
Responsibility	Expectation	4.99	0.24	17.39	0.00
	Perception	4.66	0.37		
Safety	Expectation	4.99	0.02	23.50	0.00
	Perception	4.65	0.04		
Empathy	Expectation	4.97	0.24	1.74	0.22
	Perception	4.83	0.70		

Based on the results shown in **Table 5**, it can be concluded that there are statistically significant differences between expectations and perception of sport - recreational service for 4 from 5 determinants of the quality level of  $Q = 0.00$ , **which confirmed second hypothesis**. Only at determinant empathy gap which appeared between arithmetic expectations and



perception is not statistically significant. The difference of all determinants is in the direction that more is expected than it is perceived the current situation. The standard deviation as a measure of the average deviation of the individual results from the arithmetic mean is lower in all cases of expectations in terms of perception.

For reasons that in all determinants except one has appearance of statistically significant difference in arithmetic means, then gap gets validity, and we can say that the expectations of tourists were higher compared to received quality sports - recreational service. The greatest dissatisfaction it is with the determinant tangibility, but the emergence of a gap also in the other determinants where the key role is the human factor i.e. sports instructor. Therefore, should encourage the means of additional education towards the psychology of the tourists that participates in sports activities, for the reason of the evident difference when compared to the psychology of the athlete participating in sports activities. Among first there is no space for added impact of quality on the one hand and on the other hand, due to the limited residence time gets value. Sport - recreational service is just part of the general level of satisfaction with the entire travel package and evaluation in general is stricter than usual.

#### **4. CONCLUSION**

Keeping up with the competition, and achieving competitive advantage, the destination can achieve with innovative new products and services that it generated by various forms of tourism. However, in this process, should not compromise the level of service quality. Although, the assessment of quality it is linked to the user's experiences, it is necessary to have continuous monitoring of satisfaction of all users. The complexity of services in tourism is because of their interdisciplinary, which in turn emphasize the need for inter-sectorial collaboration, depending on which form of tourism service belongs. From the research, the statistical significance of the difference in the direction of greater expectations of perception is visible. This should not underestimate the high mean of particular dimensions of certain variables in dimension. Intersectional cooperation, i.e. the competence of administrative bodies are the factor that determines the quality of service over the responsibilities they have in the regulation of the environment. On the other hand, the continuous education of service provider in terms of the specifics of the service user/tourist is a key factor in raising the quality of sport services based on natural resources in tourism. Therefore, this obtained information generates further policy development, which is oriented towards the creation of services that suit the wishes and needs of the user in order to build a satisfied tourist that should become loyal tourist.

#### **5. REFERENCES**

1. Блешин И., Ромелин Ј., Брадин М.: Примена модификованог SERQUAL модела у оцени квалитета хотелских услуга на примеру западноморавске бањске зоне. *Journal of the Geographical ...* 2009, 137 Vol. 59 NO 1, p.121-138.
2. Calabuig-Moreno F., Crespo-Hervas J., Prado-Gasco V., Mundina-Gomez J., Valantine I., Stanislovaitis A.: Quality of Sporting Events: Validation of the Eventqual Scale, *Transformations in Business & Economics*, 2016. Vol. 15, No 2 (38), pp.21-32.

3. Chen, C-F., & Chen, F-S.: Experience quality, perceived value, satisfaction and behavioral intentions for heritage tourists. *Tourism Management*, 2010. Vol. 31(1), p. 29-35.
4. Chiu L.K., Radzuwan R.B., Ting C.S.: Assessing Sport and Recreation Programmes' Service Quality at Hotels and Resorts: Towards Enhancing Customer Participation. *Journal of Tourism and Hospitality Management*, ISSN 2328-2169. January 2014, Vol. 2, No. 1, 6-17
5. Jasinskas E., Reklaitene D., Svagzdiene B.: Evaluation of Service Quality in Fitness Centers. *Transformations in Business and Economies*. 2013, Vol 12, No 1, p.108 - 124
6. Lee JH, Kim HD, Ko YJ, Sagas M,: The influence of service quality on satisfaction and intention: A gender segmentation strategy. *Sport Management Review*, 2011. Vol. 14, p.54-63.
7. Kouthoris C., Konstantinos A.: Can service quality predict customer satisfaction and behavioral intention in sport tourism industry? An Application of SERQUAL MODEL IN AN OUTDOOR SETTING. *Journal of sport tourism*, 2005, Vol.10(2), p. 101-111.
8. Madžar T., Lazibat T., Mikuli J.: Mjerenje kvalitetete usluga u zdravstvenom turizmu. *Poslovna izvrsnost Zagreb*, 2016. God.X, Br.1, UDK / UDC: 338.48-6:615.8, JEL klasifi kacija / JEL classifi cation: I1, L83, Z3 p.187-202.
9. Serrano V., Rial A., Garcia – Carcia O., Gambau V.: QGOLF – 9: A scale to Access Percived Quality in Golf Clubs, *Revista de Psicologia del Deporte*, 2013, Vol 22, No 1, pp. 111 – 121 (In Spanish)
10. Theodorakis N. D., Kaplanidou K., & Karabaxoglou I. Effect of Event Service Quality and Satisfaction on Happiness Among Runners of a Recurring Sport Event. *Leisure Sciences*, 37(1),2015, p. 87-107.<https://doi.org/10.1080/01490400.2014.938846>
11. Tseane L.: Service quality in sport tourism: The case of the Berg River canoe marathon. MTECH Degree: Tourism and Hospitality Management. Faculty of Business Cape Peninsula University of Technology, Cape Town, 2006.

## **INCREASING MARKET SHARE AND ACHIEVING COMPETITIVE ADVANTAGE THROUGH MERGING ON MACEDONIAN TELECOMMUNICATION MARKET – TELEKOM AUSTRIA GROUP AND TELEKOM SLOVENIA GROUP**

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**Abstract:** Significant trend that characterizes global economy, which, at the same time, for many countries is the only source of growth, is the trend of international movement of capital in the form of foreign direct investment. Namely, as the speed of market change increases, mergers and acquisitions (M&A) are becoming valid strategic option for the companies in general to enter into a new business or to merge with a business infrastructure. The accelerated pace of the process of consolidation of the companies - players on the markets, including the entry of foreign companies, for many domestic companies may imply confrontation with the business integration challenge. The achievement of competitive advantage for the telecommunication companies on the Macedonian market depends on many factors. Hence, the companies are implementing specific strategies to increase the market share, and thus to increase their competitive advantage. Increasing the market share and achieving competitiveness for the companies are usually the main reasons for mergers or strategic acquisitions or alliances. This paper elaborates the merging of two mobile operators, VIP and ONE, both operating on the Macedonian market, which are subsidiaries of Telekom Austria Group and Telekom Slovenia Group respectively.

**Keywords:** merging, acquisitions, market share, competitive advantage, telecommunications

### **1. INTRODUCTION**

M&A include takeovers and all other issues related to the restructuring, corporate control, change in the ownership structure of the companies, etc. [19]. Or, in a broader context, M&A cover all transactions that lead to changes in the ownership structure of the companies [12]. The term M&A refers to the aspects of corporate strategy, corporate finance and managing purchases and sales which, combined with the finances of another company, can help the first company to achieve faster growth in the industry without the need for establishment of a new business entity. Or, more accurately, when a company becomes engaged in M&A activity, it invests. If the investment brings benefits in terms of value creation for shareholders, the company that takes over other company should make a decision to take over the target and finalize the transaction [12]. Mergers are usually defined as consolidation of two previously separate companies into a single organization, while acquisitions are generally defined as purchase of one company by another, whereas the company buyer retains the primary control [17].

This paper explains the merging of companies; conceptually, it incorporates two segments which aim to answer the main problem related to the role of the mergers, with special reference to Telekom Austria Group and Telekom Slovenia Group and their subsidiaries, Vip Operator and One, both operating on the Macedonian market, as well as to answer some other issues which are set as goals of this paper. This paper provides a special analysis intended to determine the reasons behind the increased momentum of mergers and acquisitions as a form of capital movement. It also identifies the importance of mergers in terms of market share, as well as the achievement of competitive advantage. Moreover, it gives answer to the questions how much and in what way they affect the structures and segments of national economies of various countries. Special attention is paid to determining the situation in the Republic of Macedonia in terms of representation, role and importance of mergers, and to determining the dynamics of M&A activity and what determinants condition M&A.

To reduce the impact of the decline in revenues and to provide appropriate services for the consumers, in the EU and globally, there is a trend of consolidation of the markets. This trend is the only solution for most companies, which, not only ensure greater productivity in this way, but they make the latest technology from the world of communications available to their users. This trend is confirmed by numerous examples - in the Netherlands, T-Mobile took over Orange, and thus from 4 mobile operators operating in the market, there are 3 operators active now. In the even larger market in the UK, T-Mobile took over Orange and thus from 5 mobile operators operating in the market, there are 4 operators active now, while with the take over of E-Plus by O2, from 3 operators there are 4 operators now. Macedonia was affected by this trend slightly with the take over of the cable operator Blizoo by Telekom Austria Group, owner of Vip operator. Telekom Austria Group entered into a partnership with Telekom Slovenia Group to merge the Macedonian operators Vip and One. Telekom Austria retained a 55 percent stake, and thus gained control over the new entity, while the remaining 45 percent went into the ownership of Telekom Slovenia.

## **2. ESSENCE AND RATIONALITY OF M&A**

Companies find rationality in the decisions to engage in M&A activities in the strategic and efficiency benefits that these investments generate. Strategic motivated M&A transactions aim at reducing competition, while efficiency motivated M&A aim at achieving profit by combining synergies. According to Grinblatt, there are two types of synergies [14]:

- Operational synergies;
- Financial synergies.

The operational synergies include the economies of scale, the economies of vertical integration and the combination of complementary resources.

Through the economies of scale, the management has the possibility to distribute the fixed costs to greater volume output. Cost reduction comes as a result of the consolidation of operations and the elimination of unnecessary costs. The most common reason that companies engage in M&A activities are precisely the economies of scale. In conglomerate acquisitions,

the economy of scale is achieved through the joint use of the centrally located activities, such as accounting, financial control and management at higher levels [14].

Through the economies of vertical integration, the management has the opportunity to ensure greater control and coordination of the production process. It involves elimination of all the problems that could occur with regard to the coordination between the consumers and suppliers. For a combination of complementary resources, every company should possess the resources that the other company needs. In this case, the inclusion of both companies in M&A activity is usually faster and cheaper way to provide an access to the required resources than to individually produce them.

The financial synergies include diversification and mergers as sufficient fund. Through diversification, the risk of capital of the company is reduced. Thus, it becomes more attractive to investors. Moreover, the diversification reduces the cost of capital. Mergers as sufficient fund motivate companies with excess cash, but with few profitable investment opportunities. They can raise capital by investing their excess cash in M&A [8]. Also, the personal income tax, which would otherwise exist if the companies traded with each other, can be eliminated. Taking into account all these aspects of rationality of engaging in M&A activity, it is characteristic that most countries, since they prefer to retain control over the local companies, quite sensitively react to mergers and acquisitions as a form of FDI [5].

Whether there will be synergistic effect of the takeover or not and how that effect will be dispersed are questions that affect shareholders. Synergy is achieved if the value of the new company acquired with the takeover is greater than the individual values of the company that takes over and the target. If the takeover generates synergistic effects, then the company that takes over and the target will benefit thereof. In fact, research shows that, although certain negative effects of mergers and acquisitions appear in the short term, however, in the long term, positive benefits are guaranteed [2].

The process of merging should be guided by all the factors that influence the value added, i.e. the achievement of synergies. “The easiest way to lose the game in such an integration process is the failure to define the synergies in terms of real and measurable improvements of the competitive advantages.” [15] The level of achievement of of certain expected objectives of the processes of merging is shown in Table No. 1.

Table 1. Expected vs achieved M&A objectives

<b>Objectives</b>	<b>Achieved</b>	<b>Expected</b>
<b>Entry into new makets</b>	76%	55%
<b>Increase of market share</b>	65%	54%
<b>Access to new products</b>	46%	56%
<b>Reduction of operating costs</b>	38%	39%
<b>Access to more suppliers</b>	12%	27%
<b>Reduction of distribution costs</b>	26%	25%
<b>Access to know-how</b>	15%	21%
<b>Access to new brands</b>	24%	72%
<b>Access to new technologies</b>	23%	55%

Source: Adapted according to Feldman and Spratt, 2001, page 9

Value created is the best judge of synergies, since only real synergies create value for shareholders. Therefore, the imperative for adopting wise decisions about mergers and investments comes first, before everything else.

### **3. FACTORS FOR M&A**

There are a number of reasons that can play a major role in the activities of mergers and acquisitions. A general pattern is considered that the acquisition is seen by the buyer company as a profitable investment. Most common attitude in the economic papers that explain the activity of the merger is that M&A are treated as an alternative form of investment [10]. Companies opt for acquisition when it is considered the most profitable option in terms of increasing capacity, acquiring new knowledge and skills, introducing new products or entering new geographic areas or reallocating of resources and their control by effective managers /owners [18].

Hence, many of the factors that affect major investment decisions also affect the activities of M&A. However, this understanding of mergers and acquisitions, as a special business investment, is not universally accepted. Research shows that the M&A activities are somehow different than a simple expansion of business investment. Thus, relying on the general motives for mergers and acquisitions, several categories of factors that play a role in these activities are differentiated [1]:

- efficiency;
- financial and tax benefits;
- effects of market power;
- managerial greed or personal glorification;
- favorable purchase power;
- expropriation of stakeholders.

### **4. MOTIVES FOR M&A**

Most of the motives for mergers and acquisitions within the global strategies of multinational corporations (MNCs) are, in essence, motives for reshaping the competitive advantages in important for them industries. Mergers are not specific to certain sectors because they have greater or lesser effect on MNCs in all or most of the industries. However, some motives affect certain industries to a greater extent, thus it can be expected this phenomenon to be associated with the higher intensity of activities of M&A in the respective sectors [9].

Namely, greater affection has been identified for mergers in cross industries and greater impact on the general factors that promote a new wave of M&A, on the global strategy of MNCs in all industries. The latest waves of mergers and acquisitions stimulated research on a broader range of theoretical literature, which mainly focuses on the reasons for taking initiatives for mergers, as well as on the weaknesses they can generate. The main motives identified by the literature are grouped into three groups [7]:

- Competitive considerations;
- Reactions to changes in the environment;
- Inefficient capital markets.

## **5. INTERNAL AND EXTERNAL ANALYSIS**

This part of the paper provides internal and external analysis of the companies VIP and ONE and the effects achieved with their merger.

### **5.1. INTERNAL ANALYSIS**

Every company is a collection of unique resources that create the foundation of its strategy for merger or acquisition, which is its main source of feedback [4]. Resources, tangible and intangible, such as: capital equipment, skills of employees, patents and talented managers, are the main inputs of the company. In the event of a merger or acquisition, only synergistic combination and integration of a set of these resources can create a competitive advantage. According to this view, the competitive advantage of a company depends on its ability to collect and exploit appropriate combination of resources through the development of the existing and creation of new resources, in response to the rapid change of market conditions. Hence, the internal analysis of the two companies will be considered from the aspect of the available resources, such as: management team, intellectual capital, organizational culture and communication [5].

- Management team – On the market of corporate control, there is a strong competition between the management teams and a constant struggle for the right to manage the assets of the companies [18]. Companies that merge, such as Telekom Austria Group and Telekom Slovenia Group, i.e. their subsidiaries Vip Operator and One, should decide on the management team at the beginning of the process, if possible, at the pre-contract stage. Those companies that give priority to the selection of the management team at the pre-contract stage, in planning the merger, are more likely to realize a successful deal.
- Intellectual capital - Understanding the development of intellectual capital and optimal management is very important for value creation and continued success in the processes of VIP and ONE. Intangible assets are key features distinguishing a business enterprise, and therefore the intellectual capital is considered an added value within the knowledge-based economy [11]. Members of each company are those who possess knowledge that characterizes the intellectual capital of the target company, which is necessary for implementation of the planned activities in the period after the merger of the mobile network operators VIP and ONE.
- Organizational culture - Organizational culture can be positive or destructive factor in the process of merging. In order to achieve the best possible outcome of the merger, the two companies, VIP and ONE, should be integrated in a way that will enable creation of a shared organizational culture [11]. The importance of research

on organizational culture in the process of M&A heavily emphasized the need for research on organizational culture in general, which is equally important as a part of the total research target, along with the traditional legal and financial research.

- Communication – The activities of the merger require proactive and relevant communication between all stakeholders in order to ensure acceptance and support for the new integration. The absence of a formal, precise and timely communication results in low motivation and morale of the employees. VIP and ONE should be guided by the four rules of effective communication in transition: no secrets, no surprises, no exaggerations and no empty promises.

## 5.2.EXTERNAL ANALYSIS

The external analysis of the merging of the mobile operators VIP and ONE will analyze the impact on the economic development. M&A, as a form of a new type of investment, mostly affect the economic development through its impact in several areas, including:

Financial resources and investments - M&A affect the volume and characteristics of the financial resources that will be invested and the investment itself in the country in which the companies operate. The case of the merger of VIP and ONE affects the balance of payments of the host country and the division of the benefits of the investment between them and other countries.

Technology - The transfer of technology and its effective application and diffusion is one of the most significant benefits of M&A [3]. Through the merger of VIP and ONE, the level of soft and hard technologies is increasing, because of the technological power that the companies individually possess. Because the technological differences between these two companies are not outsized, but they certainly have the best technology, the effect on technology will also be more significant. All the innovations and improvements will be merged, which, in turn, will increase the competitive advantage of VIP and ONE on the Macedonian market of telecommunication services. Moreover, the diffusion of technology through M&A includes institutions such as: research centers, universities and quality assurance institutes, etc., which are being more intensively used by the foreign affiliates than by the local companies, because of their greater awareness of the importance of technology and skills. Diffusion of technology can take the form of spillovers of highly skilled workforce to local competitors.

Employment – the merger of VIP and ONE, as a form of strategic partnership, affects the quantity of workforce [13]. M&A can lead to employment growth if the processes of restructuring and integration that accompany the process of merging are successfully implemented. The effects on the employment depend on the motives of the companies that merge, i.e. on the motives of Telekom Austria Group and Telekom Slovenia Group [16]. If the motive is “conquering new markets”, the effect on the employment will be neutral or positive in the short to medium term. The companies retain the existing workforce with the intention to increase the number of employees if the market expands or the subsidiary increases its market share, as in the case of VIP and ONE. In M&A which are “looking for strategic assets”, the companies are making efforts to retain the employees in the merged companies due to the significant skills and abilities they possess. If M&A result in productive



synergy, employment growth can be expected in motivated companies. In M&A which are “looking for efficiency”, it is obvious that the acquired companies with outdated technology and management or excess capacity will lose employees in the process of restructuring. The removal of functions that overlap may also result in loss of jobs. However, after the strengthening of other functions, employment can grow. VIP and ONE, which take into account “the financial results” in the short term, may affect the reduction in employment when restructuring is needed. Given the fact that the merger of these two companies is aimed to increase the market share and achieve a competitive advantage, it can be concluded that there will be no reduction in the number of employees.

Competition - VIP and ONE can reduce competition by monopolizing mergers. They perform competitive pressure on other companies operating on the Macedonian market. Experience shows that the pressure made by the two companies on the Macedonian market through their operators VIP and ONE leads to improved quality of telecommunication services, their differentiation and innovation. In this case, the efforts of the other companies engaged in such activities are aimed at improving the quality of service, reducing costs and increasing customer satisfaction [13]. Therefore, the need to introduce effective competition policy among the telecommunication companies on the Macedonian market is imminent.

## 6. CONCLUSION

The effects of the M&A activity of Telekom Austria Group and Telekom Slovenia Group on their subsidiaries, Vip Operator and One, on the market structure and competition are very complex and extensive. The merger for the users is certainly a surprise since One and Vip were severe rivals for seven years on the Macedonian market. But for those who are familiar with the industry, the merger of the two smaller operators was logical. If M&A include mergers of existing companies on the market, as was the case with the mobile network operators Vip and One that would otherwise be squeezed out of the market, then the effects on the competition will be positive. The biggest effects on the accomplishments will be aimed at increasing market share and achieving competitive advantage. Through the merger, Vip and One can reduce competition by monopolizing mergers and acquisitions [16]. Foreign companies, such as Telekom Austria Group and Telekom Slovenia Group, which already have affiliates on the market, merge and thereby acquire ownership of dominant or monopolistic market share. These two companies, through their subsidiaries Vip and One, previously competed in the same market. Thus, both companies strive to develop the potential of the joint company or through M&A to achieve competitive advantage in the telecommunication market. Namely, by combining the business cores of both companies, Telekom Austria Group and Telekom Slovenia Group created a “new organism with a unique organizational culture”. The inability to achieve real and measurable improvements in competitive advantage by clearly defined potentials of added value increases the risk of making unfavorable decisions. The most common improvements in competitive advantages include increased revenue, cost reduction, reduction of tax costs, reduction of assets and reduction of working capital. Hence, it can be concluded that the combining of two companies into a new company can result in synergy in revenue, synergy in cost reduction, synergy in reducing assets and tax and financial synergies.

## REFERENCES

1. Alfaro, A. & Charlton, A. “Intra-industry foreign direct investment”, Working Paper 13447, National Bureau of Economic Research, Cambridge, 2007.
2. Cartwright, S. at all., Methods in M&A—A look at the past and the future to forge a path forward. Scandinavian Journal of Management, 2012.
3. Chatterji, D., Accessing external sources of technology, Research-technology management 39, (2), (2002).
4. Dunning, J. H. & Lundan, S. M., “Multinational enterprises and the global economy”, second edition, Northampton, MA: Edward Elgar Publishing, 2008.
5. Estrin, S. & Uvalic, M., “Foreign direct investment into transition economies: Are the Balkans different?”, LSE ‘Europe in Question’ Discussion Paper Series, (64), (2013).
6. Gantumur T., Stephan A., Mergers and acquisitions and innovation performance in telecommunication industry, Industrial and Corporate Change, (21), (2011).
7. Hill I.W.C, (2008). “International business”, University Washington, Washington
8. Hill, W. L. C & Gareth, R. and Jones, G., R, Essentials of strategic management. South Western Pub, 2011.
9. Hollensen, S., “Global marketing”, 4<sup>th</sup> edition, Prentice Hall, New York, 2007.
10. Jorgensen B. V. and Bach I., The Importance of Mergers&Acquisitions within the Danish banking sector during a financial crisis, BSC in business administration and international management department of business, 2010.
11. Keith T. and Stephen A., The learning organisation: a meta-analysis of themes and literature, The Learning Organization, 13 (2), (2006), pp.123-139
12. Lafforet, C. & Wageman, R., Successful mergers and acquisitions: Beyond the financial issues. Leader to leader, (53), (2009) p.44.
13. Porter M., Building the microeconomic foundations of prosperity, findings from the business competitiveness index, Harvard University Press, 2004.
14. Roller L-H, Stennek, J., and Verboven F., “Efficiency Gains from Mergers,” in European Merger Control: Do We Need and Efficiency Defence, ed. by Ilzkovitz and Meiklejohn. Edward Elgar, 2006.
15. Sirower, M.L., The synergy trap: How companies lose the acquisition game, The Free Press, New York, 2007, p. 15.
16. UNCTAD, WIR, 2012
17. UNCTAD, WIR, 2014
18. Weber, Y., Rachman-Moore, D. & Yedidia T., S., HR practices during post-merger conflict and merger performance." International Journal of Cross 253 Cultural Management 12, (1), (2012), 73-99.
19. Yesilyurt, O., International Expansion Strategies: Are Cross-Border Mergers & Acquisitions Successful? Aarhus School of Business, Aarhus University, 2012.

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## PREDICTION OF STOCK PRICE USING TECHNICAL ANALYSIS

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**Abstract:** The technical analysis is a process of analyzing past prices of stocks for the purpose of predicting possible future prices. It focuses on why, when and how to invest money in stocks or sell stocks. It determines the optimal timing for investment and its findings determine how long one should stay in a particular investment deal. The technical analysis does not take into consideration the performances of the issuer, but is based solely on the market movements of securities, primarily on the prices and traded quantities. Hence, the purpose of the technical analysis is to determine the time when to buy and when to sell stocks, thus maximizing the profit. The technical analysis assumes that the qualities of the company-issuer of a particular security, information and future expectations are already incorporated in the market price and that the only thing to be done is to predict when the security reaches the highest price and is about to start to decline (this is the time to sell) or, if the price goes down, to predict the time of lowest cost after which it is expected to begin to grow (this is the time to buy). In addition, the technical analysis uses a number of methods that are improved day by day, but basic are the comparisons of prices and trading volumes of a security. The technical analysis uses the theories of psychology of the masses, namely the behavior of large groups of people who, in this case, constitute the market.

**Keywords:** technical analysis, share, price, share value, stock market

### INTRODUCTION

The technical analysis is an analyzing process of the previous prices of the securities with main aim for predicting their possible future prices. It can be done by comparing the current price oscillations with the previous ones [3].

If we do not have an opportunity to define the future prices precisely, the technical analysis can be used as a tool for reducing the risk and increasing the profit. The effort for correctly predicting the future flow of the share prices and choosing the right time to buy or to sell a share, must be taken into consideration as one of the most persistent investor's efforts.

Almost every trader uses some form of technical analysis. Even the one who is the biggest supporter of the market basis is going to take a look at the charts before to start with the trading process. With their basic degree, these charts are helping traders to determine the right entry and exit trading points. They are also visually representing the historical flow of the price or other chosen subject. With other words using the charts, the traders can easily know if the buying price is favorably (based on the pricing history on the chosen market) or if it is the right selling time. Depending on their level of sophistication, the charts can also help with the more developed market researches.

At the beginning it may seem like the technicians are ignoring the market basis while they are surrounded with tables and data charts. Anyhow, the technical trader is going to tell you that all of the basis are already involved in the price. They are not so concerned that the natural catastrophe or the awful inflation can increase the price, as they are concerned for that how the flow of the price is going to be implemented into the model or trend. Furthermore, they are concerned about the way of using the model and predicting the prices.

## 1. TECHNICAL ANALYSIS

The technical analysis is an analyzing process of the previous prices of the securities with main aim for predicting the possible future prices of them. The main objective of this analysis is why, when and how to transform money into share as well as selling those shares. The analysis also determines optimal timing and position and the conclusions refers to how long one company needs to stay in one investment deal [3].

Investment politic can be active and passive. The passive one is related to those investors who are investing in values and are using the approach – “buy and care”. The active investors are more concentrated on revenue activities and the investment politic: “buy cheap – sell expensive” [10].

Generally, there are two ways of estimating shares: fundamental and technical analysis [3].

Fundamental analysis is trying to find the intern, real value of the given share, regardless the current situation of the market, i.e. its market price which becomes important in the moment of taking the final decision for buying/retaining/selling shares [12]. So, if already defined real value of the share is lower than the market price, the process of buying that share is going to be a good investment. Therefore, fundamental analysis is using more methods for estimating the value of the company that is providing the shares, strengths, working risks, opportunities for future development and so on.

On the other side, the technical analysis is not taking into consideration the performances of the provider, but is based only on the movements of the shares on the market, giving priority to the prices and trading quantity [3]. The main objective of the technical analysis is finding the right moment for buying and selling and maximizing the profit. The technical analysis starts from the assumption that the qualities of the company – provider of shares, information as well as future expectations are already calculated in the market price. The only thing that has to be done here is to predict the moment when the shares are reaching the highest price and the moment of the increasing the price (that is the moment when it has to be sold) or, if the price is getting lower, to predict the moment of the lowest price after which the share is going to increase (that is the moment when it should be bought). Although, this analysis is using many methods which are constantly improving, but in the basis is placed the comparison of the prices and quantities of trading with given share. Technical analysis is also using the theories of psychology on a mass of people, i.e. the acting of large groups of people who in this case are making the market [3]. Interesting is the fact that almost every big investor who is using technical analysis usually has specific technics through which are earning money and later are announcing them as a useful methods. It is important to say that in many cases the technical analysis is approving itself but sometimes it is disproved. If all of them are using the same method which refers to the fact that the share price is growing, they are going to buy and then the price will really grow! And reverse, of course.

## 1.1. ASSUMPTIONS ON WHICH THE TECHNICAL APPROACH IS BASED

The technical approach is based on three assumptions [10]:

1. The market motions are taking into consideration all of the available information
2. The prices are following the trends
3. The history is repeating

1. The fact that the market motions are taking into consideration all available information is foundation of the technical analysis. The technician believes everything that can have a potential influence on the price – fundamentally, politically, psychologically or any other way – is already reflecting on the market price. That's why the only thing that is necessary for exploration is the price changing. The technician is sure that the changes in the prices are consequence of the changes in the demand and supply [10]. If the demand is overcoming the supply, than the price is going to be increased. And if the supply is overcoming the demand, the price must go lower [10]. This model is base of every economical and fundamental predictions. Technicians are understanding this model on an opposite way and it comes to conclusion that if the price are going higher (nevertheless the specific reason), the demand must overcome the supply. In this case the fundamental prices will grow as well. If the price are decreasing, the same will happen with the fundamental values [10].

2. The trend's concept is absolutely essential for the technical approach. The whole thing of presenting the price flow on charts is to identify the trends in the first development phases, so trading can be done in a way of those trends. Therefore, the biggest number of technics which are using in this approach are following the trends, which means that their intention is to recognize and follow the existing trends [5]. The consequence of the assumption that the prices are changing according to the trends, is that the current trend is more likely to be continued than to be changed. Another way that can bring the same conclusion is that the current trend is going to be continued in the same way until the moment when it is not going to be changed [12]. The whole approach regarding following the trend is maximal usage of the current trend until it is not going to be changed [11].

3. The history is repeating. Big part of the technical analysis and the analysis of the market movements are related with learning human phycology. For example, models that appear on the charts and are identified and categorized in the last hundred years, are maintaining some pictures that are always appearing on the price charts. Those pictures are determining the increasing or decreasing psychological mood on the market. Considering the fact that those models were well used in the past, they are going to be used in the future too [10]. They are also based on analyzing the human psychology which does not have changing tendency.

## 1.2. FLEXIBILITY AND ADAPTABILITY OF THE TECHNICAL ANALYSIS

One of the biggest strength of the technical analysis is its adaptability in almost every market n environment and time dimension [10]. Seems like there is not existing a trading part where these principles are not used. But, there is no place for ignoring the other advantages.

First, the market goes through active and less active periods, phases in which are and are not happening oscillations. The technician can concentrate his attention and resources on those markets which are showing strong moving tendencies and to choose to ignore the rest of them [9]. Sometimes, some markets are becoming very attractive and there can be seen many important models. The technician can freely choose while the fundamentalist, especially the one who prefers to become a specialist in one area, does not have opportunity for flexibility in that way.

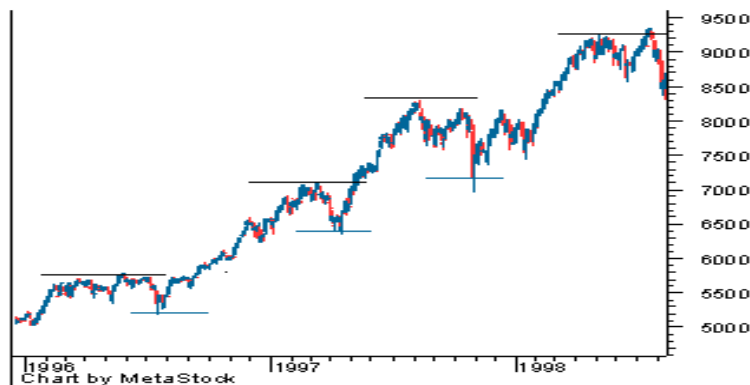
Another advantage which the technician has is the “big picture”. Considering the fact that he is following the markets, he has an excellent knowledge about what is happening on the markets in general, avoiding the limitations which may occur during the process of following of only one group of markets. Also, because of the fact that most of the markets have internal economic relations and are reacting on similar economic factors, the price changes can provide significant proofs related with the future way of market flow [9].

## 2. TECHNICAL ANALYSIS AND DOW THEORY

Dow Theory is formed by Charles H. Dow and is presenting his believes of how the market of shares is acting and how the market has to be used, so the “health” of the business environment can be measured. He believed that the market of shares as a whole is an authentic measurement for all business conditions in one economy and that using the analysis on the whole market can help with the process of measuring those conditions and recognizing the way of the main market trends, as well as the probable way of individual actions [8]. The Dow Theory is using the trend analysis for determining in which way is going the market. Therefore, the primary trends are the main market trends and the second ones are corrections of the first ones [3].

The primary trends are consisting of three phases. For the upward trend (bull market) those phases are the following [12]:

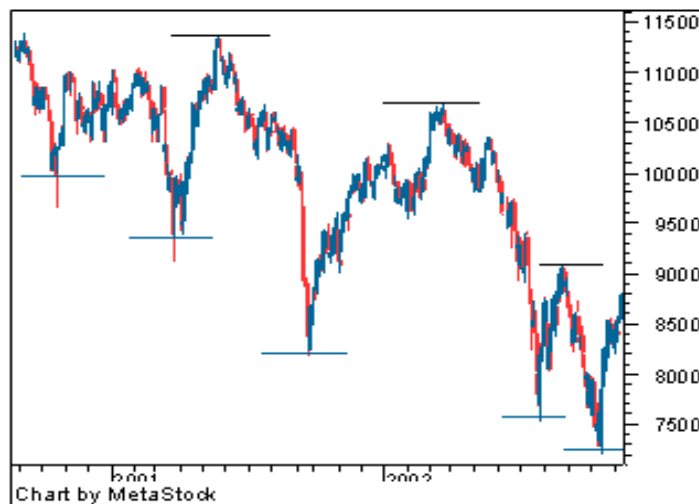
- Phase of accumulation
- Phase of public participation and
- Phase of excess.



Picture 1. Upward trend (bull market) [13]

For the downward trend (bear market), the three phases are the following [12]:

- Distribution phase
- Phase of public participation and
- Panic phase.



Picture 2. Downward trend (bear market) [13]

According to the Dow Theory, the main turning back into the previous condition, from bull to bear market (or reverse) cannot be signaled until both indexes (Dow Industrial and Rail Average) are not in accordance [3]. For example, if one of the indexes confirms upward trend, and the other one remains in primer stage of decreasing trend, it is hard to suppose that a new trend has been started.

The volume must confirm the trend. The indexes are main signals which are referring to the secure share movements, but the volume is used as a secondary indicator which helps to approve which price movement is proclaimed. The trend remains effective until the reversion is not appeared [6].

For determining the trend, Dow was basing solely on the price in the moments when the stock market was closing, and not to the price changes during the day. On the other side, peak – and – through analysis is a key technic which is using for identification of Dow Theory's trends [6].

### 3. ELLIOT WAVE THEORY

Elliot wave theory is a detail description of how some groups of people are acting. It reveals the massive psychological changes from pessimism to optimism and reverse, in one nature flow which created specific schemes (samples) [7].

Financial markets are the places where this theory is functioning the best and where every psychological change of the investor can be noticed and provokes price changes [7]. If we are able to identify the repeating price schemes and to understand where our position is today, than it very probable that we can predict what will happen with them in the future. The wave theory is estimating the investor's psychology which means a real moving body that stands behind every share market. When the people are optimists regarding the future outcome related with specific situation on the market, it is logical that they are going to increase the price [10].

There are three significant elements in the wave theory: sample, ratio and time - listed in order of importance [10].

The sample refers to the wave models or formations which are the most important part of the Elliot theory. The ratio analysis is useful during the process of determination of the deviation point in the current trend, i.e. pricing objectives which are measuring the relations between the different waves [4]. In the end, there are also a time relations which can be used for approving the wave models and the ratio, but some theory followers are not counted as so secure market predictions [7].

#### **4. TECHNICAL INDICATORS**

The clear defining of the market trend, as well as predicting the market situation, often could be classified as a complicated process. Therefore, following the charts is transforming in an inconvenient method, and the reasons for that are the aggressive market changes. This problem can be solved through of usage of indicators as an additional method [2].

From technical analysis perspective, the indicator is a mathematic calculation which involves prices and/or scope of trading shares. The result is using for predicting the future price flow. Special indicators are used only for closing prices, and beside the price and scope, they include different elements as well.

Generally, indicators have three basic functions [8]:

- They provide high level of caution in situations when the picture on the chart is not clearly showing the flow of the prices
- Are used as a confirmation for the other tools of the technical analysis.
- Are used as a tool for predicting the future prices.

In practice, there are a huge number of price indicators and the users are everyday creating new ones. The indicators can be divided into two groups [9]:

1. Leading indicators – created to predict the price changes
2. Following indicators – created to follow the trend and to give an opportunity for new changes. The can achieve their best when the trend is strongly expressed.

Big number of indicators are presented in a form of oscillators. They are identic to the indicators but their difference lays in the fact that the estimated values are modified, i.e. helped by the arithmetic process, they are adapted in interval from +1 to - 1 [9]. The number



of available pricing indicators in the technical analysis, as we already said, is big. Which indicators are going to be used by the analyst, depends on the personal references, experience and on the current situation on the market.

One indicator can give different results if it is used on a different financial instruments. It is recommended to not be used more than two or three indicators, because using more of this can cause confusion in the perception of the real market condition. During the process of choosing, it also has to be taken into consideration if are going to be used complementary indicators, instead of those that in the end are going to give same signals. One of the frequently used indicators in the technical analysis are [4]:

- MACD – Moving Average Convergence Divergence
- RSI – Relative Strength Index
- AMDI – Average Movement Directional Index
- Stochastic oscillator

The moving average of convergence and divergence which is explored in the time of 70's, becomes one of the most popular technic tools used by the short – term and long – term investors of shares, bonds and other forms of investment markets. It is characteristic indicator which can be found in almost every computer based trading program [2]. This indicator is an indicator for all times. If the monthly data is retained, MACD can be used for all long – term analysis. It can be used for short period of times, reflected through weekly and daily information, for analysis of average and short – term market trend, as well as an intra - daily base in every long – term time frames as hours and minutes, which makes it acceptable for short – term objectives related with trading [2].

The Relative Strength Index is developed by J. Wels Wilder and for the first time it is presented in his book in 1978 with title “New Concepts in Technical Trading Systems [9]. The term “relative strength is not counted as an appropriate term and often causes confusion through those who are more into this term in the stock analysis. The relative strength generally presents the correlation between two different entities. On the other side, Wilder's relative strength index is not measuring the real strength between two different entities, and therefore becomes the fact that the name is not correct. So, RSI is solving this problem with the changeable movement and the need for constant top and bottom differentiation. The formula is defining as the follow [1]:

$$\mathbf{RSI = 100 - (100/RS + 1)}$$

$$\mathbf{RS = average\ profit / average\ loss}$$

The average index of ADX is developed by J. Wels Wilder and it presents the indicator which is used for measuring the strength of a specific trend [10]. The indicator is rarely used for identifying the specific trend and the current trend, but it can be used to identify the monument which is standing behind the trend. ADX is a combination of two pricing criteria: positive fixed indicator (DI+) and negative fixed indicator (DI-) [10]. It measures the trends strength but not his way. DI+ stands for measuring the strength on the upward trend, and DI- is measuring the trend which goes down. These two measurements are coming together with the ADX line.

The stochastic oscillator was popularized by George S. Lain in the late 50's. These oscillators are another useful tool for overview on the expected ability to maintain the trend. They are providing the trader with information for the prices during the moment of closing in a given time period, and are primarily used for analyzing the instrument's performance. The stochastic is measurable and is presented from two perspectives, line %K and %D. The line %D is more significant and is the line that is giving the main signals [11].

The main aim is determining when and in which moment the closing price is related with the price scope in a given period. The 14<sup>th</sup> period is the most common one which is used for this oscillator. For determining the line K which is more sensitive than the other one, the following formula is used [11]:

$$\%K = 100 [(C - L14) / (H14 - L14)]$$

C – last closing price

L14 – the lowest closing price in the 14<sup>th</sup> period

H14 – the highest opening price in the 14<sup>th</sup> period

$$\% D = \text{average} (\%K, 3)$$

The line %D is three periodic moving averages from %K.

## CONCLUSION

Managing the resources and the best moments for entrance and exiting form the market is something that must be always taken into consideration. The entry and exit points can be determined with using the tools of the technical analysis and usage of indicators and oscillators, as well as with usage of own strategies and understanding the technical analysis's indicators. After defining the points we must be aware that it is also necessary to realize them. The realization sometimes can ask for more than only the process of determining. Every investor need to ask his self about how many resources have to be invested in one position and how many position he has to open, and how many own resources is prepared to use for the process of opening of those positions. He also needs to consider of the situation in the real life and the needs which are going to make him to close the positions, and what he is supposed to do to avoid those situations.

The technical analysis can give a significant information and can be very useful while managing the suppositions for taking right investment decisions, and can help defining the right time buying and selling shares. But, always have to be considered that the analysis is not a crystal ball in investor's hands which came from the middle of nowhere. This analysis cannot be the only thing that the investor has to have in mind, especially when there are signals (indicators) for possible future changes. Those are defined as a long – term market stagnations or periods where are not existing specific trends on the market.

In the end, only the investor has to decide whether he is going to be patient, he will use other forms of analysis for making decisions, or he will believe in third parties' opinions and "whispered stories" that often could be wrong and not trustable.

## REFERENCES

1. Achelis, B. Steven, (2003), *Technical analysis from A to Z*, Equis International
2. Appel, Gerald, (2005), *Technical Analysis: Power Tools for active Investors*, Financial Times Prentice Hall
3. Bodie, Z., Kane, A., Marcus, J. A., (2010), *Investments*, 9<sup>th</sup> Edition, McGraw-Hill/Irwin
4. Colby, Robert W., (2003), *The Encyclopedia of Technical Market Indicators, Second Edition*, McGraw-Hill, New York
5. Dolan, B. (2006), *Technical Analysis well Suited for all Occasions*, Wasendorf & Associates, Inc.
6. Edwards D. R., Magee J., (2007), *Technical analysis of stock trends*, CRC Press
7. Jenkins, S. M., (1997), *The Geometry of Stock Market profits: A Guide to Professional Trading For a Living*, Traders Press
8. Jones, C. P.,(2007), *Investments: analysis and management*, John Wiley and Sons
9. Mendelsohn, B. L. (2000), *Trend Forecasting with technical Analysis*, Marketplace Books
10. Murphy, J. John, (1999), *Technical analysis of tehe financial markets*, Institute of Finance, New York
11. Nison, Steve, (1999), *Japanese candlestick charting techniques : a contemporary guide to the ancient investment technique of the Far East*, New York Institute of Finance ,Simon & Schuster
12. Stevens, L. (2002), *Essential technical analysis: tools and techniques to spot market trends*, John Wiley and Sons, New York
13. [www.metastock.com](http://www.metastock.com)

## **ANALYSES FOR ESTABLISHING CONDITIONS FOR MANAGING SPORT ACTIVITIES AT THE UNIVERSITIES – REPUBLIC OF MACEDONIA CASE STUDY**

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**Abstract:** High education institutions are in process of rising competition for attracting top students. Attempts are being made to establish high authority, with which education image is built. SWOT analysis represent best combination of trends in surroundings and inner abilities. It is designed to answer questions regarding specific strategic factors and it can affect managing sports on high education institutions.

Elements from outside are affecting possibilities and threats that can help or interfere universities in conducting strategic goals, and inner circle is characterizing strength and weaknesses in establishing same strategic goals.

With help of questionnaire distributed to 35 experts in R. Macedonia – university managers, university professors and government representatives, public and private sport organizations, we can detect numerous and diverse factors for managerial and marketing activities in organizing sports on our country universities. With organizing and systemizing those informations and with basis on comprehensive theoretical backing, SWOT analysis is presented, with which universities will profit using her possibilities and advantages, and in the same time avoiding and fighting weaknesses and threats. Given results should be used in building strategy and action plan which will guarantee educational prestige.

**Keywords:** management, SWOT analysis, student sport, universities, R. Macedonia

### **1. INTRODUCTION**

High education institutions are in process of competing for top students. Efforts are being made to establish high levels of authority and prestige as part of educational image. Education is changing, in respect to democracy and willingness for efficient educational process, and following same path sport and physical activities are coming close to real time possibilities and interest of students. Scientific treatment of the issue, especially in the specific fields of sport management and marketing is very modest and with lack of experimental intensity from R.Macedonia high education department. In regard to different previously made analysis and conclusions, this is a weak link in Macedonian education system and improvements are needed. From 26 universities (both private and public) currently operating on R Macedonia territory, only on five of them (or 1/5=19.23%) organized sports activities are customary. (Kitanovska T., Cakareska L., Cvetokov C., UNSS – Sofia, 2013). Especially disregarded is an idea to include sports in curriculum on all tributaries in universities in R Macedonia. Whole educational system is left on his own, but thanks to enthusiasm of sport personnel, elementary sport activities are performed. All this with years passing leads to serious and deepening crisis of sport and his influence on students.

(Kitanovska T., Cakareska L., International journal of scientific and professional issues in physical education and sport. Vol. 5, No. 11, pp. 121-125, 2015).

## 2. METHODOLOGY OF RESEARCH

There is a number of reasons for unsatisfactory managing of sports activities on universities in R Macedonia. This generates our goal and effort which leads to enrichment of ideas for acting towards finding solutions for perfecting college sport. SWOT analysis presents best combination of trends in our surroundings and our in house capabilities. It's meant to answer questions related with specific strategic factors and it can affect managing even if we talk about managing sports in educational system and consequently on high education institutions.

Outside environment affects possibilities and threats which can help or set back universities in administering strategic goals, on the other hand inside environment characterize strengths and weaknesses in establishing same strategic goals.

For goal achievement it is necessary to acknowledge four known phases used in analytic process, and those are:

Phase one – choosing critical factors for sport status in universities and there surroundings.

Information and data are included for functions, resources, competition, market, sports management and contemporary sport marketing;

Phase two - editing information gained from two general groups (outer and inner environment);

Phase three – systemization factors responsible for strengths and weaknesses of one side as possibilities and threats of other;

Phase four – proving and grading influence of factors, and based on comprehensive theoretical proof and formulation of development strategy.

## 3. RESULTS AND DISCUSION

Analysis was conducted at the end of school year 2012/13, with part of university management, university professors, and representatives from public, general and private sports organizations, who have direct relation and influence on college sport managing. Conclusion of 35 experts (**table 1**) is guidance for perfecting sport presence and gives possibilities for objective information on different sport activities of students:

Table 1. Numbers of experts by sex and age

sex \ age	under 40 years	under 50 years	Over 50 год.	General	Specialists in sport / Managers of institutions
Man	4	6	13	23	10 / 13
Women	4	6	2	12	8 / 4
General	8	12	15	35	18 / 17

Experts suggest five answers for each of four factors which determine our strategic goal:

Opportunities – potential positive influence, which allows university to achieve its strategic goals.

Threats – potential negative influence, which prohibits university to achieve its strategic goals.

Strengths - university can use these to achieve advancement from other higher education institutions;

Weaknesses – which can make strategic competition of universities difficult.

SWOT model (**table 2**) makes identifying alternative strategies possible, for help universities taking advantage of possibilities at the same time avoiding weaknesses and threats trying to accomplish end goals:

Table 2. SWOT model for analysis

<b>Ext.</b>		
<b>Inter.</b>	<b>OPPORTUNITIES</b>	<b>THREATS</b>
<b>STRENGTHS</b>	SO strategy	ST strategy
<b>WEAKNESSES</b>	WO strategy	WT strategy

SO strategies – build from factors, with strengths of inner resources of university coexisting with many possibilities of outer surroundings for organizing and managing students sports activities. This synergy makes so called max-max strategy making it competitive on the market.

ST strategies – build from factors, where strengths of universities are met with diverse limiting factors of outer environment, correction is necessary to advance. This is called max-min strategy.

WO strategies – build from factors trying to minimize influence of inner weaknesses of universities and optimize influence of outside environment on sports activities management itself. This is called min-max strategy.

WT strategies – build of min-min factors, determining battle for survival, in case of which universities should minimize influence of inner weaknesses and existing many of outside threats.

Systemizing it properly, in next table (**table 3**) presented most important strategic factors, which can have enormous influence on future development of high education sports.

Table 3. Strategic factors for development of high education sports - excerpt of SWOT analysis

Ext. Inter.	OPPORTUNITIES	THREATS
STRENGT HS	<p style="text-align: center;"><b><u>SO strategy</u></b></p> <ol style="list-style-type: none"> <li><b>1. Increasing sport necessities for students, which is a good base for universities to actively participate in building, organizing and practicing the sport activities.</b></li> <li>2. Where sport teams are existing, it is necessary to build student sport clubs within the faculties or sport clubs under the umbrella of the university.</li> <li><b>3. Tradition in education has to be towards enrichment of sport activities for students.</b></li> <li>4. Enrichment of student sport knowledge through the exchange of experience.</li> <li><b>5. Financial independence of sport activities will help development of the professional sport.</b></li> <li>6. Building sport material base for student needs is excellent way of university promotion.</li> <li><b>7. Good sports management can build any college team into a brand.</b></li> <li>8. Organizing student sport matches among faculties and universities, as well as festivals and events in the name of sport.</li> </ol>	<p style="text-align: center;"><b><u>ST strategy</u></b></p> <ol style="list-style-type: none"> <li>1. There are educational programs for sport and physical education, but the general opinion of the students for them is not very serious, so the subjects and the profession is viewed with great distrust as a possibility to be activity to support a family, in the future.</li> <li><b>2. Volunteering as an alternative form can easily be organized at universities to improve the organization of the sport, but the state is missing such infrastructure and social culture for extensive action.</b></li> <li>3. Some unievrsties have good material and technical conditions for sports activities, which are not used properly and efficiently.</li> <li><b>4. Cooperation between universities and colleges can change the general opinion limited to organize sport activities for students.</b></li> <li>5. The motivation of youth sport educators through modern strategies and marketing programs can positively affect the legal regulations in force relating student sport.</li> </ol>
WEAKN ESSES	<p style="text-align: center;"><b><u>WO strategy</u></b></p> <ol style="list-style-type: none"> <li><b>1. Absence of sport colleges and sport specialists as mandatory staff across all universities in the country.</b></li> <li>2. Absence of legal borrowing Law on Sports, respectively, and the Law on High Education regarding sport activities at universities.</li> <li><b>3. Strategy for scholarships for best athletes.</b></li> <li>4. Creating student sport centers across all universities in the country, where students will be able to give proposals and ideas for their interest in organizing sport student life.</li> <li><b>5. Greater freedom and rights for the students to come together and form a Student Sport Clubs in colleges and universities themselves, through student council and parliament.</b></li> <li>6. We need sport sectors within universities, through which will reduce unemployment of this profile .</li> <li><b>7. Active involvement of Student Sport Clubs in the Agency for Youth and Sports, in the respective federations and competitions, in the country.</b></li> <li>8. People who work as sports specialists should be permanent trained in improving student sports and activities.</li> <li><b>9. Universities in R. Macedonia have sport sectors that students will provide various sport opportunities.</b></li> </ol>	<p style="text-align: center;"><b><u>WT strategy</u></b></p> <ol style="list-style-type: none"> <li>1. The funds are the major problem that universities and colleges are afraid to make for the organization of student sport.</li> <li><b>2. The policy of universities coincides with the general state policy, when we talk for sport activities.</b></li> <li>3. No underpin student activities inside universities show the real picture of the sport in the country.</li> <li><b>4. The existence of various alternative forms available at universities to cover free time (and internet cafes), are contrary to the need for shareware sport equipment.</b></li> <li>5. Talented sport students are leaving to study abroad, somewhere where you can continue with both running parallel.</li> <li><b>6. Lack of material and technical base within universities.</b></li> <li>7. Lack of own literature management of sport in all areas of operation, as well as projects, seminar papers for sport management in education.</li> <li><b>8. Lack of marketing program to overcome the socio-economic conditions of the sport.</b></li> <li>9. Lack or inadequate evaluation and control of the physical fitness of students.</li> <li><b>10. Lack of internal and external real strategy for sport in education that systematically builds from the beginning, throughout the education system and will guide young students to lifelong sports.</b></li> </ol>

Analysis on interior and in the same time, exterior environment included variety of factors for managerial and marketing activities in organizing high education sports in Republic of Macedonia.

Some of them are strategic for university success today, but progress of those activities should be continuous and be able to guarantee future conditions for survival. That's why we should include

given results in producing our own strategy for student sport, so we can show educational prestige.

#### **4. CONCLUSION**

New way for establishing conditions and management of high education sports leads to reach world standards. Trends in this direction are continuing and they are going to be:

-Personal result of each student, like in most western countries, should bring better conditions for sport activities as result;

-Bigger state influence in raising awareness of importance of physical and health condition of citizens, making sure educational process is getting positive achievements, experience and organization.

Analysis is showing current state in sport organizing or absence in high education institutions, with all basic programs in R Macedonia. Managers and supervisors at universities do not have precise attitude regarding sport and sport activities among students. It is a fact that sport activities are presented and organized without difficulties, only at faculty of sport, physical studies and sport management. Therefore that proves that great freedom, rights and obligations are needed, for organizing and participating in managing sports from sport specialists and students themselves. Additions for mandatory and facultative sport activities of students in high education law will be extra step in encouragement of youth to participate in sport classes. Informational material regarding available sport activities at all universities, promo material, fan shop, info posters. Including sport professionals in educational process, clearly define student-athlete status.

Sport is also included in projects, visions and sign-up politics at universities. Active participation of management is also important in building of sport market economy with resources known as "sport funds", and sponsorship deals for development of student and university competitions.

#### **5. REFERENCES**

1. Китановска Т., Цветков Ц., Проучване интересите и потребностите, относно спортните занимания на студентите в Р. Македонија, НСА – Спорт и здраве, Софија, Мај 2013
2. Китановска Т., Чакареска Л., Цветков Ц., Управление на спортните дейности във висшите училища в Р. Македонија, УНСС – Софија, Ноември 2013
3. Шуклев, Б., Л. Дракулевски. Стратегиски менџмент, Економски факултет, 1996, Скопје.



4. Communique of the Conference of European Ministers Responsible for Higher Education: The European Higher Education Area-Achieving the Goals, Bergen, May 2005.
5. EUA Graz Convention, 29/31 May 2003 Reichert, S. and Tauch, Ch.: Trends in Learning Structures in European Higher Education (III) - 2003;
6. Kitanovska T., Chakareska L., „Organization of the sports and physical education management system structure in the Republic of Macedonia“, International journal of scientific and professional Issues in physical education and sport. Vol. 5, No. 1, pp. 121-125, 2015. (indexed in EBSCO)
7. Kotler, Ph. And K.Fox. “Strategic Marketing for Educational Institutions Prentice-Hall”, New Jersey 1985
8. Kotler Ph., Fox K. “Strategic Marketing for Higher Educational”, 1995.

## **THE SIZE OF THE COMPANY – ADVANTAGE OR DISADVANTAGE? (CASE STUDY FROM THE CZECH REPUBLIC)**

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**Abstract:** The aim of this article is to analyse the impact of company size on the perception of the business environment for SMEs in the Czech Republic. The results from the research conducted at Tomas Bata University in Zlín in 2015 were used. Within the research micro, small and medium-sized enterprises from all regions of the Czech Republic were surveyed by using an on-line questionnaire. A total of 1,141 respondents responded to questions about the business environment in the Czech Republic. The results focused on perception of business risks and state role were used in this study. It was found that the business environment is relatively consistent in most of the aspects in terms of company size. It can be concluded that small and medium size businesses perceive the state's help more than micro businesses. Micro-sized enterprises have expressed also less willingness to invest in risky projects than SMEs.

**Keywords:** small and medium-sized enterprises, business environment, business risk, state role

### **1. INTRODUCTION**

Small and medium-sized enterprises (SME) are without a doubt an essential part of every market economy. [11] In line with that Henderson and Weiler state that SME could be characterised as the most important catalyst for economic growth. 99 % of all companies are from the SME segment in the European Union and the USA. [4, 9]

According to the initiative called Small Business Act, the Czech Republic is more or less at the EU average level in such fields as entrepreneurship, access to finance, the single market, skills and innovation, but is significantly below the average in the area of the second chance, “Green light to Small and Medium-Sized Enterprises”, flexible management, state support, public procurement and internationalization. [7]

Quality business environment is a prerequisite for a long-term competitiveness and growth of every market economy. In its broadest sense, the business environment reflects the quality of economic conditions and preconditions of economic activities of enterprises. Belanová states that quality business environment creates conditions for long-term sustainable economic growth, and is a basic prerequisite for business development and growth of competitiveness of the country on an international scale. [1]

Business activities are significantly determined by the environment of the company, which forces it to use a particular method of behavior and to choose particular business goals and ways of achieving them. In this context, important roles are played by the social environment and the political and legal environments that are created by the state authorities. Presumably, a positive perception of these companies by their environment could stimulate

their financial performance and accelerate the positive influences of these companies on society. [3]

The structure of the article is as follows. In the theoretical part, we present the importance of business environment and differences in perception of business environment from the viewpoint of company size. Based on the empirical research of the quality of business environment in the Czech Republic, we quantify med(x) and dorvar and Pearson's Chi-squared test, and we compare differences in perception by Czech entrepreneurship in relation to their size. At the end of this paper, we present the main results of our research.

## 2. THEORETICAL BACKGROUND

Small and medium-sized enterprises play an important role in the domestic and also international economic environment. They enter the international division of labour either directly through the contacts with foreign partners or indirectly through importing and exporting companies as subcontractors. With an increasing liberalization of international trade, their activity continues to grow. [6]

On the macroeconomic importance of the SMEs points out Tamosiunas, who believes that SME is one of the most important economics growth factors having the basic impact on the general development of the country's economy and social stability, creation of new work places, therefore its development is one of the most important country's economic politics' trends. [16]

Business environment is defined similarly as a combination of factors that play a role in the development of entrepreneurship by another authors. [8,10] First, it refers to the overall economic, sociocultural, and political factors that influence people's willingness and ability to undertake entrepreneurial activities. Second, it refers to the availability of assistance and support services that facilitate the start-up process.

Stenholm, Acs and Wuebker study entrepreneurial environment and activity based on three pillars: regulatory dimension (regulations, policies, rules and laws that affect individual behavior and their subsequent influence on economic growth), cognitive dimension (the nature of reality and the cognitive frameworks through which individuals interpret information) and normative dimension (social norms, values and beliefs related to human behaviour). [15]

Quality business environment creates favourable conditions for development of SMEs, which represent an important part of the national economic system. Not only economic criteria, but also social, educational, cultural and other factors are playing an important role in this process. [12,14]

Micro enterprises owned by educated professionals have lower credit risk and as a result, they can access loans under lower interest rates. Furthermore, micro firms' access to credit largely depends on the managerial ability and professional expertise of entrepreneurs. In that case, they can get access to bank loans more easily when a firm is well managed and when the owner is more experienced. [13]

According to other studies microenterprises have lower profitability and higher debt, largely bank debt, than companies of other sizes. Empirical results indicate that microenterprises must provide more guarantees, more collateral while asking for bank loans than other firms and they pay higher rates of interest than other firms as a result of information asymmetry and higher credit risks. [5,13]

### 3. RESEARCH AIM AND METHODOLOGY

The aim of this article is to analyze the impact of company size on the perception of the business environment for SMEs in the Czech Republic. The research was done in the Czech Republic in 2015. The companies were chosen from the Albertina database and 1.650 randomly selected firms were addressed by e-mail or phone to fill in the questionnaire placed at:

<https://docs.google.com/forms/d/e/1FAIpQLScfMtKdtx8faYHb8ZHf5GybfmmxB62ggVlyvlfekW0CNh-nA/viewform>.

The data was provided by 1.141 owners of SMEs in 14 regions of the Czech Republic. The questionnaire consisted of 52 questions. In the first nine questions, respondents and their structure in relation to their education, gender, age, residency and size of a firm, the length of time and area of business, motives for starting a business, and the most important characteristics of entrepreneur were analysed. The rest of the questions were connected with answers on a 1-5 scale, from totally agree (1) to completely disagree (5) focused on business environment.

The total number of 1,141 companies surveyed, 62% of them were doing business for more than 10 years, 21% of them between 1 and 5 years, and 17% of them between 5 and 10 years. It can be stated that the owners of the companies were quite experienced entrepreneurs.

In terms of company size, the structure of the examined sample was as follows: 65% of Micro Enterprises (< 10 employees); 27% of Small Enterprises (10-50 employees); and 8% of Medium-sized Enterprises (50-250 employees). In terms of ratios, this structure is consistent with the distribution of companies in economy.

The paper is focused on analysing the partial results of the research in the following areas for which SMEs were surveyed as to their current attitude toward selected factors of the Czech business environment. This areas were analysed from the view of the company size.

S1: The business environment in the Czech Republic is suitable for starting a business.

S2: The state creates a favorable business environment for SMEs.

S3: Business conditions have improved over the past 5 years.

S4: Administrative burden on businesses has decreased over the past five years.

S5: The state helps with entrepreneurship.

S6: Companies are not afraid of investing in risky projects.

In analyzing the above statements, the following research questions were determined:

RQ1: Micro enterprises consider the business environment in Czech Republic more suitable for starting a business than bigger companies.

RQ2: Less than 50% small and medium enterprises in Czech Republic agree with the statement that state crates a favourable business environment.

RQ3: Small and medium enterprises see an improvement in business conditions during the last 5 years more than micro enterprises.

RQ4: Micro enterprises can see a decreasing of administrative burden during last 5 year less than small and medium enterprises.

RQ5: Small and medium enterprises in the Czech Republic perceive state help with entrepreneurship more than micro enterprises.

RQ6: The perception of the business environment from the perspective of SMEs is dependent on the size of the company.

RQ7: At least 30% of the entrepreneurs having a micro-enterprise are not afraid to invest in risky projects.

RQ8: There is a statistically significant difference in risk attitudes in terms of enterprise size.

In process of solving the formulated research questions the following statistical tools such as tables, descriptive characteristics - mean, variance, standard deviation were used. Statistical methods such as absolute frequency and the easy separation of statistical codes were also used. It was also used other methods as follows: sorting according to two statistical characters, dependence between qualitative plural statistical codes (PivotTable intensity contingency). Contingency intensity was measured by using the Pearson coefficient of contingency, which is based on square contingency. An ordinal mean value [med(x)] was determined for each scaled answer and a discrete ordinal variance (dorvar) was computed. For the comparison of the relative abundance of selected statistical characters graphic tools for data analysis such as pie charts were used. Statistical research questions were tested using the test mentioned above with chi-square and Z-score. Various hypotheses were tested at the 5% level of statistical significance, results with p-value lower than 0.05 led to the rejection of the null hypothesis of independence of variables. Z-score was used to determine statistically significant differences between the responses of selected socio-demographic groups. P-value of standardization (standardized) normal distribution was used for the evaluation of Z-score parameters. Conditions for performing the Z - test (normal distribution of statistical features and a large range of sample) have been met. Calculations have been conducted through SPSS Statistics – a sophisticated statistical software.

#### 4. RESULTS

Table 1 contains the nominal value of the examined statements in a relation to the size of the company.

Medium-sized enterprises achieved the highest levels of agreement (med(x) = 3.13) with the statement S1 - The business environment in the Czech Republic is suitable for starting a business. At the same time, these companies achieved the highest heterogeneity in responses (dorvar = 1.13). Small Enterprises at least agreed with favorable environment to start a business (med(x) = 3.49), along with the highest homogeneity of their responses (dorvar = 1.01). More than 30% micro enterprises and 27% other companies agree that the

business environment is suitable for starting a business. RQ1 was confirmed, but the difference is not significant.

Similar results were also achieved in evaluating whether the state creates a favorable business environment for SMEs (S2). However this statement generally achieves the highest homogeneity of responses across all sizes of companies. More than 50% companies in all sizes disagree with this statement. There was not identified statistical difference. RQ2 was confirmed.

Compared to previous results assessment of the development of the business environment over the past 5 years (S3) is showing a change. Micro enterprises presented the highest rate of disagreement ( $\text{med}(x) = 3.64$ ), with this statement and they also achieved the highest stability in the answers ( $\text{dorvar} = 0.99$ ). Only 19% of micro enterprises can see an improvement in business conditions and 56% of them disagree with this statement. In segment of small and medium enterprises agree 24% and disagree 51%. RQ3 was rejected.

Table 1. Contingency table for selected statements [own]

<b>RQ1: The business environment in the Czech republic is suitable for starting a business</b>								
Size	completely agree	agree	no idea	disagree	completely disagree	Total	med(x)	dorvar
<10 employees	11	217	184	283	45	740	3,27	1,06
10-50 employees	2	77	75	134	18	306	3,49	1,01
50-250 employees	2	29	26	29	9	95	3,13	1,13
Total	15	323	285	446	72	1141		
<b>RQ2: The state creates a favorable business environment for SMEs.</b>								
Size	completely agree	agree	no idea	disagree	completely disagree	Total	med(x)	dorvar
<10 employees	2	66	220	382	70	740	3,71	0,819
10-50 employees	1	20	95	156	34	306	3,74	0,803
50-250 employees	0	10	31	47	7	95	3,64	0,816
Total	3	96	346	585	111	1141		
<b>RQ3: Business conditions have improved over the past five years.</b>								
Size	completely agree	agree	no idea	disagree	completely disagree	Total	med(x)	dorvar
<10 employees	5	134	183	345	73	740	3,64	0,99
10-50 employees	2	65	73	136	30	306	3,6	1,03
50-250 employees	0	30	25	35	5	95	3,2	1,02
Total	7	229	281	516	108	1141		
<b>RQ4: Administrative burden on businesses has decreased over the past five years.</b>								
Size	completely agree	agree	no idea	disagree	completely disagree	Total	med(x)	dorvar
<10 employees	11	72	91	389	177	740	4	0,95
10-50 employees	6	27	23	169	81	306	4,07	0,92
50-250 employees	3	8	10	55	19	95	3,98	0,93
Total	20	107	124	613	277	1141		
<b>RQ5: The state helps with entrepreneurship</b>								
Size	completely agree	agree	no idea	disagree	completely disagree	Total	med(x)	dorvar
<10 employees	6	65	186	361	122	740	3,81	0,92
10-50 employees	3	33	90	134	46	306	3,7	0,97
50-250 employees	1	19	25	37	13	95	3,57	1,09
Total	10	117	301	532	181	1141		

The table above shows that the highest rate of disagreement across all sizes of companies achieved assessment of statement S4 - Administrative burden on businesses has decreased over the past five years. At the same time, this statement also showed the second largest homogeneity in the observed statements. Only 11% of companies in all sizes agree with this statement. RQ4 was rejected.

In the last statement S5 – State helps with entrepreneurship micro enterprises presented the highest rate of disagreement ( $\text{med}(x) = 3.81$ ). They also show high stability in answers ( $\text{dorvar} = 0.92$ ). Only 9.5% of micro enterprises and 13% of small and medium enterprises agree with this statement.

Tab. 2 shows the results of testing dependencies of surveyed statements of SMEs with respect to the size of the company in using Pearson's chi-squared test at 5 % significance level

Table 2. Screenshot for Q2 Chi-square Test [own]

Pearson's Chi-squared test with simulated p-value (based on 5000 replicates)
H0: Variables are independent (no interaction between variables)
H1: Variables are dependent (interaction between variables)
S1: The business environment in the Czech Republic is suitable for starting a business. X-squared = 8.6921, df = NA, p-value = 0.3597
S2: The state creates a favorable business environment for SMEs. X-squared = 3.8981, df = NA, p-value = 0.8754
S3: Business conditions have improved over the past 5 years. X-squared = 12.4934, df = NA, p-value = 0.1352
S4: Administrative burden on businesses has decreased over the past five years. X-squared = 8.2821, df = NA, p-value = 0.3939
S5: State helps with entrepreneurship. X-squared = 15.1189, df = NA, p-value = 0.05179

The results in Tab. 2 show that correlation has not been proven between the size of the company and the individual surveyed statements. Therefore it can be concluded that across companies of different sizes, it can be found significantly different attitudes to the examined statements relating to the business environment in which the surveyed companies are located. RQ6 was rejected.

The results of next two research questions (RQ7 and RQ8) which are focused on the attitude to the risk are showed in the table and the figure below.

Table 3. An analysis of the attitude to risk taking based on the enterprise's size of the attitude to risk, based on the age of the entrepreneur [own]

Attitude of the entrepreneur	Size of the enterprise		Z-score (p-value)
	Micro-sized	SME	
I completely agree	20	6	0.1936
I agree	210	134	0.0767
I don't hold position	138	67	0.4122
I disagree	328	165	0.3030
I completely disagree	44	29	0.3953
chi square	5.675		
p-value	0.2247		

The following figure (Fig. 1) expresses a relative abundance of the results in percentage. The label SME means small and medium-sized enterprises in the pie chart.

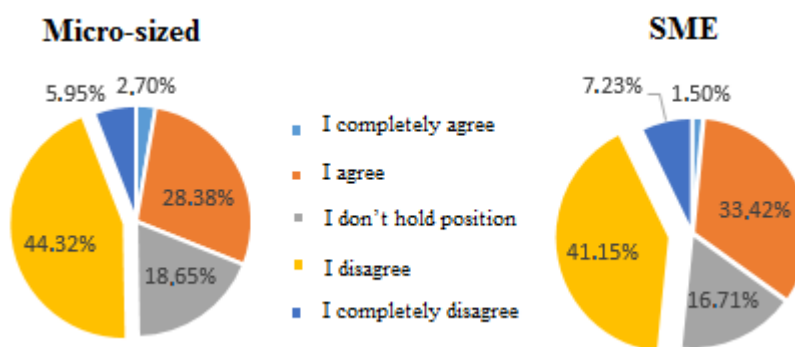


Figure 1. A comparison of the relative frequencies of the attitude to risk taking depending on the size of the enterprise. [own]

Based on the analysis of the enterprise's size and its impact on risk perception it is possible to state that 31% of entrepreneurs with micro-sized enterprises have a positive attitude to risk projects and also 35% of entrepreneurs with small and medium enterprises agreed with the positive approach. RQ7 was confirmed, since the percentage of affirmative responses for micro enterprises is higher than 30%. There was neither statistically significant difference between the groups in this category (chi-square 5.645, p-value 0.2247), nor between individual answers. RQ8 was thus rejected.

## 5. CONCLUSION AND DISCUSSION

The performed analysis shows relatively negative perception of the examined factors of business environment in the Czech Republic.



It can be concluded that micro enterprises consider business environment in Czech Republic suitable for starting a business more than other companies. 30% of micro enterprises and 27% of other enterprises agreed with this statement. The difference is not significant. It can mean that micro companies have not so much administrative burden. Entrepreneurs can create this micro enterprises as trade which is in Czech Republic easier for starting a business.

Small and medium enterprises disagree with the statement that state creates a favorable business environment in Czech Republic. The statement generally achieved the highest homogeneity of responses across all sizes of companies. It shows that there is not significant advantage if an enterprise is micro, small or medium. The similar results are achieved by the statement analyses state help. Only 9.5% of micro enterprises and 13% of small and medium enterprises agree that state helps them during their business. Small and medium enterprises can see state help more than micro enterprises.

In terms of company size it was proved that medium size companies perceive the development of administrative burden connected to entrepreneurship more positively than other entrepreneurs. The dependence of the perception of administrative burden on company size was not proved. The enterprises across all sizes also do not see an improvement in business conditions.

Micro-sized enterprises have expressed less willingness to invest in risky projects than SMEs. This fact may be due to the fear of existence of micro-sized enterprises due to the risky investments that may thus destroy small businesses. For example Belás has found in his previous research that despite the challenging business conditions, entrepreneurs show a great amount of business optimism. More than 95% responding entrepreneurs from the Czech Republic believe that their business will survive the next 5 years. [2]

This research provides a valuable experience regarding the business environment and risk management in small and medium-sized enterprises in the Czech Republic. However, certain limitations of this study cannot be overlooked. These include the possibility that entrepreneurs did not adequately understand the issues involved or the allegations that have expressed themselves, so some answers may not be correct. This investigation has only a national character and it is only valid on the territory of the Czech Republic. In the future it should be enriched by international comparison.

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## REFERENCES

- Belanová, K., Komparácia kvality podnikateľského prostredia v krajinách Vyšehradskej štvorky s osobitným akcentom na dostupnosť finančných zdrojov. *Biatec*, No.1, (2014), 12 – 17.
- Belás, J., et al., Business risks and the level of entrepreneurial optimism of SME in the Czech and Slovak Republic. *Journal of competitiveness*, 6 (2), (2014), 30-41.
- Belás, J., Demjan, V., Habáňik, J., Hudáková, M., Sipko, J., The business environment of small and medium-sized enterprises in selected regions of the Czech Republic and Slovakia, *E+M Ekonomie a Management*, 18(1), (2015), 308-326.

- Bhaird, C. M., *Resourcing Small and Medium Sized Enterprises*. Springer Verlag: Berlin, 2010.
- De Mitri, S., De Socio, A. Russo, P.F., Nigro, V., Micro-enterprises in Italy: A first analysis of economic and financial conditions. Bank of Italy Occasional Paper No. 162., 2013.
- Dúbravská, M., Mura, L., Kotulič, R., Novotný, J., Internationalization of Entrepreneurship – Motivating Factors: Case Study of the Slovak Republic, *Acta Polytechnica Hungarica*, 12(5), (2015), 121-133.
- European Commission 2015 SBA Fact Sheet Czech Republic. Available at: [http://ec.europa.eu/growth/smes/business-friendly-environment/performance-review/files/countries-sheets/2015/czech-republic\\_en.pdf](http://ec.europa.eu/growth/smes/business-friendly-environment/performance-review/files/countries-sheets/2015/czech-republic_en.pdf). (referred on 201/03/2017)
- Gnyawali, D.R., Fogel, D.S., Environments for entrepreneurship development: key dimensions and research implications', *Entrepreneurship theory and practice*, 18 (4), (1994), 43-63.
- Henderson, J., Weiler, S., Entrepreneurs and job growth: probing the boundaries of time and space, *Economic Development Quarterly*, 24(1), (2010), 23 – 32.
- Jintong, T., How entrepreneurs discover opportunities in China: An institutional view', *Asia Pacific Journal Of Management*, 27 (3), (2010), 461-479.
- Karpak, B., Topcu, I., Small medium manufacturing enterprises in Turkey: an analytic network process framework for prioritizing factors affecting success. *International Journal of Production Economics* 125 (1), (2010), 60-70.
- Ključnikov, A., Belás, J., Kozubíková, L., Paseková, P., The Entrepreneurial Perception of SME Business Environment Quality in the Czech Republic. *Journal of Competitiveness*, 8(1), (2016), 66-78.
- Neuberger, D., Rathke, S., Microenterprises and multiple bank relationships: the case of professionals. *Small Business Economics*, 32(1), (2009), 207–229.
- Smékalová, L., Hájek, O., Belás, J., Macháček, J., Perception of Small and Medium Entrepreneurship in the Czech Republic. *Journal of Competitiveness*, 6(4), (2014), 41-49.
- Stenholm, P., Acs, Z.J., Wuebker, R., Exploring country-level institutional arrangements on the rate and type of entrepreneurial activity, *Journal of Business Venturing*, 28(1), (2013), 176-193.
- Tamosiunas, T., Lukosius, S., Possibilities for Business Enterprise Support, *Inzinerine Ekonomika-Engineering Economics*, 1 (1), (2009), 58-64
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## **WIND ENERGY - A LEADING SOURCE OF NEW RENEWABLE ENERGY CAPACITY**

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**Abstract:** Wind energy currently meets about 5% of global demand for electricity, which is in second place just after the solar energy, and capacity has more than doubled in recent years. The development of facility renewables, in this case the wind, has a major role in reducing the use of fossil fuels, thus reducing the impact of global environmental changes.

The purpose of this study is to explore the trend of development and investment in the capacity of renewable wind energy, in the period 2010-2016. With special emphasis on the countries of Europe, as wind energy now amounts to 17% of the total installed capacity of electricity in Europe, with last year's growth of production 12.490MW or 51% of total electricity. That there is a growing interest in investment in this sector, evidenced by the fact that in 2016 invested 27.5 billion euros, which is 5% more than in 2015.

Wind could meet a quarter of the world's electricity consumption by 2050, to the current rate of growth continues, creates the need for additional land 1,000,000 and 100,000 wind turbines on water. Therefore, continues global transition of non-renewable to renewable energy sources in the world.

**Keywords:** wind energy, capacity, renewable energy, electricity, investment

### **1.UVOD**

Sa razvojem tehnologija dolazi do povećane potrošnje i mnogo većih potreba za ukupnom energijom, na globalnom nivou. Obnovljivi ili kako ih neki nazivaju, novi izvori energije, nameću se kao jedini logičan a opet godinama zapostavljan izvor proizvodnje energije. Čovječanstvo, najzad, nakon nesebičnog eksploatiranja neobnovljivih izvora energije, okreće onoj manje štetnoj alternativi. Od svih obnovljivih izvora energije, upotreba vjetra danas bilježi jednu od najvećih stopa rasta.

### **2.NASTANAK VJETRA I PRINCIPI ISKORIŠTAVANJA**

Sva obnovljiva energija dolazi od sunca. Ono prema Zemlji zrači oko 1015 kwh po kvadratnom metru. Prema tome, 1 do 2% energije koja dolazi od sunca pretvara se u vjetar. Neravnomjerno zagrijavanje različitih dijelova Zemlje prouzrokuje različite pritiske zraka, vjetar nastaje kao rezultat nastojanja izjednačavanja pritiska. Tako postoje dijelovi Zemlje gdje su za zastupljeni takozvani stalni vjetrovi, poput obala mora ili pučina, gdje je iskorištavanje energije vjetra najisplativije. U zavisnosti od mjesta izgradnje vjetroelektrana, one mogu biti takozvane "onshore"(na kopnu) ili "offshore"(u blizini obale tj. na vodi) vjetroelektrane.

Princip dobijanja energije iz vjetra zasniva se na odnosu ili konkretnije, pretvaranju kinetičke energije vjetra u mehaničku energije. Vjetrogenerator pretvara kinetičku energiju vazduha koji se kreće (vjetra) pomoću lopatica rotora (elise), prenosnog mehanizma i elektrogeneratorsa u električnu energiju. Tako se iskorištava samo razlika brzine vjetra na ulazu i na izlazu. Njemački fizičar, Albert Betz, još davne 1919. godine dao je zakon energije vjetra danas poznat kao Betzov zakon<sup>3</sup>

## 2.1. SOCIJALNO EKONOMSKE PREDNOSTI ENERGIJE VJETRA

U protekle dve decenije, energija vjetra nosi pozitivan epitet u nekoliko evropskih zemalja poput Danske, Španije i Njemačke ali se u posljednjih nekoliko godina statistički podaci investicija i izgradnje vjetroelektrana drastično povećavaju i u SAD-u, Kini, Indiji i drugim zemljama širom svijeta. Vodeće evropske zemlje, poput gore navedenih, uspjele su uspostaviti energiju vjetra kao glavni stub njihovih projekata energetskog napajanja. Ovo se posebno odnosi na Njemačku i Dansku, gdje je energija vjetra postala i veoma popularna investicija za „prosječne“ građane. Stotine hiljada njih doprinijeli su svojim ušteđevinama, stvarajući kapital za izgradnju lanca snadbijevanja obnovljive energije. Postoje mnogi razlozi za to a osnovni, pored finansijske isplativosti na duži period (smanjenje cijene električne energije) i sve manjih količina neobnovljivih izvora energije, jeste povećanje svijesti o ekološkoj zagađenosti i klimatskim promjenama. Prednosti ili prostije rečeno dobre strane korištenja vjetra, između ostalih, kao izvora energije su brojne:

- pristup neizmjerljivoj količini energije,
- niski troškovi (praćeni sve većim padom cijena koštanja proizvodne tehnologije),
- zaštita životne sredine (ekološki čist način dobijanja energije),
- mala zauzetost zemljišta,
- vjetroelektrane su specijalizovane za sve vrste zemljišta i sve klimatske uslove,
- povećanje zaposlenosti u industriji energije vjetra,
- među svim obnovljivim izvorima energije, energija vjetra je rangirana kao jedna od najjeftinijih opcija za smanjenje emisije CO<sub>2</sub> ali i drugih zagađujućih materija,
- i kao posljednje i veoma zanimljivo, u zadnje vrijeme velike vjetroelektrane u Evropi postale su i jedna od turističkih atrakcija.

## 3. INVESTICIJE EVROPSKIH ZEMALJA U ENERGIJU VJETRA

Postrojenja obnovljivih izvora, u ovom slučaju vjetra, zahtijevaju još uvijek veoma visoke investicije za mnoge nacionalne ekonomije, što se posebno odnosi na one „offshore“

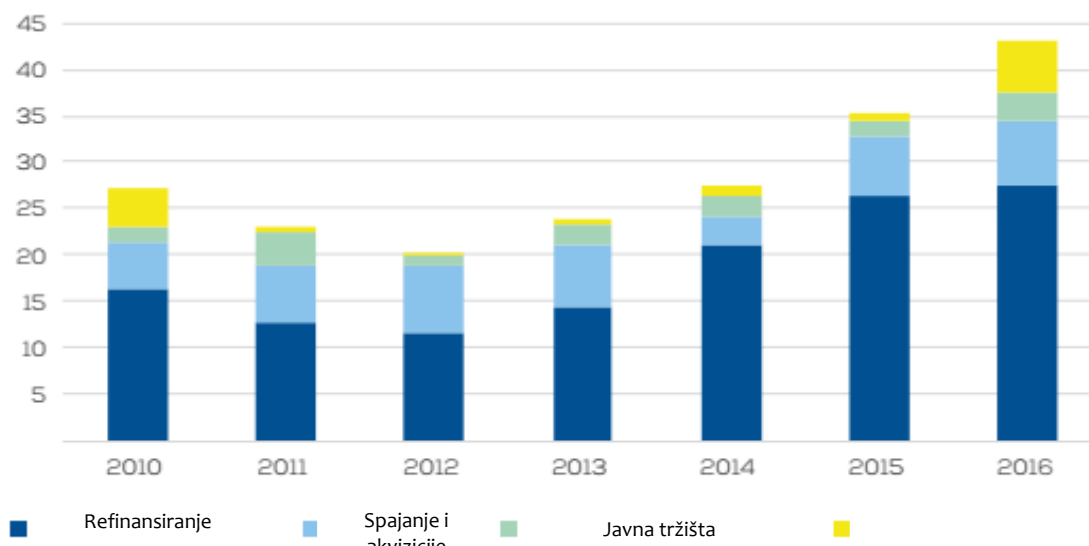
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<sup>3</sup> Publikovan 1926. godine u knjizi „Wind – Energie“. Prema ovom zakonu, pomoću turbine na vjetar odnosno vjetroelektrane, možemo pretvoriti manje od 59% kinetičke energije u mehaničku energiju. To je teorijski maksimum, dok je u praksi taj procenat uglavnom između 35% i 45% energije vjetra.

odnosno vjetroelektrane na vodi koje su zbog stalnosti vjetra najproduktivnije i najisplativije. Prema tome, mnoge zemlje u razvoju su pokušale, ali još uvijek bezuspješno, uspostaviti domaću industriju energije vjetra. Pristup kapitalu je glavni izazov u ovim zemljama a energija vjetra, kako je već navedeno, zahtijeva unaprijed visoke investicije. Ono što ide u prilog ovim zemljama, jesu sve niži troškovi proizvodnje vjetroelektrana i razvoj pristupačnijih tehnologija. Na osnovu dosadašnjih iskustava u gradnji vjetroelektrana došlo se do orijentacione vrijednosti investicija od oko 700 do 1000 eura po instaliranom kW. Vjetroelektrane, a samim tim i farnevjetroelektrana su znatno pojeftinili u posljednjih deset godina i ta tendencija će se i dalje nastaviti. Na taj način je i cijena električne energije dobijene iz vjetroelektrane drastično smanjena. Na to je dodatno uticalo i smanjenje operativnih troškova i rast efikasnosti i pouzdanosti. Obzirom da kod korišćenja energije vjetra, kao kod mnogih drugih obnovljivih izvora energije, nema troškova goriva, poslije investicione izgradnje jedini troškovi su operativni i troškovi održavanja. Investicioni troškovi se kreću od 75% do 90% ukupnih troškova. Investicioni troškovi su troškovi izgradnje vjetroelektrane ili farme vjetroelektrana, uključujući troškove izgradnje pristupnih puteva ukoliko je potrebno i troškove priključivanja na elektroenergetski sistem. Cijena vjetroelektrane se kreće od 600 do 900 eura po instaliranom kW(9)

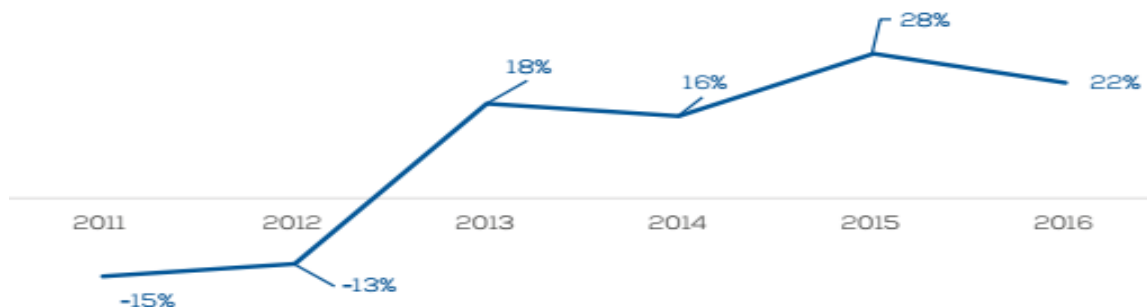
### 3.1. TREND RASTA INVESTICIJA U PERIODU 2010 - 2016

U međuvremenu, razvijene zemlje sve više napreduju u tranziciji neobnovljivih izvora energije u obnovljive izvore energije, ulagajući velike količine sredstava u ovu industriju. Evropa je u 2016. godini investirala ukupno 43 milijardi eura u sektor energije vjetra i rast od 22% u odnosu na 35 milijardi eura investiranih u 2015. godini. Investicije su uključivale ulaganja u nove kapacitete, transakcije refinansiranja postojećih projekata, transakcije na javnim tržištima, kao i u porast preduzetničkog i privatnog kapitala. Ovo je bila rekordna godina za energiju vjetra, koja bilježi najveći porast u odnosu na druge obnovljive izvore energije. Samo u izgradnju novih kapaciteta odnosno vjetroelektrana uloženo je 27,6 milijardi eura. Akcenat je ovaj put stavljen na „offshore“ (priobalne) vjetroelektrane, sa 18,2 milijardi eura što je do sada najveće ulaganje u ovu granu industrije energije vjetra. Razlog tome je smanjenje troškova, prema vrijednosti u ovoj industriji, što je rezultiralo pozitivnim ishodom za investitore koji sada finansiraju više kapaciteta za manje novca.



Grafikon 1. Ukupne investicije u energiju vjetra u Evropi 2010 – 2016(milijardiEUR) (7)

Kroz proteklih šest godina drastično raste nivo finansiranja kapaciteta obnovljivih izvora, o čemu svjedoče i podaci *Bloomberg New Energy Finance*, prema kojima je od -15% krajem 2010.godine procenat uloženih finansijskih sredstava kulminirao i do pomenutih 22% u 2016.godini.



Grafikon 2. Povećanje stopa investicija u energiju vjetra iz godine u godinu

Tržišta energije vjetra u 2016. godini uglavnom su bila bazirana na Sjevernu i Zapadnu Evropu, zbog velikih ulaganja u priobalne vjetroelektrane. Dok investicije u Južnoj i Istočnoj Evropi ostaju veoma niske. Razlog tome je, dobrim dijelom, smanjena stabilnost u nekim državama ovih dijelova Evrope. Već drugu godinu za redom, Velika Britanija je dosegla najviši nivo finansiranja novih projekata u Evropi, Sa ukupnom sumom od 12,7 milijardi eura, što ove investicije čini dijelom od 46% ukupnih evropskih investicija. Njemačka predstavlja drugo najveće tržište energije vjetra u Evropi 2016. godine, zbog pada investicija od 19% u iznosu od 5,3 milijardi eura. Krajem godine usvojena su i dva velika

projekta, i to najveća priobalna vjetroelektrana do danas, sa novih dodatnih 1,2 GW kapaciteta za projekte koji čekaju gradnju u Velikoj Britaniji. Drugi projekat odnosi se na izgradnju najveće farme vjetroelektrana sa sjedištem u Norveškoj, vrijednosti od 1,1 milijardi eura i kapaciteta od 1 GW.

Ono što je zabrinjavajuće u svim ovim pozitivnim brojkama, jeste nejednak geografski rast. To se odnosi na činjenicu da je *80% novih ulaganja dolazilo iz samo četiri zemlje, Velike Britanije, Njemačke, Belgije i Norveške. 14 država članica Evropske unije nisu objavile nikakve nove investicije u energiju vjetra u 2016.godini. Samo 7 država članica Evropske unije ima jasne politike za obnovljive izvore poslije 2020.godine, nejasne perspektivne politike u ostalim državama djeluju tako da investitori i programeri odlaze negdje drugo. Nacionalni planovi djelovanja za energiju i klimu biće ključni za održavanje investicija (Giles Dicson, glavni izvršni direktor Evropskog udruženja za energiju vjetra (EWEA)).*(2)

Prema statističkim podacima agencija koje se bave tematikom energije vjetra, investicije u ovaj sektor energetike bi u 2017. godini mogle da dožive blagi pad odnosno intenzitet investicija biće nešto sporiji. Bez obzira, ulaganje u energiju vjetra će se nastaviti ali se očekuje usporavanje trenda pada kamatnih stopa, budući da poslovne banke uspostavljaju svoju konkurencijsku poziciju na tržištu energije vjetra.

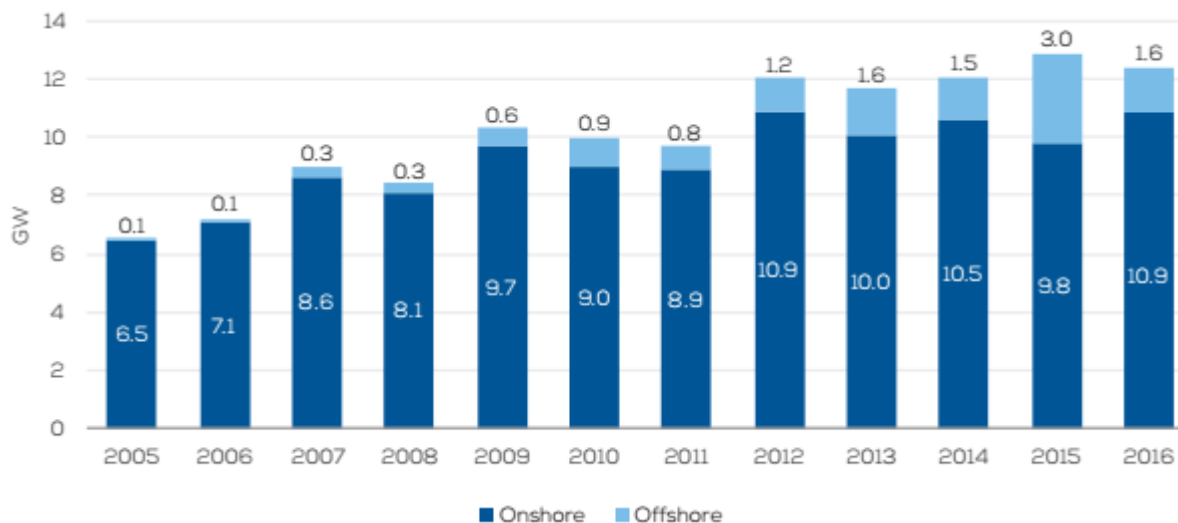
### 3.2.ULOGA RAZVOJNIH BANAKA U INVESTIRANJU ENERGIJE VJETRA

Razvojne banke igraju ključnu ulogu u finansiranju inovacija na „onshore“ (kopnenim) i „offshore“ (priobalnim) projektima gdje su troškovi i faktori rizika visoki, a privatne banke nisu interesanti. Evropska investiciona banka će imati ključnu ulogu u finansiranju velikih inovacionih projekata za izgradnju i obnovu vjetroelektrana na kopnu. Energetski projekti finansirani su iz kredita Evropske investicione banke u visini od preko 50 milijardi eura, u periodu od 2011–2015, sa oko 8 milijardi eura namijenjenih projektima vjetroelektrana. 34 projekta posebno su bili posvećeni vjetroelektranama na obali vjetra i 32 su bili posvećeni vjetroelektranama na kopnu. U 2016. godini Evropska investiciona banka podržala je Evropski fond za strateška ulaganja (EFSI), te osigurala investicije vrijedne 1,5 milijardi eura za izgradnju kopnenih i priobalnih vjetroelektrana. Time je olakšan dolazak novih investitora. Nizak rizik, penzioni fondovi sa niskim prinosom investitora spremni su preuzeti ulogu davaoca duga, jer kapital postaje sve skuplji. Tako su, kao jedan od primjera, pod uticajem niskih kamatnih stopa na domaćem tržištu japanske banke ojačale svoju prisutnost u evropskim projektima vjetroelektrana.

### 4.IZGRADNJA NOVIH KAPACITETA I TEHNOLOGIJA

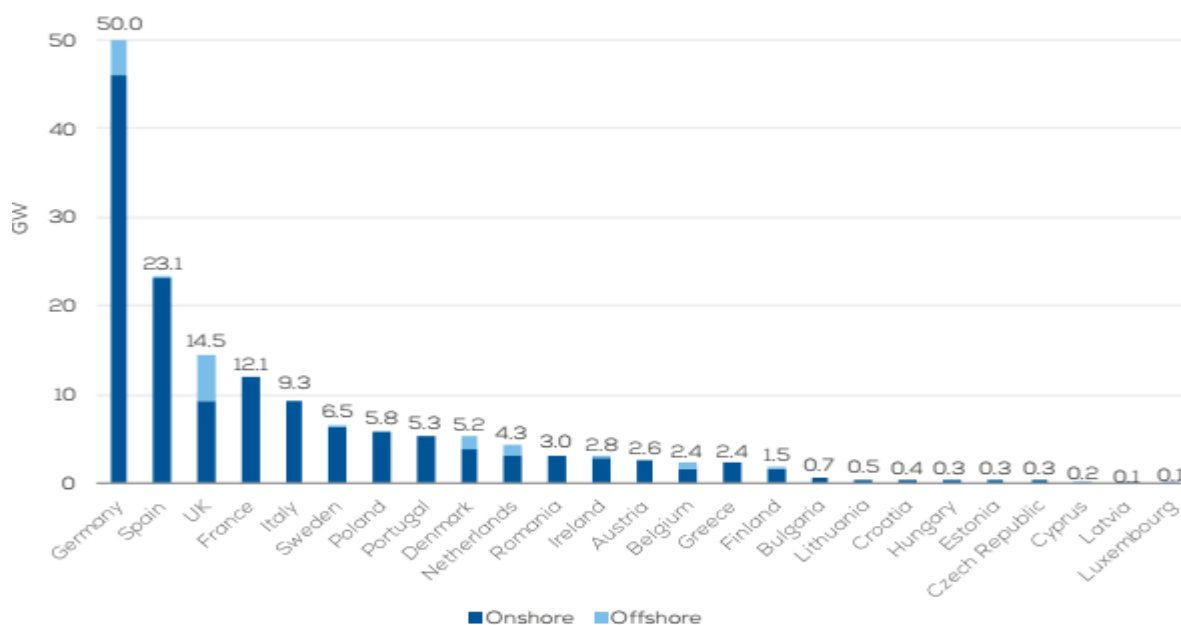
Udio energije vjetra u ukupno instaliranom kapacitetu energije u Evropi se povećao, u proteklih 10 godina, sa 6% na 16,7%. Samim tim je ova vrsta energije zamijenila uglj, kao drugi najveći energent za proizvodnju električne energije u Evropi. U istom razdoblju, udio svih obnovljivih izvora energije povećan je sa 24% ukupne snage na 46%.

Izgradnjom energetskih postrojenja - vjetroelektrana se povećavao ukupan kapacitet sa 9,9 GW u 2010. godini na 12,5 GW u 2016. godini (u 2000.godini ukupni kapacitet iznosio je 2,3 GW), iako je maksimalno proizvedeni nivo energije bio 2015. godine od 12,8GW.



Grafikon 3. Godišnje izgrađeni kapaciteti energije vjetra u Evropi (8)

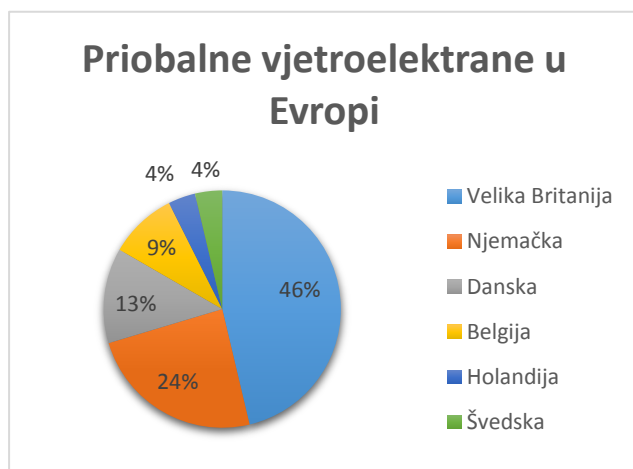
Danas je u zemljama Evropske unije ukupno instalirano 153,7 GW kapaciteta energije vjetra. Najveći kapacitet još uvijek ima Njemačka, zatim Španija, Velika Britanija, Francuska i Italija. Više od 5 GW instaliranog kapaciteta imaju Švedska, Danska, Poljska i Portugal. Dok sedam evropskih država još uvijek stagniraju na nešto više od 1 GW instaliranog kapaciteta.



Grafikon 4. Ukupno instalirani energetska kapaciteti vjetra u EU po državama (ukupno 153,7 GW)(8)



#### 4.1.POTENCIJALI „OFFSHORE“ VJETROELEKTRANA



Na početku rada bilo je riječi o iskoristivosti vjetra u priobalnim područjima i pučinama, kroz izgradnju „offshore“ vjetroelektrana koje imaju tendenciju najveće iskoristivosti energetskog potencijala vjetra. Najveći rotirajući strojevi na Zemlji su upravo priobalne vjetroelektrane. Razvojem tehnologija kako u samim temeljima, tako i u instalacijama, pristupima, operacijama i integracijama sistema, uticali su na mogućnost instaliranja vjetroelektrana u dublje vode. Dalje od obale, gdje su veći i

bolji vjetroenergetski resursi. Do 2007. godine vjetroelektrane su instalirane u dubinama vode ispod 20 m I manje od 30 km udaljenosti od obale. Danas, kao dokaz o napretku, vjetroelektrane se rutinski instaliraju u dubinama vode do 40m I do 80km udaljenosti od obale.

Ovaj sektor industrije energije vjetra skočio je sa nekoliko megavata (MW) instaliranih kapaciteta na više od 12 GW za nepunih 15 godina. Većina vjetroelektrana se nalazi pri obalama Sjeverne Evrope, pola kapaciteta je u vodama Velike Britanije, trećina u vodama Njemačke, a ostatak gotovo potpuno u ostalim dijelovima Sjevernog mora ili Baltičkog mora. Do kraja 2015. godine u Evropi je ostvaren kapacitet od 11,2 GW ili 1,6% proizvedene energije, kroz ukupno 54 “offshore” vjetroelektrane.(5)

U toku prethodne 2016. godine dodano je 338 mrežnih vjetroelektrana, umrežanih na 6 “offshore” farmi. Dok je novih 361 jedinica kapaciteta energije vjetra instalirano. Četiri projekta su završena u 2016. godini, a započet je rad na 11 novih projekata u Belgiji, Njemačkoj, Holandiji I Britaniji (procijenjeno povećanje kapaciteta ovim projektima je ukupno 4,8 GW).Trenutno, u Evropi je instalirano 3.589 “offshore” vjetroelektrana sa ukupnim kapacitetom od 12.631 MW. Uključujući I umrežane vjetroelektrane (“offshore” farme vjetroelektrana) kojih u 10 evropskih zemalja ima oko 81.(3)

Tabela 1. Broj vjetroelektrana I farmi vjetroelektrana sa ukupnim kapacitetom u 2016.godini (3)

Država	BE	DE	DK	ES	FI	IE	NL	NO	SE	UK	Total
Br. farmi vjetroelektrana	6	18	13	1	2	1	6	1	5	28	81
Br. Vjetroelektr.	182	947	517	1	11	7	365	1	86	1,472	3,589
Kapacitet	712 MW	4,108 MW	1,271 MW	5 MW	32 MW	25 MW	1,118 MW	2 MW	202 MW	5,156 MW	12,631 MW

#### 4.1.1. Glavni ciljevi “offshore” industrije energije vjetra

**Smanjenje troškova energije** – Da bi industrija “offshore” energije vjetra i dalje napredovala, troškovi energije bi morali biti sve manje iz godine u godinu, na taj način bi bila konkurentnija drugim izvorima dobijanja energije. Neke od mogućnosti za realizaciju ovog cilja su:

- razvoj vjetroelektrana (projektovanje, istraživanje),
- veće turbine, bolje hvatanje energije, veća pouzdanost,
- električna povezanost sa dalekim “offshore” vjetroelektranama,
- manja osjetljivost na vremenske uslove i nepravilnosti,
- ina kraj, smanjenje troškova finansiranja – manjim rizikom i periodom između ulaganja i realizacije.

**Razvoj međusobnog povezivanja** – Postoje mogućnosti za tehnološku inovaciju kroz razvoj projekata vjetroelektrana sa dizajniranim turbinama koje su otporne na olujne uslove, sa razvijenim dubinskim tehnologijama i najvažnije poboljšanim električnim međusobnim povezivanjem. Sa tim tehnologijama, s obzirom na specifične mogućnosti povezane s vjetrom, može se postići integracija energije u međunarodne interkonektore čime se smanjuju troškovi prenosa i korištenje rješenja za skladištenje u dubokoj vodi.

**Otvaranje novih tržišta** – Razvijanje raznovrsnog globalnog tržišta ima posebnu težinu i svrhu. Napredovanjem istog, osigurao bi se snažan i dugoročan rast investicija, privrženost mreže snabdijevanja i finansijske zajednice.

**Smanjenje uticaja na životnu sredinu** - Uticaj ugljenika “offshore” vjetroelektrana niži je od većine drugih tehnologija, ali razvojni projekti i dalje imaju lokalni uticaj na okolinu a i društveni uticaj. Ovi uticaji odnose se na:

- lokalne populacije divljih životinja (morskih sisavaca, ptica, riba itd.),
- lokalne zajednice (imaju vizuelni uticaj i infrastrukturu na kopnu),
- ostale učesnike (poput turizma i industrije).

**Unapređenje zdravlja i sigurnosti** - Izgradnja i upravljanje “offshore” vjetroelektranama na podrazumijeva širok raspon rizika za ljudsko zdravlje i sigurnost. Aktivnosti s povećanim rizikom uključuju:

- rad na obali,
- rad na visini,
- ronjenje,
- podizanje,
- prenos turbinama iz broda ili helikoptera.

To je glavni prioritet bilo koje odgovorne industrije da štiti svoje radnike kroz odgovarajuće i učinkovite politike, procese i mjere zaštite.

## 5.ZAKLJUČAK

Energija vjetra, jedan od vodećih izvora stalne i obnovljive energije u svijetu, u posljednjih nekoliko godina je u značajnom porastu. Čak postoji mogućnost da preraste i solarnu energiju koja je još uvijek na prvom mjestu, kada su u pitanju obnovljivi izvori energije. U proizvodnji električne energije nijedan izvor energije nije imao tako dinamičnu ekspanziju u posljednjih dvadesetak godina. Savremene vjetroelektrane po ekonomičnosti su izjednačeni sa klasičnim izvorima energije. Klimatske i ekološke promjene su trenutno stanja koja se ne mogu kontrolisati, zbog dugoročnog negativnog uticaja koji je prouzrokovala modernizacija. Vjetar je stalan i prisutan u svim dijelovima Zemlje, čitavu godinu a posebno u zimskom periodu kada je vjetar intenzivniji. To bi značilo da uglavnom sve zemlje ili bar većina, imaju geografske uslove za izgradnju ovih kapaciteta obnovljive energije. Osnovni problem a ujedno i najveća mana ovih projekata jeste finansiranje, koje nije jača strana svake nacionalne ekonomije.

Međutim napretkom tehnologija cijene troškova izgradnje vjetroelektrana opadaju, stoga bi u budućnosti mogle biti pristupačnije mnogim društvima. Razvijene države Evrope unutar Evropske unije planiraju da do 2050. godine potpuno transformišu sistem dobijanja i napajanja električne energije u potpuno neškodljiv i ekološki ispravan, za razliku od dosadašnjeg koji štetno utiče na okolinu (za sada su realna predviđanja stručnjaka da bi se energijom vjetra do 2030. godine moglo zadovoljiti 20 % globalne potražnje za električnom energijom). Energija vjetra imaće veliku ulogu u ovom konceptu, što se moglo i naslutiti s obzirom na količinu instaliranih kapaciteta vjetroelektrana do sada i sume uložene investicije. Taj trend ulaganja nastaviće se i u narednim godinama, iako Evropa ili preciznije Evropska unije ima specifično uređen pravni okvir. Što bi moglo pomalo da uspori realizaciju zadatih planova, dok se ne usklade zakoni zemalja članica. Energija vjetra ima mnogo pozitivnih strana, i jako malo negativnih koje bi u poređenju sa krajnjim ishodom, mogle da se zanemare.

## REFERENCE

1. European Technology and Innovation Platform on Wind Energy, Strategic research and innovation agenda, 2016
2. Hill Joshua, article „European Wind Power Investments To Slow In 2017 After €43 Billion In 2016, May 10. 2017.
3. Ho Andrew, Mbistrova Ariola, The European offshore wind industry – Key trends and statistics 2016, 2017, 7 – 18.
4. Hossain Jami, Technical Committee Report on Grid Integration – Wind Energy 2050, World Wind Energy Association(WWEA), 2015
5. IRENA, Innovation Outlook:Offshore Wind, International Renewable Energy Agency, Abu Dhabi, 2016, 2.
6. Malik Sohaib, Dabla Nopenyo, Improving Investment Conditions for Wind and Other Renewables in Developing World, WWEA Policy Paper series(PP-02-14), 214

7. Mbistrova Ariola, Financing and investment trends, WindEurope Business Intelligence, 2016, 9.
8. Nghiem Aloys, Mbistrova Ariola, Wind in power – 2016 European statistics, WindEurope Business Intelligence, 2017, 16 – 18.
9. OEBS Misija u Srbiji i Crnoj Gori, Sektor za ekonomska pitanja i politiku životne sredine, Liber perpetuum – Knjiga o potencijalima obnovljivih izvora energije u Srbiji i Crnoj Gori, 2004, 47.
10. REN21 Steering Committee, Renewables – Global status report, 2016

## THE IMPACT OF PROCESS OF MANAGING RESULTS ON THE PROFITABILITY OF ORGANIZATIONS

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**Abstract:** Managing results is one of the main parts of the profit making and development strategy of an organization. Managing results is continuous and joint process, where the employees assisted by the employers are trying to increase their contribution to the organizational goal through better individual results.

The implementation of a successful results management process, contributes to the achievement of higher organizational and personal results. The higher results contribute to the achievement of the goals and overcoming the projected expectation of the productivity, quality, consumer services, increase in the profit and increase in the price of the shares. At the same time, successful process of results management can serve the purpose of personal development of the employees, increase of the personal results and better effectiveness and skills development.

This paper elaborates the link between the process of managing results and profitability of organizations. The sample contains 32 successful small, medium-sized and large private enterprises paying attention to this problem. The basic data in this study has been obtained through structured questionnaire, and the results have been analyzed using SPSS -Statistical Program for Social Sciences.

**Keywords:** managing results, productivity, organizations

### 1. THE PROCESS OF MANAGING RESULTS IN THE ORGANIZATION

The results that are achieved in the organization by employees are very important, just like the employees in the organization. Namely, as emphasized Senyucel, people are the greatest asset in organizations. Individuals and organizations have learned about the great importance of employees in the organization and success of an organization is due precisely to these workers.

The importance of people in organizations is immense because it is the people that plan, design, implement, sustain and end an organization's life. From this vital point, we can assume that one of the most important functions in an organization is the management of the human resource function. Hence, the role of human resources is absolutely crucial in increasing the performance of the organization.<sup>4</sup> That performance is realized by individuals

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<sup>4</sup> Z. Senyucel, *Managing the Human resource in the 21<sup>st</sup> Century*, Bookboon.com, Free Business Books, Zorlu Senyucel&Ventus Publishing ApS, 2009, p. 11;

who contribute to achieving the objectives of the organization, which increases the importance of managing with this process.

Performance management is an integral part of effective human resources management and development strategy of the organization. It is a continuous and common process where employees with help of employers trying to improve personal performance and their contribution to organizational goals.

Performance management also can incorporate all aspects of human resources that lead to progress and increase the effectiveness and efficiency of individuals and the organization. In order to raise and keep that level of performance achieved, the manager need to see past performance of individuals and teams within the system of performance management. The success of the system of performance management depends on the commitment and support by the management of the organization. Performance management must reward personal development and achievement.<sup>5</sup>

Within the area of managing the performance of employees in the organization is very important objectives set for all groups to be fair and equitable. It is imperative for the employees because they feel the support from the management of the organization where they work. Good system of performance management in the organization motivates employees to better achieve their performance and build and strengthen relationships through open communication between employees and managers.

Successful performance management requires full participation between employees and managers through effective communication and consistent objectives, resulting in full mutual understanding, not in unfounded expectations. It allows managers and employees to understand the organization's mission, the way in which work should be done and to what degree the work is completed. Employees should be empowered and be supported by their managers without removing some responsibilities.<sup>6</sup>

On the one hand, the effective performance management has multiple benefits for the organization. It leads to a high level of satisfaction of employees, so that they know exactly what is expected of them and thus direct their attention towards achieving the set goals. Employees can always rely on their subordinates and superiors when they need help in order to better achieve their performance.

On the other hand, the importance of managing performance of the organization is reflected in the benefits that this process provides and they should be clear to employees:<sup>7</sup>

- When roles and responsibilities are clear, the motivation increases. If team members know what should work, no losses appear in the process due to confusion or uncertainty. In fact, motivated people will be in action and motivated individuals within the team complement each other and help keep that motivation going.

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<sup>5</sup> T. Deb, Performance Appraisal and Management: Concepts, antecedents and implications, Excel Books, 2008, p. 23-25.

<sup>6</sup> M. Armstrong, A. Baron, Managing Performance: Performance management in action, Chartered Institute of Personnel and Development, CIPD House, London, 2005, p. 9;

<sup>7</sup> MTD Training, Performance Management, Bookboon.com, Free Business Books, MTD Training&Ventus Publishing ApS, 2010, p. 8.

- When expectations are clear, employees are more likely to commit to their work, and they will be dedicated to the expected results. Also, they are willing to take risks in business and to put in extra effort;
- When the objectives are clear and will be accepted, team members are responsible for achieving the effectiveness of the team. Without the process of performance management, a team can't be expected to be effective;
- Performance management also helps to develop team members. You can use it to stretch their capabilities, also performance management make opportunities for individual growth, which in turn will help to fuel their enthusiasm for their job.
- Managing performance is a powerful tool for dealing with poor performance.

It is very important that benefits of performance management be transferred to employees in the organization. Well structured and implemented process of performance management provides the security of employees in performing work that is required to be done. Also, employees understand what is expected of them and that appropriate rewards will get. But the process of performance management is a framework for measuring employee performance and leads to improve their skills and performance.

## **2.SETTING OBJECTIVES**

The planning function is the primary activity of management. Planning is the process of establishing goals and a suitable course of action for achieving those goals. The first step in the planning is the selection of goals for the organization. Goals are then established for each of the organization's subunits-its division, department and soon. Once these are determined, programs are established for achieving goals in a systematic manner.

The organizational objectives are set by top management in the context of its basic purpose and mission, environmental factors, business forecasts, and available and potential resources.

These objectives are both long-range as well as short-range. They are divided into divisional, departmental, sectional and individual objectives or goals. This is followed by the development of strategies and courses of action to be followed at various levels of management and in various segments of the organization. Policies, procedures and rules provide the framework of decision making, and the method and order for the making and implementation of these decisions.

## **3. PLANNING PERFORMANCE OF EMPLOYEES IN THE ORGANIZATION**

The planning process of the organization's performances is the first stage under the management of performances in the organization. This phase is very important because this is where it starts with defining and setting goals. If at this stage are made mistakes, it is hard to be corrected in the next stages.

At the beginning of cycle of management performances, it is very important along with employees to discuss their expectations in terms of performances, including the behavior of employees who are expected to demonstrate during the execution of the work, how in the results which are expected to achieve before of the beginning of the next assessment cycle.

Behaviors are important because they are the reflection of the way of performing work of employees, or how, as individuals are supporting the team, how communicate, the mentoring of the others and etc.

#### **4. IMPROVING EMPLOYEE PERFORMANCE IN THE ORGANIZATION**

Improving performance is a leading perspective on the results of the work, the workplace and employees. It refers to what you work, why you do it and how do you move in relation to it. Improving performance relates to stay focused on the true goals while the organization faces real constraints and competitive pressures, to do that which adds value and cooperate with real people. Also, the improvement relates it to be systematic and disciplined when you evaluate the situation, analyze the possible reasons, to design and implement feasible solutions and assess whether you did something different. To be skilled in managing and improving performance is essential for personal and organizational effectiveness.

Performance improvement like management is based on fundamental beliefs or principles that include:<sup>8</sup>

- Focus on results;
- Systematic viewing of situation and determine ways to work effectively within the constraints and competing objectives;
- Add value to your people, your customers, and the organization now and in the future, because well-being and loyalty are critical to sustainable success;
- Cooperation with appropriate groups and individuals, if success requires experts, understanding and support of many people;
- Be disciplined in approach to the execution of the work with minimum assess and analysis the facts, assumptions, testing ideas, weigh alternatives, measurement of current work and evaluation.

#### **5. ANALYSIS OF THE LINK BETWEEN THE PROCESS OF MANAGING RESULTS ON THE PROFITABILITY OF ORGANIZATIONS**

Namely, in this part of the paper is performed checking on theoretical aspects, with particular subject of interest are empirical knowledge and experiences for the connection of multiple factors in the field of human resources with profitability of organizations in the Republic of Macedonia.

Considering everything mentioned above for the need of analysis was conducted survey of 64 respondents from Republic of Macedonia. Questionnaires were voluntarily filled by staff and were asked to respond freely to questions, which were guaranteed anonymity. The analysis of the data is used statistical program SPSS (Statistical Program for Social Sciences). Using the  $\chi^2$ - test and Pearson coefficient proves our hypothesis, while using

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<sup>8</sup> J. Hale, Performance-Based Management: What Every Manager Should Do to Get Results, John Wiley & Sons, Inc, 2004, p. 4.



correlation analysis shows the strength of the relationship between the independent variable (the process of managing results) and the dependent variable (profitability of organization).

### 5.1 TESTING THE HYPOTHESIS

Hypothesis 1: There is a positive link between the process of managing results and profitability of the organization.

Hypothesis 2: There is a negative link between the process of managing results and profitability of the organization.

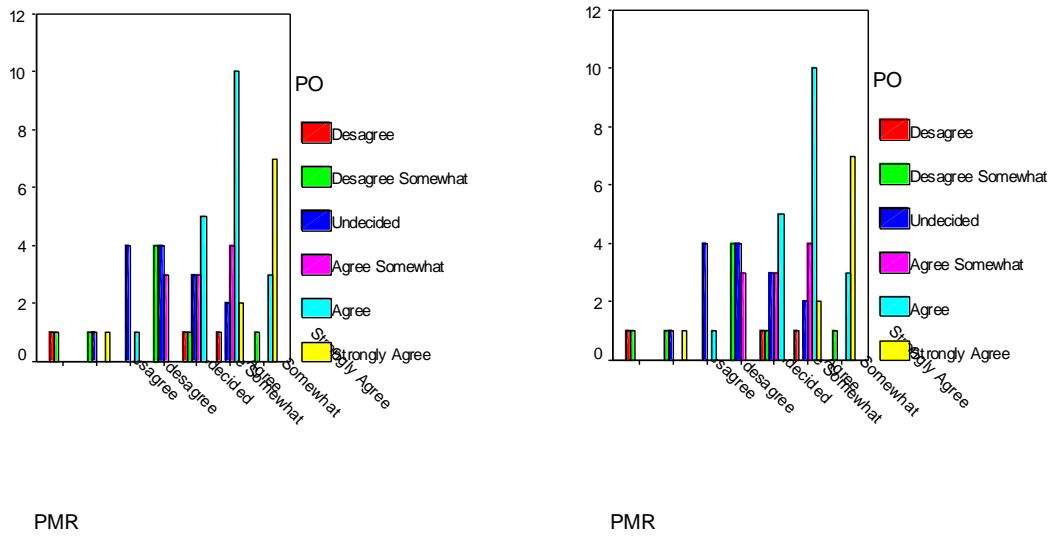
Table 1. Empirical and theoretical frequencies of variables: the process of managing results (in rows) and profitability of the organization (in column)

**PMR \* PO Crosstabulation**

Count		PO					Total
		Desagree	Desagree Somewhat	Undecided	Agree Somewhat	Agree	
PMR	Strongly disagree	1	1				2
	Desagree		1	1			3
	Desagree Somewhat			4		1	5
	Undecided		4	4	3		11
	Agree Somewhat	1	1	3	3	5	13
	Agree	1		2	4	10	19
	Strongly Agree		1			3	11
Total		3	8	14	10	19	64

**PMR \* PO Crosstabulation**

Expected Count		PO					Total	
		Desagree	Desagree Somewhat	Undecided	Agree Somewhat	Agree		Strongly Agree
PMR	Strongly disagree	,1	,3	,4	,3	,6	,3	2,0
	Desagree	,1	,4	,7	,5	,9	,5	3,0
	Desagree Somewhat	,2	,6	1,1	,8	1,5	,8	5,0
	Undecided	,5	1,4	2,4	1,7	3,3	1,7	11,0
	Agree Somewhat	,6	1,6	2,8	2,0	3,9	2,0	13,0
	Agree	,9	2,4	4,2	3,0	5,6	3,0	19,0
	Strongly Agree	,5	1,4	2,4	1,7	3,3	1,7	11,0
Total		3,0	8,0	14,0	10,0	19,0	10,0	64,0



Picture. 1. Empirical and theoretical frequencies of variables: the process of managing results (in rows) and profitability of the organization (in column)

Table 2. Grouped data for the given variables

**Case Processing Summary**

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
PMR * PO	64	100,0%	0	,0%	64	100,0%

Table 3. Results of  $\chi^2$  - test

**Chi-Square Tests**

	Value	df	Asy mp. Sig. (2-sided)
Pearson Chi-Square	70,687 <sup>a</sup>	30	,000
Likelihood Ratio	70,707	30	,000
Linear-by-Linear Association	19,983	1	,000
N of Valid Cases	64		

a. 41 cells (97,6%) have expected count less than 5. The minimum expected count is ,09.

The calculated value of  $\chi^2 = 70,687$

The risk of error from 0.05% and the number of degrees of freedom  $df = 30$  theoretical (critical) value of the test  $\chi^2$  is  $(0.05, 30) = 43.77$ .

Because ( $\chi^2=70,687$ ) > ( $\chi^2= 43.77$ ) hypothesis is accepted and it can be concluded that **the process of managing results have a positive impact on profitability of the organizations in the Republic of Macedonia.** This is confirmed by the fact that the defined risk of error is  $1-\alpha$ , ie 0.05 is greater than the value of the realized level of risk of error, which is  $p = 0,000$ .

The proof of the first hypothesis is rejected the second hypothesis which indicated the negative impact of the process of managing results have a positive impact on profitability of the organizations in the Republic of Macedonia.

Using correlation coefficient analysis and the coefficient of Spearman we can realize how strong is the link between alignment of the individual goals with the organizational goals and organizational performance of organizations.

Table 4. Correlation between the process of managing results and profitability of the organization

			PMR	PO
Spearman's rho	PMR	Correlation Coefficient	1,000	,605**
		Sig. (2-tailed)	,	,000
		N	64	64
	PO	Correlation Coefficient	,605**	1,000
		Sig. (2-tailed)	,000	,
		N	64	64

\*\* . Correlation is significant at the .01 level (2-tailed).

Correlation analysis shows that there is a strong link between the process of managing results (independent variable) and profitability of organizations in the Republic of Macedonia (dependent variable).

## 6. CONCLUSION

Considering the importance of the process of managing employee performance as an important function in the human resources management in developed market economies, we are necessarily faced with the challenge of its proper implementation in our companies too. Also, in practice many successful enterprises in countries with developed market economies often invest much effort in preparing programs and strategies to managing this phenomenon and raising the level of awareness of managers for importance of the process of managing results of employees and its impact on increasing the development potential of organizations.

Here, we can note that this issue was not adequately represented in the Macedonian management practices. But the growing need for involvement the organizations in the global market environment, requires use the benefits of the development of human resources and raising the level of competitiveness of Macedonian products and services, of course, it is a result of successful implementation of the performance management process in enterprises in the country.

## REFERENCES

1. Armstrong, Michael, *A handbook of human resource management practice*, 12th Edition, Kogan Page Limited, London, 2012;
2. M. Armstrong, A. Baron, *Managing Performance: Performance management in action*, Chartered Institute of Personnel and Development, CIPD House, London, 2005;
3. MTD Training, *Performance Management*, Bookboon.com, Free Business Books, MTD Training&Ventus Publishing ApS, 2010
4. Ashtalkoska, I., Popovski, V., *Menadzment na performansi*, FON Univerzitet, Skopje, 2015;
5. Aguinis, H., *Performance Management*, Prentice Hall, 2<sup>nd</sup> ed, 2009;
6. J. Hale, *Performance-Based Management: What Every Manager Should Do to Get Results*, John Wiley & Sons, Inc, 2004
7. Mathis, R. L., Jackson, J.H., Valentine, S. R., *Human Resource Management*, 14<sup>ed</sup>, Cengage Learning, 2014;
8. Pulakos, E. D., *Performance Management: A New Approach for Driving Business Results*, Wiley-Blackwell, 2009;
9. T. Deb, *Performance Appraisal and Management: Concepts, antecedents and implications*, Excel Books, 2008;
10. Z. Senyucel, *Managing the Human resource in the 21<sup>st</sup> Century*, Bookboon.com, Free Business Books, Zorlu Senyucel&Ventus Publishing ApS, 2009

## DETERMINATION OF QUALITY IN PLASTIC INJECTION MOLDING PROCESS OF LID FOR OPTICAL FIBER HUB BASED ON GEOMETRIC DEFORMATIONS

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**Abstract:** Paper inquires influential factors of injection molding on geometric deformations for lid from Terluran - GP35 plastic of optical fiber hub. Geometric deformations (shrinkage and warpage) are examined in five points from injection point to furthest points. Two methods were applied and compared - simulation and real experimentation. Experimental set-up for simulation was unreplicable two level factorial designs, while in real experimentation three level factorial were used. Analysis was conducted using modified Taguchi method, with application of contribution ratio whenever it was possible. For further comparison between results simulation and real experiment alternated Taguchi arrays are applied for influential factors, with reduction of the most important factors from real experiment from three to two levels. Obtained results lead to conclusions that simulation is ineffective for obtaining correct results. Furthermore real experiment lead to conclusion that same selection of factors and their levels can lead to incomplete results due same experimental setup - factors and their levels for all parts of optical fiber hub.

**Keywords:** Injection molding of plastic, geometric deformations - shrinkage and warpage, simulation, real experimentation

### 1. INTRODUCTION

Modern products dictate great increase in use of polymer plastic parts. Production processes for thermoplastic use injection molding to a great degree due economical - low cost of production, and technological advantages such as geometric freedom and low production waste [1], [2], [3], [4].

Quality of parts and production characteristic as a commonly applied method for polymers produced by injection molding are examined by scientist and practitioners in order to achieve desired quality levels and market competitiveness [4], [5], [6].

Quality characteristics are primarily measure by geometric deformations of produced parts such are shrinkage and warpage. Most authors apply simulation methods or other numerical methods (computing, fuzzy logic, response surface methodology etc) using adequate computer packages such are MoldFlow Plastic Insight, Moldex 3D, PRO/Engineer, C-Mold [5], [6], [7], [8], [9], [10], while some of them use experiments conducted in laboratory conditions [11], [12], [13]. Experiments conducted in real productions are sparsely used [2], [3], [8], [14] [15].

Conducted research was based on parameters which in production most commonly influence geometric deformations (walpage and shrinkage) of finished product, i.e. its quality [1], [2], [3], [5], [7], [8], [10], [11], [14].

This paper presents part of analysis conducted on optical fiber hub regarding production using injection molding with comparison of two types of experiments - simulation and real experimentation, with further recommendations for future research [15].

## 2. EXPERIMENTAL BACKGROUND

Ćurić et.al. [16] presented an analysis of parameters for injection molding process of lid, with emphasis on process, while this paper concentrate on mathematical aspect of experimental design and its results.

Series of experiments were conducted on various parts of optical fiber hub which were produced using plastic injection modeling. For the research three parts were examined applying modified Taguchi's orthogonal array (OA) [17] and using two approaches simulation by Moldflow Plastic 2010 program and real experimentation using Battenfeld BK-T 1300/500 machine, first constructed in 1989, in ISO 9000 certified company, while measuring of deformations were conducted on the coordinate measuring machine Zeiss Contura G2 Aktiv 700 (according to ISO 10360-2 recommendations) in ISO 9000 and ISO 17025 certified laboratory [16].

For simulation two level unreplicable two level OA  $L_8$  was used, while for the real experimentation three level OA  $L_{27}$  with three replications was utilized. For each part geometric deformations were measured in five different points, from injection point to outermost points. For all three parts - house, lid and splitter influences of the same factors were measured. Measured fiber hub parts differ in dimensions and type of plastic.

## 3. EXPERIMENTAL SETUP

Lid is made from thermoplastic material Terluran - GP35 and presented on Fig. 1 with injection point and points where geometric deformations were measured.

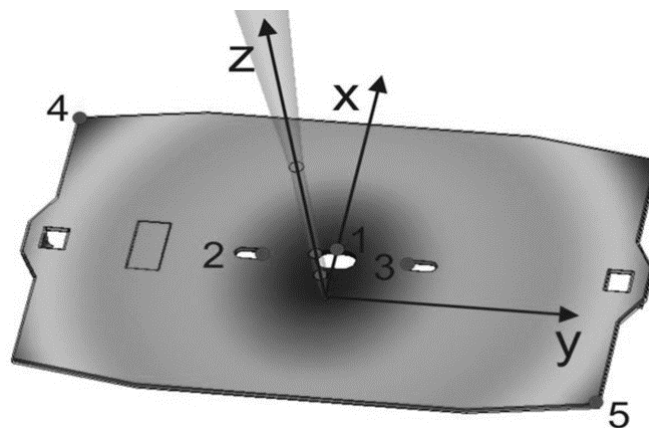


Figure 1. Lid of optical fiber hub, with measurement points for geometric deformations

In both experiments five presumably most important factors were measured - holding pressure, injection time, temperature of molded plastic, holding pressure time and cooling time. Levels of factors are shown at Table 1.

Table 1. Process parameters defining factor levels

	simulation		Level 1		Level 2
	real experiment		Level 1	Level 2	Level 3
Process parameter	Abbriv.	Measure			
Holding pressure	HP	bar	40	55	70
Injection time	IT	s	0.8	1	1.2
Temperature of molded plastic	TMP	<sup>0</sup> C	220	240	260
Holding pressure time	HPT	s	3	4	5
Cooling time	CT	s	15	25	40

For simulation and real experiment the first and the last level are the same. Simulation in Moldflow enables three levels simulation with a additions for experimental design in original program, which laboratory where simulation were conducted didn't have. Hence simulation with two levels OA without replication, i.e. unreplicated experiments. Furthermore Moldflow simulation automatically assumes normal distribution, which in case of tree level factorials limits middle level symmetrically distributed between lowest and highest level of experimentation [18]. This is not the case for some factors in real experimentation where Level 2 of 3 differs for its middle value, specifically for holding pressure.

Measurement of geometric deformations due injection molding was conducted by simulation, using following allocation of factors in L<sub>8</sub> OA - 7x8 table with two levels are shown at Tab 2.

Table 2. Allocation of factors in two level L<sub>8</sub> OA (simulation)

Factor	HP	IT	TMP	HPT	CT	e <sub>1</sub>	e <sub>2</sub>
Column	1	2	3	4	5	6	7

For this experimental setup (Tab 2), columns 6 and 7 were used as second error columns [19] in order to avoid analysis for unreplicated experiments, since there exist various methods.

For real experimentation factors and their interactions were allocated in L<sub>27</sub> OA with dimensions 13x27 as presented in Table 3. and according to linear graph presented at Fig. 2.

Table 3. Allocation of factors and their levels in L<sub>27</sub> OA (real experiment)

Factor	HP	IT	HPxIT	HPxIT	TMP	HPxTMP	HPxTMP	HPT	HPxHPT	HPxHPT	CT	e <sub>1</sub>	e <sub>2</sub>
Column	1	2	3	4	5	6	7	8	9	10	11	12	13

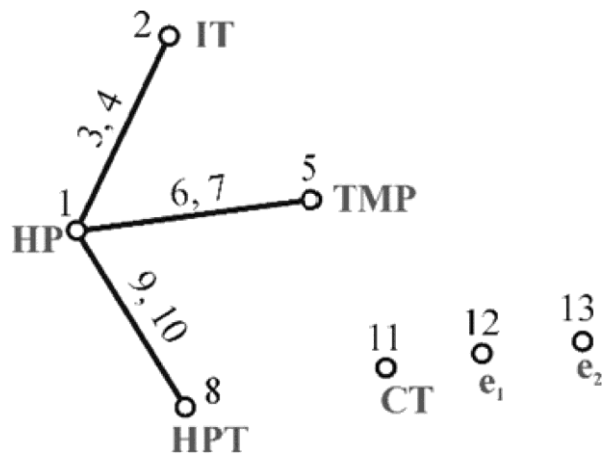


Figure 2. Linear graph defining factor allocation for real experiment [19]

In this experimental setup (Tab. 3, Fig. 2) only interactions of the assumed factor with main effect of other presumably influential factors are considered. Therefore columns 12 and 13 were setup as second error columns. Experiment was conducted with three replications.

For both experiments measurements of geometric deformations were measured in five points - from injection points through lid surface, up to furthest points.

#### 4. ANALYSIS OF EXPERIMENTAL RESULTS

Analysis of experimental results was conducted in four phases:

- basic analysis with Taguchi's approach,
- comparison analysis of experimental results obtained by simulation and real experiment,
- determination of optimal factor levels and
- analysis of contribution ratio for optimal factor levels in real experiment.

##### 4.1. BASIC ANALYSIS OF DATA

For simulation experiments results are presented at Table 4 using level of significance. Experimental results for simulation applying errors from second error columns show that only influential factor is TMP - temperature of molded plastic an in only first three measured points at lowest significance level i.e. 0.05. Neither other factor do not have influence on geometric deformations.

In order to refine results of simulation further, another analysis was conducted including pooled error method [19] in order to extract more precise results (Tab, 4). Inclusion of pooled error leads to results of simulation where TMP - temperature of molded plastic is influential factor, for first three measurement points, with higher levels of confidence in first and third points of 0.01, while in second measurement point significance level is 0.05. The same level of significance has the HP - holding pressure in third, fourth and fifth point.



Table 4. Experimental results in measurement points for simulation for lid

Factor	Simulation Taguchi					Simulation Taguchi pooled error				
	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>
HP								<0.05	<0.05	<0.05
IT										
TMP	<0.05	<0.05	<0.05			<0.01	<0.05	<0.01		
HPT										
CT										

Examining the influence only for main effects in real experiment (Tab. 5) leads to conclusion that far more factors have an influence on geometric deformations. Hence IT and HPT influence four measurement points (Fig. 1). Missing influence of holding pressure is in fourth measurement point, injection time (IT) and holding pressure time (HPT) doesn't had influences in second measurement. Holding pressure (HP) has influence in the first three measurement points while temperature of molded plastic (TMP) point has influence in three measurement points, first and furthest (fourth and fifth). Obtained levels of significance of influential factors are 0.05 or 0.01.

Table 5. Results of factor influence in measurement points for real three level experiment

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>
HP	<0.01	<0.05	<0.01		
IT	<0.01		<0.01	<0.05	<0.05
TMP	<0.01			<0.01	<0.01
HPT	<0.05		<0.01	<0.05	<0.05
CT		<0.01	<0.05	<0.05	<0.05

#### 4.2. COMPARISON ANALYSIS OF EXPERIMENTAL RESULTS

Research given above indicates that there exists significant difference between simulation and real experimental results. Therefore comparison of method was conducted using a reduced OA [15] for real experiment which is shown at Tab. 6, which has the same values of factorial levels for influential factors common for both experiments, i.e. HP and TMP.

Due restriction of reduced OA [15] this setup also includes IT, while results comparison for geometric deformations obtained with this method are shown at Fig 3.

Table 6. Reduced  $L_{27}$  OA used for comparison between simulation and real experimental results of geometric deformations

	HP	IT	TMP
row/column	1	2	5
1	1	1	1
3	1	1	3
7	1	3	1
9	1	3	3
19	3	1	1
21	3	1	3
25	3	3	1
27	3	3	3

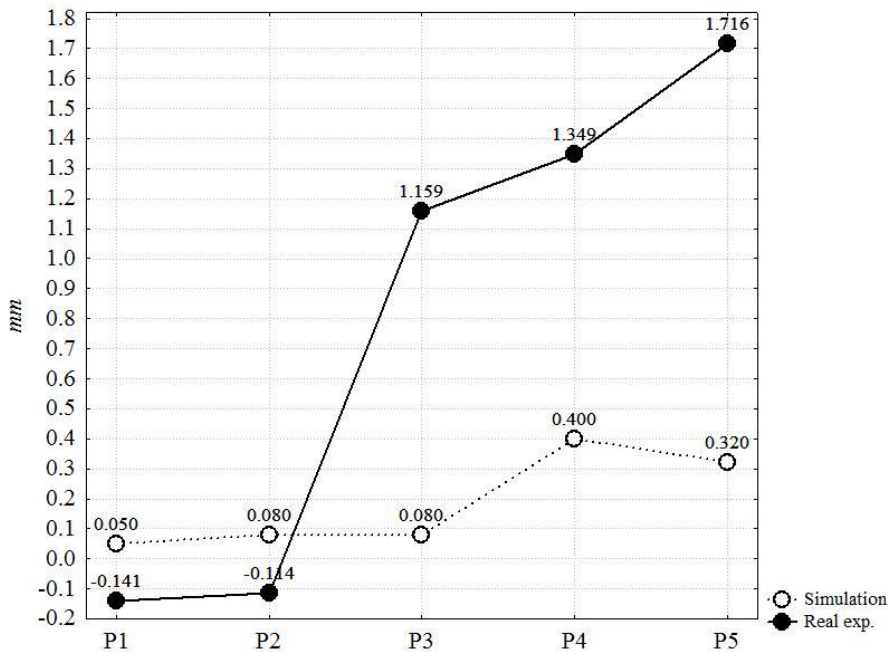


Figure 3. Geometric deformations due injection molding for simulation and reduced experimental measures

From Fig. 3 it is obvious that simulation results had significantly smaller geometric deformations in range of 0.35mm with almost linear increase comparing with real experimentation and have only warpage, where geometric deformations vary in range 1.857 mm including the shrinkage and warpage. That means that results of geometric deformations are 5.3 times larger in real experimentation than in simulation.

Optimal factor levels for HP and TMP differ for simulation and real experimentation. Thus determination of optimal factor levels is the same for measurement points two and three, while differs for simulation and real experiment in points one (nearest to injection point) and four and five (further from injection points).

Actual geometric deformations in measurement points are shown at Fig. 4., which represents results geometric deformations for simulation experiment using pooling error

method, and real three level experiment. Application of full results from real experimentation that includes all three values of factor levels, leads to variation of geometric deformations in range of 2.522 mm, with same range as previous for simulation results. Therefore real experimental geometric deformations are 7.3 times greater then results obtained by simulation.

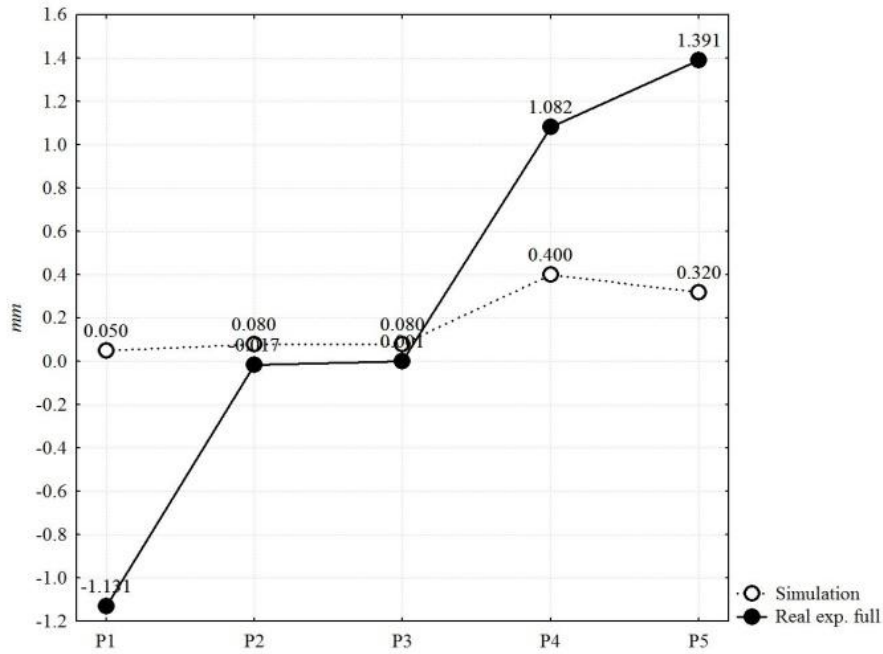


Figure 4. Geometric deformations for simulation and real three level experiment

From Fig 3 and Fig 4 it should be noted that neither one value from simulation experiment is under zero, indicate that in injection molding process there is no shrinkage, only warpage which is contrary to real experiment and real injection molding process, since geometric deformation include both deformities.

#### 4.3. OBTAINING OPTIMAL FACTOR LEVELS

In order to obtain optimal factor levels for simulation and real experiment, using obtained results from all measurement points following equations were applied [20]:

$$Y_{ij} = \min(|P_{1j}|, |P_{2j}|, |P_{3j}|, |P_{4j}|, |P_{5j}|), j = 1, \dots, n, \quad (1)$$

where  $n = 8$ , for simulation and  $n = 27$  for real experiment, with optimal allocation of factor levels (2) defined as

$$Y_{opt} = \max(Y_{ij}), i = 1 \dots 5, j = 1 \dots n \quad (2)$$

This leads to results for simulation (using pooled error method) as is presented at equation (3)

$$Y_{ij} = \min(|0.05|, |0.08|, |0.08|, |0.4|, |0.32|), j = 1, \dots, 8 \quad (3)$$

with optimal combination of factor levels defined by (4)

$$Y_{opt} = 0.32mm, i = 4, j = 6 \quad (4)$$

as HP, IT, TMP, HPT and CT with values 70 bar, 1.2 sec, 220<sup>0</sup>C, 5 sec, and 15 sec respectively. Since HP and TMP have influence on experimental results their values should be 70 bar and 220<sup>0</sup>C, while values of the other factors can be chosen differently.

For real experiment values obtained from L<sub>27</sub> OA (5)  $Y_{ij}$  are defined as

$$Y_{ij} = \min(|-0.131|, |-0.017|, |0.001|, |1.082|, |1.391|), j = 1, \dots, 27 \quad (5)$$

Therefore optimal values of factors are defined by (6)

$$Y_{opt} = 1.391mm, i = 5, j = 7 \quad (6)$$

which is the furthers measurement point, i.e. P<sub>5</sub>.

Optimal factor levels were HP 40 bar, IT 1.2 s, TMP 220<sup>0</sup>C, HPT 5 s and CT 25 s. All factor levels, excluding HP should be chosen by experimental data results. HP, could be chosen by some secondary criteria, such as price, usage simplicity etc.

According the presented results simulation is inadequate for obtaining valid results for geometric deformation for producing lid using injection molding method.

#### 4.4. ANALYSIS OF CONTRIBUTION RATIO FOR REAL EXPERIMENT

Experimental results in real production experiment were additionally explored using contribution ratio. Since P<sub>5</sub> is the point with optimal main factor levels, contribution ratios are presented for its value at Fig. 5

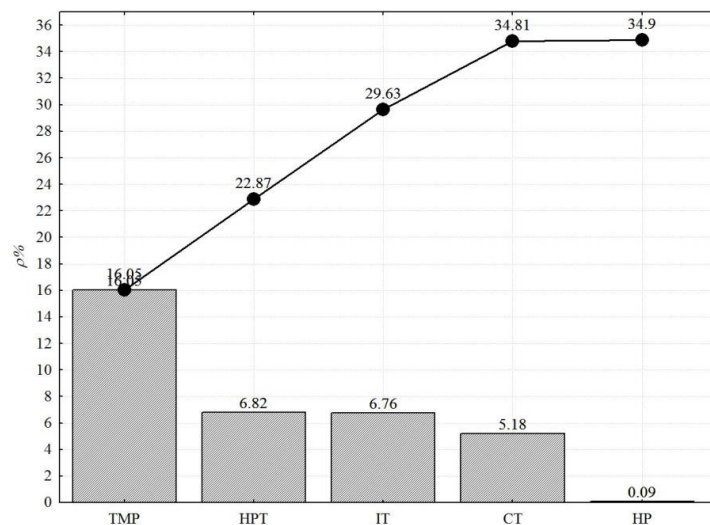


Figure 5. Contribution ratio and cumulative contribution ratio for P<sub>5</sub> in real experiment

When influence of interactions is included it is obtained that only 56.5% of variation can be explained by factor influence leading to conclusion that less than 60% of geometric deformations can be managed by proposed factors and their levels. That further leads to conclusion that for real experiment either wrong factor is chosen, or selection of factor levels are inadequate.

Examination of results for optical fiber hub [15], [16], only real influence of chosen factors and levels is obtained for housing. All three examined parts differ in material and dimension, with the same production process parameters. Thus it can be further concluded that for each part different factors or factor level should be chosen in order to obtain best production parameters for injection molding process in order to reduce geometric deformations in production optical fiber hub.

## 5. CONCLUSIONS

Regarding the simulation following results can be drawn:

- Simulation results have smaller geometric deformations than real experiment and with smaller range of those deformations
- Results obtained from simulation experiment gravitate to linear increase of geometric deformations which is consequence of independent errors which with normal distribution  $N(0, \sigma^2)$ , which is not a case in real conditions
- Geometric deformations obtained by simulation have significantly smaller number of factors influencing geometric deformation in injection molding
- Simulation results present only warpage, but not shrinkage, which are both normal consequences of geometric deformations obtained by injection molding plastic.

Main conclusion for simulation usage is that it is inadequate method for determination of influential factors and geometric deformations in cases of low or medium level of technology levels of production machines for injection molding of plastic resulting with obtaining reliable data for production of plastic parts using injection molding method.

For real experimental results it can be concluded that selection of factors and factor levels is inadequate either by selected factor or their factor levels, since less than 60% of variation can be controlled by analyzed results of conducted production experimentation.

In further research real experimentation is recommended but with different factors and/or different levels of factors.

## ACKNOWLEDGEMENT

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## REFERENCES

- [1] Khan, R. M., Acharya, G. *Plastic Injection Molding Process and Its Aspects for Quality: A Review*. Eu. J. of Advances in Engineering and Technology, 3 (2016) 4, pp. 66-70.
- [2] Chen, X., Lam, Y. C., Li, D. Q., Analysis of Thermal Residual Stress in Plastic Injection Molding. *J. of Materials Processing Technology*, 101 (2000) 1, pp. 275-280.
- [3] Kurt, M., Kamber, O. S., Kaynak, Y., Atakok, G., Girit, O., Experimental Investigation of Plastic Injection Molding: Assessment of the Effects of Cavity Pressure and Mold Temperature on the Quality of the Final Products. *Materials & Design*, 30 (2009) 8, pp. 3217-3224.
- [4] Reig, M. J., Segui, V. J., Zamanillo, J. D., Rheological behavior modeling of recycled ABS/PC blends applied to injection molding process. *J. of polymer engineering*, 25 (2005) (5), pp. 435-457.
- [5] Ozcelik, B., Erzurumlu, T., *Comparison of the Warpage Optimization in the Plastic Injection Molding Using ANOVA, Neural Network model and Genetic Algorithm*. *J. of Materials Processing Technology*, 171(2006) 3, pp. 437-445.
- [6] Zink, B., Szabó, F., Hatos, I., Suplicz, A., Kovács, N. K., Hargitai, H., ... , Kovács, J. G., Enhanced Injection Molding Simulation of Advanced Injection Molds. *Polymers*, 9 (2017) (2), pp. 1-11.
- [7] Busick, D. R., Beiter, K. A., Ishii, K., *Design for injection molding: Using process simulation to assess tolerance feasibility*. *Computers in Engineering*, 1 (1994), pp. 113-113.
- [8] Oktem, H., Erzurumlu, T., Uzman, I., *Application of Taguchi Optimization Technique in Determining Plastic Injection Molding Process Parameters for a Thin-shell Part*. *Materials & Design*, 28 (2007) 4, pp. 1271-1278.
- [9] Ribeiro, B., Support Vector Machines for Quality Monitoring in a Plastic Injection Molding Process. *IEEE Transactions Systems, Man, and Cybernetics, Part C*, 35(2005) 3, pp. 401-410.
- [10] Wavare, A., Ubale, S., *Parametric Investigation for PP Homopolymer (1110MAS) in Plastic Injection Molding Process using Taguchi Method*. *Int. J. of Engineering Research and General Science*, 4 (2016) 2, pp. 1-9
- [11] López, A., Aisa, J., Martínez, A., Mercado, D. (2016). *Injection Moulding Parameters Influence on Weight Quality of Complex Parts by Means of DOE Application: Case Study*. *Measurement*, 90 (2016), pp. 349-356.
- [12] Lu, X., Khim, L. S., *A Statistical Experimental Study of the Injection Molding of Optical Lenses*. *J. of Materials Processing Technology*, 113 (2001) 1, pp. 189-195.

- [13] Chen, W. C., Nguyen, M. H., Chiu, W. H., Chen, T. N., Tai, P. H., *Optimization of the Plastic Injection Molding Process Using the Taguchi Method, RSM, and Hybrid GA-PSO*. The Int. J of Advanced Manufacturing Technology, 83 (2016), pp. 1873-1886.
- [14] Tang, S. H., Tan, Y. J., Sapuan, S. M., Sulaiman, S., Ismail, N., Samin, R. *The Use of Taguchi Method in the Design of Plastic Injection Mould for Reducing Warpage*. J. of Materials Processing Technology, 182 (2007) 1, pp. 418-426.
- [15] Ćurić, D., Veljković, Z. A., Duhovnik, J., Comparison of Methodologies for Identification of Process Parameters Affecting Geometric Deviations in Plastic Injection Molding of Housing Using Taguchi Method. *Mechanics*, 18 (2012) 6, pp. 671-676.
- [16] Ćurić, D., Veljković, Z, Rahimić, S. Influence of Some Process Parameters on Part Shrinkage in Plastic Injection Moulding, Proc of 9. Naučno stručni skup sa međunarodnim učešćem, Kvalitet 2015, 10.06-13.06, Neum, BiH, 2015, (in Bosnian), pp 609-614.
- [17] Spasojević-Brkić V.K., Veljković Z.A., Golubović T., Brkić A.Dj., Kosić-Šotić, I., *Workspace Design for Crane Cabins Applying a Combined Traditional Approach and the Taguchi Method for Design of Experiments*. Int. J. of Occupational Safety and Ergonomics (JOSE), 22(2015) 2, pp. 228-240.
- [18] Batwara, A., Sharma, P., An Experimental Study of Parameters on Plastic Product using Mold Flow Simulation-ANOVA Based Analysis. *European Journal of Advances in Engineering and Technology*, 3 (2016) 1, pp. 5-11.
- [19] Taguchi, G., System of Experimental Design, Vol. 1&2., American Supplier Institute, Kraus, New York, USA 1991
- [20] Veljković, Z.A., Ćurić, D, Spasojević Brkić, V., Rakonjac, I., Quality Aspect of Geometric Deformations at Process of Injection Molding - Case Study on Optical Fiber Hub Parts, IMKSM2016 Conference, Bor, Serbia, (2016), pp. 850-859.

## **AWARENESS OF PRIMARY SCHOOL TEACHERS ABOUT USE OF NEW TECHNOLOGIES IN THE SYSTEM OF PRIMARY EDUCATION IN SERBIA**

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**Abstract:** Studying of awareness of employees in education systems about the use of new technologies is in fact an important process that creates this awareness. In order to establish a real level of this awareness among the employed teachers at primary education system in Zajecar and get adequately real image of the subject, the employed teachers at elementary schools in Zajecar were interviewed. The majority of the employed teachers consider that new technologies have considerable impact on improvement of quality of the elementary education system and motivate elementary school children in their school activities. The acquired results of the interviews show that employees at elementary education system are eager to enter actively into the programs and actions of introduction of new technologies into the system of elementary education.

**Keywords:** awareness, new technologies, elementary education, employed teachers, interview, image, impact, introduction, Zajecar.

### **1. INTRODUCTION**

All systems of educations (primary, secondary and collegiate) depend from work's quality of teachers, professors, and information technology, which is used in teaching process. Use a new technologies represents innovation and modernization of teaching and educations, where teacher is main initiator for modernization of teaching, but pupil is center of educational process [1]. Professional training of teachers is more important for use a new information technologies in primary schools because raises quality of teaching and education. Investment in system of primary education represents a good investment in future, because is “beared smart generations”, which moved boundaries of modern world. Needs for introduction of new technologies, such as a new generations of computers, each of school year was grown and was improved quality of teaching from previous school years [2, 3].

### **2. USE A NEW TECHNOLOGIES IN THE SYSTEM OF PRIMARY EDUCATION**

In recent years, awareness of primary school teachers about use of new technologies in the system of primary education was developed. A modern types of computers, internet and multimedia represents integral part of educational process. If a primary school teachers want a successful changes in system of education and in areas of science and technologies, then must be worked on modernization the educational system. The educational system must be adapted to innovations, such as teachers, who take over a new and responsible goals and problems [1].



Furnishing school with a modern computer's equipments and information education represents one of priority reform the educational system. The pupils in primary school is required more active contact with new information technologies. All pupils will be get out from primary school such as IT educated person.

In a process of educational system is more important to establish a part of primary education, which relations on knowledge and skills of IT literacy and use of IT technologies in learning and teaching [1]. A primary school teachers would be interested and trained for implementation educational projects from areas of use IT technologies in learning and teaching, for diagnosis and evaluation knowledge using IT technologies, for encouraging independent learning and extension independent improvement. The latest research in world show that computer is effective teaching tools, which allow control, regulation and management with teaching and learning using permanent feedback relations with have a strong motivational power and basic evaluation system and justly evaluation pupil's work [1]. Pupils in primary schools using a new technologies more fast progressing and acquired knowledge is durable. Teaching and learning using a modern technologies are more efficient than traditional teaching regarding quality and quantity acquired knowledge, thought mobility pupils, motivations for learning and faster, humane, just evaluation pupils work. Teaching with using a new IT technologies allows developing a memory, fantasy, independent in learning, raise educational level, builds sensitivity for problems, openness, flexibility, tolerance and independent in work [1]. A primary school teachers through the programs of professional training can be improve theirs knowledge, skills, and abilities for using modern IT technologies. One of the programs professional trainings for teachers primary and secondary schools is International conference "New technologies in education", which is organized with a goal promotion education quantity in Serbia trough using information and communication technologies (IKT). This event has goal that helps develop techers and nonteachers persons in preschools, schools, universities and other organizations, which deal with education in any form. The subjects, which is process at conference including use IKT technologies in preschools education, schools educations and inclusive educations. Assignment of teching persons in primary schools are motivate creativity and innovations, modernize process of learning and take advantage opportunities, which a new technologies offer.

### **3. RESEARCH GOALS**

Džigurski and associates are questioned usage information and communication technologies of schools in Serbia. Using the electronic questionnaire, in order to evaluate and analyzed the current situation related using a modern information and communication technologies in education processes, looking at needs and impediments, with who actors of educational processes faced [4, 5]. The role of teachers in primary schools, which realizes using information and communication technologies are distinguished than the role of teachers in traditional teaching [6, 7]. A teacher prepare a multimedia education software, choosing the content and planning activities, which would be start up a pupils on independent work [8, 9].

In this paper, was examined awareness of primary school teachers about use of new technologies in the system of primary education in Zajecar, Serbia. Questionnaire was

conducted, in order to determine a level of awareness of primary school teachers, on the territory city of Zajecar. Survey questions included the estimates and opinions of teachers about the position of application of modern technologies in the system of primary education, on how new technologies impact on improving the quality of primary education system, whether the application of new technologies in the system of primary education motivates primary school students in learning, whether are employed in the system of primary education engaged for the introduction of new technology in primary schools, to what extent international conference "new technologies in education" to develop awareness of teaching staff in primary schools on the application of new technologies in the system of primary education, how the application of tablet computers and social networks increase the efficiency of learning in primary school pupils and those who primarily need to be engaged for the introduction of new technologies in the primary education system. The survey was conducted during April 2017 on a sample of 50 respondents filling in the questionnaire in electronic form.

The main assumption of the survey was that the awareness of the use of modern technologies in the system of primary education, examined the teaching staff is constantly developing and stronger and that is related to the intensity of the different information and communication activities initiated in the previous period regarding the improvement of the quality of teaching. Reviews of employees given in the survey, was to show what changes in their awareness regarding the application of modern technologies in the education of children of school age.

#### **4. RESEARCH METHODOLOGY**

In order to investigate the awareness of teachers of primary schools in Zajecar, used a survey, which was prepared for the purpose of this research. Survey data were collected through the Facebook social network through voluntary and anonymous survey via mail's employees. Conducted survey included teachers of all primary schools in Zajecar (primary school "Ljubica Radosavljevic Nada", "Ljuba Nešić", "Desanka Maksimovic", "Hajduk Veljko" and "Djura Jaksic"). The structure of participants has shown that it is the employees who belong to the so-called. interested public of the implementation of new technology in primary schools. Only the survey is attached (Appendix 1).

From a total of 50 teachers surveyed, the male respondents was 15 (30%) and 35 females (70%). The largest number of respondents (34%) who participated in this research is to 25 years, followed by respondents from the age limit from 36 to 45 years (20%), respondents from 25 to 35 years and 46 to 55 years (16%), and finally employed respondents who are age 56 to 65 years (14%). Most employees ispitinaka is engaged from the fifth to the eighth grade (70%), while the remainder (30%) engaged in working with children from first to fourth grade. Most patients had a length of service of up to 2 years (44%), followed by the subjects with the working lives of 5 to 25 years (18%), from 6 to 15, as well as with more than 25 years (16%), and the end of the subjects from 3 to 5 years of experience (6%).

## 5. RESULTS AND DISCUSSION

In the opinion of teachers of primary schools in Zajecar, new technologies influence the improvement of the quality of the primary education, 54% of the surveyed teachers think so. Other opinions are less present. That new technologies are heavily influenced by the improvement of the quality of the primary education, 26% thought that the little thoughts affect 16% and does not affect 4% of respondents thought teachers. These data, among other things indicate that primary school teachers in Zajecar, largely developed awareness about the impact of new technologies to improve the quality of the primary education system. As expected, the overwhelming majority of teachers in primary schools, estimates that the application of new technologies in the system of primary education motivates primary school students in learning (41%), it's very motivating think 22% of respondents that do not motivate 20% to motivate them a little 17% of the surveyed teachers. Also, based on the survey, we can conclude that the awareness of the use of modern information and communication technologies in primary education system developed under the influence of recent computers, but most teachers hired for the introduction of new technology in primary schools, and even 56% think so. Other answers are present to a lesser extent, 20% of respondents thought that the little engaged or highly engaged, while 4% of respondents think that do not hire an. Based on these data we can conclude that teachers are aware of the involvement of their colleagues on the use of modern technology in primary schools.

Interviewed teachers responded that the international conference and exhibition "New technologies in education" to develop awareness of teaching staff in primary schools on the application of new technologies in the system of primary education (68%), 16% of respondents think it is very developed, 12% of that little developed, while only 4% think that they do not develop. Based on these data we can conclude that the awareness among patients about the importance of conferences and seminars of this type. Application of the tablet increases the efficiency of learning in primary school students (64%), while 16% of respondents thought that a significant / insignificant extent increases (16%) and the rest of the respondents (4%) think that not increasing. Opinions of the surveyed staff are divided in this way, because many teachers think that elementary school students use tablet computers for other purposes (for gaming). Regarding acquaintance with new IT and online tools "Plickers" or "Appinventor", the majority of respondents (52%) answered that are not familiar with it, while the rest (48%) answered that they are familiar. These data indicate a lack of knowledge of modern technologies of primary school teachers. When it comes, the social network, the majority of respondents felt that they improve the quality of learning in primary school (66%), while the other opinion is divided 14% think that it greatly improved, 12% to a lesser extent, improve, while 8% think that do not improve. This opinion respondents is based on the fact that social networks can be used for educational purposes, such as the exchange of academic materials and electronic books.

The survey results show that in the opinion of respondents LinkedIn most suitable social network for use in the system of primary education (46%), while the remaining respondents, 28% think that it is Facebook, 14% think MySpace, while the rest of the reviews (6%) divided between twitter and Instagram. These results indicate occupancy respondents for using LinkedIn Society Network in purely professional purposes.

The results relating to information staff in primary schools on the possibilities of application of new technologies in the system of primary education, shows that the majority of employees (42%) think that the visit of seminars and training the best opportunities of

information. The rest of the respondents (36%) believe that internet sites, to 8% in terms of conferences and trade fairs, 6% were informed through local TV and radio stations, while 4% of them think that they are best able to inform national television and print. The data point to the fact that in our country there are a lot of seminars and trainings on the use of modern technology in primary education. The largest number of respondents (66%) said that the staff of the ministry of education should primarily be engaged in introducing new technologies in the system of primary education, while the other opinion is divided (20%) think that it still needs to work management staff of primary schools, while 14% of the teaching staff. The data resulting from the reviews and the fact that the staff of the ministry of education has the greatest opportunities and responsibilities for this type of arrangements involving. As for teacher-respondents, the majority (70%), is ready to actively participate in the programs and actions introducing new technologies into the system of primary education, 20% were not ready, while the rest (10%) included depending on the program. These statistical data indicate that respondents are aware of the importance of application of modern technologies in education base, it would be because most of them involved in programs related to this field.

## 6. CONCLUSION

Awareness of the surveyed teachers on the application of modern technologies in the system of primary education in primary schools in Zajecar, largely develops and gains significance because they remain students to be computer literate. Also, the young population is a huge "resource", which should be used during the implementation of the "peer education", which aims to obtain knowledge from their peers on modern information and communication technologies. Based on the survey of primary schools in Zajecar can be concluded that their awareness of the application of new technology in primary school students developed, and it is usually about informed through training and seminars (42%). 70% of teachers are ready to actively participate in the programs and actions to improve the application of new technologies in primary education, which is an extremely high percentage. These facts and the results indicate that the teachers of primary schools in Zajecar are "intellectuals" to their engagement in the future contribute to greater use of modern technology in primary schools.

It would therefore be useful and necessary in the coming period to include more teachers in primary schools in trainings, seminars, conferences and fairs on the application of modern technologies in primary education.

## REFERENCES

- [1] T. Marinković, Professional development of teachers in order to improve teaching application of information technology, Technology, information and education for society of learning and knowledge, 6th International Symposium, Technical Faculty Čačak, 3-5 June 2011
- [2] P. Pruet, C. S. Ang, D. Farzin, Understanding tablet computer usage among primary school students in underdeveloped areas: Students' technology experience, learning

styles and attitudes, *Computers in Human Behavior* 55 (2016) 1131–1144

- [3] A. Rosi, M. Dall’Asta, F. Brighenti, D. Del Rio, E. Volta, I. Baroni, M. Nalin, M. Coti Zelati, A. Sanna, F. Scazzina, The use of new technologies for nutritional education in primary schools: a pilot study, *Public health* 140 (2016) 50-55
- [4] Džigurski S., S. Simic, S. Marković, D. Šćepanović, Research on the use of information and communication technology in schools in Serbia, the Social inclusion and reduce poverty (2013)
- [5] A. Popadić, Application of information and communication technologies in the teaching of geography, *GLOBUS 36 - magazine for methodological and didactic questions of geography* 371 (2015) 174-182
- [6] N. Jovanović, Modern educational technologies and methodical newspapers in the classroom *Social Sciences and Humanities, Serbian Academy of Education* 371 (2012) 1-16
- [7] S. V. Božić, Internet and multimedia as a means to study literature, *Philosophy Faculty in Nis, doctoral thesis* (2014)
- [8] O. C. Jovanovic, Efficacy of multimedia contents in nature and Society, *Faculty of Philosophy in Novi Sad, doctoral thesis* (2015)
- [9] N. Delić, *Information and Communication Technologies in Education, specialist work, Banja Luka* (2008)

## **Annex 1**

### **QUESTIONNAIRE**

#### **Respected!**

**The survey, which is located in front of you is an instrument of research that is implemented within the testing and evaluation of employee awareness in primary schools on the application of new technologies in the education system. The results will be collected in order to obtain a realistic picture of the level of awareness about the degree of importance of new technologies in the education system.**

**The survey was anonymous. The data being received will be used exclusively for the stated purposes. The survey contains a series of questions to be answered, and you are**

**expected to define the labeling of only one of the answers that most closely expresses your personal opinion about the statement made under the issue.**

**Thank you in advance for your cooperation!**

1. Gender:

- 1) Male
- 2) Women

2. Age:

- 1) 25
- 2) 25-35
- 3) 36-45
- 4) 46-55
- 5) 56-65

3. I work at the age of students:

- 1) from I to IV grades
- 2) from V to VIII grade

4. Work experience:

- 1) up to 2 years
- 2) 3 to 5 years
- 3) from 6 to 15 years
- 4) from 15 to 25 years old
- 5) More than 25 years

5. New technologies affect the improvement of the quality of the primary education system:

- a) very affected,
- b) impact,
- c) has little effect,
- d) do not affect.

6. The application of new technologies in the system of primary education motivates primary school students in learning:

- a) very motivate,
- b) motivates,
- c) a little motivation,
- d) do not motivate.

7. Employed in the system of primary education engaged for the introduction of new technology in primary schools:

- a) very engaging,
- b) they are engaging,
- c) little engage,
- d) do not engage.

8. 1st International Conference and Fair "New Technologies in Education" develop awareness of teaching staff in primary schools on the application of new technologies in the system of primary education:

- a) very developed,
- b) have been developed,
- c) a little developed,
- d) do not develop.

9. Application of the tablet increases the efficiency of learning in students of elementary schools:

- a) the significantly increased,
- b) increases,
- c) to a negligible extent increases,
- d) do not increase.

10. Are you aware of a the IT tool "Plickers":

- a) yes
- b) no

11. Are you aware of with a free online tool "Appinventor":

- a) yes
- b) no

12. To what extent social networks improve the quality of learning in primary school:

- a) greatly improves,
- b) improving,
- c) to a negligible extent enhance,
- d) do not improve.

13. Which social network is best suited for use in the primary education system:

- a) LinkedIn
- b) MySpace,
- c) Facebook,
- d) Twitter,
- e) Instagram.

14. What is the best informed about the possibilities of application of new technologies in the system of primary education:

- a) through national television and radio,
- b) using local TV and radio,
- c) through the press,
- d) via the website,
- e) visits and training seminars,
- f) visiting conferences and trade fairs.

15. Who should primarily be engaged in introducing new technologies in the primary education system:

- a) Teachers,
- b) Senior management personnel of primary schools,
- c) Personnel Ministry of Education.

16. Are you willing to actively participate in the programs and actions introducing new technologies in the primary education system:

- a) yes,
- b) no,
- c) depending on the program.



## **THE IMPACT OF CREATIVITY, CREATIVE STRATEGIES AND METHODS FOR DATA COLLECTION ON SUSTAINABILITY OF BUSINESS IDEA**

**Milica Arsić, Ivan Jovanović**

*University of Belgrade, Technical Faculty in Bor, Serbia*

**Abstract:** Entrepreneurs are described as highly creative and innovative individuals who continuously create new idea in order to create a new value. However, some other approaches support the theory that the entrepreneurship do not only refers to the creative and innovative thinking, but also it largely depends on the skills and abilities of entrepreneurs. This study examines the impact of both of these aspects. The respondents were student of the Department of Engineering Management, Technical Faculty in Bor, after listening to the Entrepreneurship course. The aim of this study was to examine how usage of creative strategies, methods for data collection and creativity affect the viability of business ideas with the aim to encourage students to awaken their entrepreneurial intention and the desire to start their own business with a realistic and viable idea. The results showed that statistically significant impact on the viability of the business idea, according to the respondents have a factor Data collection.

**Keywords:** creativity, creative strategies, data collection, SEM

### **1. UVOD**

Amabile et al. [1] definiše individualnu kreativnost kao stvaranje novih i korisnih ideja u bilo kojoj oblasti. Kreativnost se smatra osobenošću da ljudi koji su kreativni u jednoj oblasti, pokazuju istu količinu kreativnosti i u drugim oblasti, baš kao što visoko inteligentni ljudi imaju sposobnost da uspešno rešavaju raznovrsne kognitivne zadatke [2]. Uspešna kreativnost u poslu ne znači samo raditi stvari drugačije od ostalih, već ideja mora biti prikladna, korisna, održiva u smislu da utiče na obavljanje posla na što bolji način. Preduzetnici se obično u literaturi opisuju kao visoko kreativni pojedinci, ali teoretičari su ipak odlučni u tome da ne određuju samo lične osobine da li će neko postati preduzetnik ili ne i koliko će biti uspešan [3]. Vremenom se javilo drugačije mišljenje, da u svom radu preduzetnik ne koristi samo prirodnu kreativnost i inovativnost, već se oslanja na znanje i poslovne veštine. Ovaj rad ima za cilj da otkrije u kojoj meri urođena kreativnost, sa jedne strane i korišćenje znanja, sa druge strane, utiču na održivost buduće poslovne ideje. Postavlja se pitanje da li se pojedinci u potrazi za održivom poslovnom idejom više oslanjaju na svoju kreativnost ili ipak koriste različite strategije za prikupljanje podataka koje im kasnije pomažu u odabiru prave ideje. Model je razvijen na osnovu modela koji je Puhakka razvio 2007 [4]. U cilju dobijanja odgovora na ovo pitanje izvršeno je anketiranje studenata koji pohađaju nastavu iz predmeta Preduzetništvo. Cilj kursa iz predmeta Preduzetništvo je da kod mladih razvije ili poboljša veštine generisanja novih ideja.

Traženje održivih poslovnih ideja uključuje u svakom slučaju kako kreativno, tako i racionalno razmišljanje. U široj i užoj okolini postoje različiti izvori mogućnosti,

nezadovoljene potrebe i nepravilnosti, koje zahtevaju rešenje i korišćenje. Stoga je pretpostavka da bi korišćenje kreativnih strategija prilikom traženja poslovne ideje uticalo pozitivno na održivost te ideje.

H<sub>1</sub>: Korišćenje kreativnih strategija prilikom traženja novih poslovnih prilika ima pozitivan uticaj na održivost ideje.

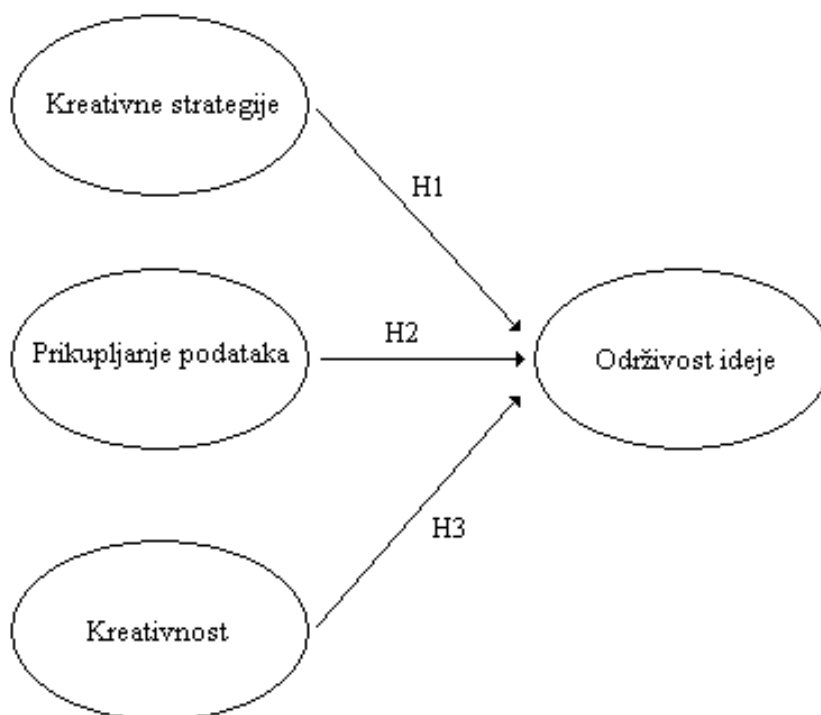
Sa druge strane prikupljanje informacija i korišćenje znanja pomaže prilikom evaluacije i kasnije razvoja polaznih ideja. Pretpostavka je da će preduzetnici i pojedinci koji koriste organizovano i sistematski prikupljene podatke imati više šanse da održe svoje poslovanje.

H<sub>2</sub>: Korišćenje strategija zasnovanih na analizi tržišta prilikom traženja novih poslovnih prilika ima pozitivan uticaj na održivost ideje.

U studijama o preduzetništvu kreativnost se smatra esencijalnim elementom prilikom razvijanja poslovne ideje, zbog toga je i kreativnost privukla veliku pažnju u kontekstu edukacije u oblasti preduzetništva. Pretpostavka je da će studenti koji sebe percipiraju kao kreativnu osobu biti u stanju da razviju bolju poslovnu ideju.

H<sub>3</sub>: Kreativnost prilikom traženja novih poslovnih prilika ima pozitivan uticaj na održivost ideje.

Na osnovu prethodno postavljenih hipoteza H<sub>1</sub>-H<sub>3</sub> definisan je konceptualni model (Slika 1).



Slika 1. Konceptualni model

## 2. METODOLOGIJA

Istraživanje je sprovedeno januara 2015. godine, na Odseku za Inženjerski menadžment, Tehničkog fakulteta u Boru. U istraživanju je učestvovalo 112 studenata.

Anketni listić je sastavljen od dva dela. Prvi deo čine 5 kontrolnih pitanja i drugi deo čine 16 istraživačkih pitanja. Istraživačka pitanja su podeljena u četiri grupe: Kreativnost, Održivost ideje, Strategije za traženje poslovnih prilika i Strategije za prikupljanje informacija. Za gradaciju dobijenih odgovora korišćena je Likertova petostepena skala, gde 1 označava „potpuno se ne slažem“, a 5 „potpuno se slažem“.

Tokom tromesečnog kursa studenti su imali priliku da pohađaju obuku za samostalnu izradu biznis plana, kao najvažnijeg dokumenta prilikom otpočinjanja novog poslovnog poduhvata. Njihov zadatak bio je da osmisle realnu i održivu poslovnu ideju, koja bi bila zasnovana na potrebama tržišta i na njihovoj kreativnosti. Studenti su najpre formirali timove koji su brojali od 5 do 6 članova, a nakon kursa svaki tim je prezentovao svoju ideju.

Deskriptivna statistika kontrolnih pitanja data je u Tabeli 1:

Tabela 1. Deskriptivna analiza kontrolnih pitanja

Faktor	Kategorije	Procenat
Pol	Muški	42,8
	Ženski	57,2
Prosečna ocena u toku dotadašnjeg studiranja	6,00-7,00	55,2
	7,01-8,00	37,6
	8,01-9,00	3,6
	9,01-10,00	3,6
Da li se bavite privatnim biznisom?	Ne	88,7
	Da	11,3
Da li se bilo ko u Vašoj užoj porodici bavi privatnim biznisom?	Ne	75,3
	Da	24,7
Da li se bilo ko u Vašoj užoj porodici ranije bavio privatnim biznisom?	Ne	55,7
	Da	44,3

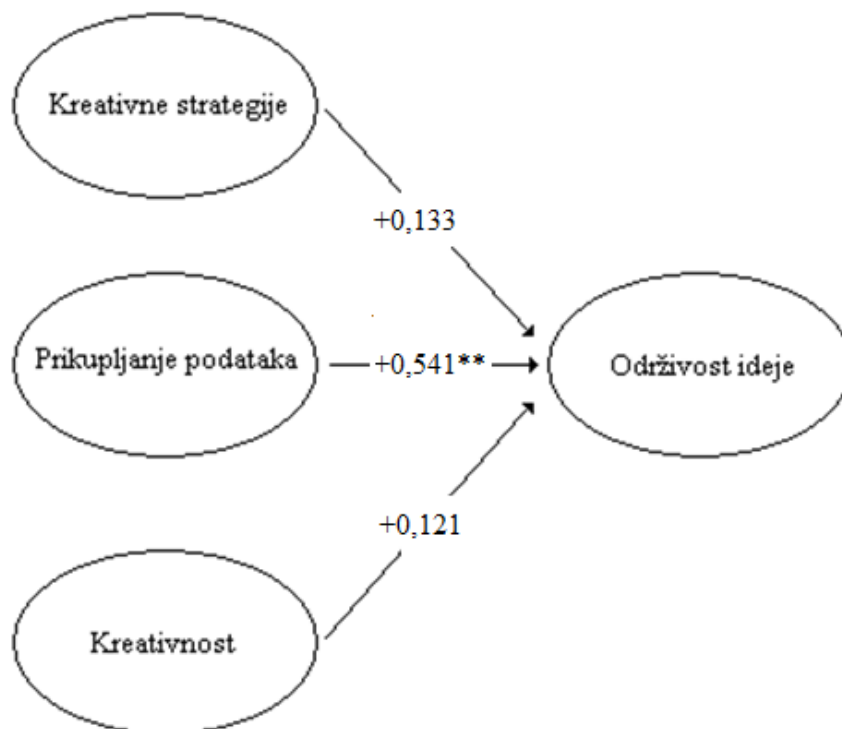
Na osnovu rezultata deskriptivne statistike prikazanih u Tabeli 1. Možemo videti da je istraživanjem obuhvaćeno 42,8% ispitanika muškog pola i 57,2% ispitanika ženskog pola i da je 55,2% ispitanika u toku studiranja imalo prosek između 6,00 i 7,00, 37,6% ispitanika je imalo prosek između 7,01 i 8,00, 3,6% ispitanika je imalo prosek između 8,01 i 9,00 i preostalih 3,6% ispitanika je imalo prosek između 9,01 i 10,00. Od svih ispitanika njih 88,7% se ne bavi privatnim biznisom a preostalih 11,3% ima svoj privatni biznis.

Većina ispitanika (75,3%) rekla je da se niko u njihovoj užoj porodici ne bavi privatnim biznisom, a 24,7% ispitanika ima u porodici nekog ko se bavi privatnim biznisom. 55,7% ispitanika nema nikoga u porodici ko se ranije bavio privatnim biznisom, a 44,3% ima nekog u porodici ko se ranije bavio privatnim biznisom.

### 3. REZULTATI

#### 3.1. STRUKTURNI MODEL

Istraživački model je testiran korišćenjem AMOS 16.0. Umesto regresione analize korišćena je SEM analiza, jer u isto vreme može da ispita sve veze među zavisnim i nezavisnim varijablama [5].



$R^2=0,603$   
\*\* $p < 0,005$

Slika 2. Strukturalni model

Na osnovu dobijenih rezultata, došlo se do sledećeg:

- ✓ Pretpostavka da kreativne strategije pozitivno utiče na održivost ideje se pokazala kao tačna ( $b=0,133$ ,  $p>0,005$ ), što znači da kako se intenzivira korišćenje kreativnih strategija tako raste i mogućnost o održivost ideje.
- ✓ Pretpostavka da prikupljanje podataka pozitivno utiče na javljanje održivosti ideje se pokazala kao tačna ( $b=0,541$ ,  $p>0,005$ ), što znači da pojačani proces prikupljanja validnih podataka dovodi do održivosti ideje. Pored toga, nezavisna varijabla Prikupljanje podataka ima najveći uticaj na rast održivosti ideje i statistički je najznačajnije.

- ✓ Pretpostavka da kreativnost pozitivno utiče na rast održivosti ideje se pokazala kao tačna ( $b=0,121$ ,  $p>0,005$ ), što znači da većom upotrebom prirodne kreativnosti dobija se bolja i uspešna ideja.

Vrednost  $R^2$  predstavlja procenat varijanse u zavisnoj varijabli objašnjene drugim varijablama koje su direktno povezane sa njom. Celokupan model objašnjava 60,3% varijanse u grupi Održivost ideje.

### 3.2. INDIKATORI FITOVANJA

Imajući u vidu apsolutnu podudarnost modela, indikatori koji se mogu primeniti kod nekompetitivne strategijske analize jesu GFI (goodness-of-fit index) indeks podudarnih vrednosti i aproksimativna greška RMSEA (root-mean-square error of approximation). GFI indikator je ograničen na interval vrednosti (0, 1). Što je veća vrednosti GFI indikatora, bolje je i podudarnost. Dobro fitovanje je označeno vrednošću iznad 0.90 [6]. Ovaj indikator je s toga prihvatljiv u našem modelu ( $GFI = 0.918$ ), nalazi se u okvirima preporučenih vrednosti, pretpostavlja se da bi se njegova vrednost čak i povećala, povećanjem broja ispitanika.

Takođe, potrebno je istaći da predloženi model pokazuje dobro uvećanje podudarnosti. Ovo je bazirano na proveru uvećanja podudarnosti između osnovnog modela i posmatranog modela. U svim slučajevima, vrednosti iznad 0.80 se smatraju prihvatljivim. U posmatranom modelu svi indikatori su dobri i nalaze se oko granice minimuma.

Tabela 2. Indikatori fitovanja

Indikatori fitovanja	Izračunate vrednosti za strukturni model	Preporučene vrednosti
Chi-Square ( $\chi^2$ )	150.658	-
Degree of freedom (d.f.)	98	-
Relative Chi-Square ( $\chi^2/d.f.$ )	1.54	< 3.0
Root Mean Square Error of Approximation (RMSEA)	0.053	< 0.08 – 0.10
Goodness-of-Fit Index (GFI)	0.918	> 0.8
Adjusted Goodness-of-Fit Index (AGFI)	0.887	> 0.9
Comparative Fit Index (CFI)	0.959	> 0.9
Incremental Fit Index (IFI)	0.959	> 0.9
Normed Fit Index (NFI)	0.892	> 0.9

Finalni aspekt koji se mora razmotriti je ekonomičnost predloženog modela. Od predloženog merenja, jedino prosečni chi-square se koristi u validnim analizama. Ovo merenje mora imati vrednost iznad 1 i ispod 3, ili čak 5 da bi se osiguralo fitovanje podataka [7] i da budu zaista reprezentativni podaci. U našem slučaju ova vrednost je  $150.658/98 = 1.54$  što je ispod gornje moguće granice definisane od strane navedene grupe autora.

#### 4. DISKUSIJA

Preduzetnici se opisuju kao visokokreativni inovativni pojedinci koji stalno kreiraju nova rešenja da bi stvorili neku novu vrednost. Međutim, neki drugi pristupi zastupaju teoriju da se preduzetništvo ne odnosi samo na kreativno i inovativno razmišljanje, već u velikoj meri zavisi i od znanja i sposobnosti. Ova studija ispituje uticaj oba ova aspekta.

Ispitano je do koje mere pojedinci koriste kreativne strategije za prikupljanje podataka, a do koje mere stečeno znanje i na koji način obe ove strategije utiču na održivost poslovne ideje. Model je razvijen na osnovu modela koji je Puhakka razvio 2007.

Istraživanje je sprovedeno januara 2015. godine, na Odseku za Inženjerski menadžment, Tehničkog fakulteta u Boru. Tokom tromesečnog kursa studenti su imali priliku da pohađaju obuku za samostalnu izradu biznis plana. Njihov zadatak bio je da osmisle realnu i održivu poslovnu ideju, koja bi bila zasnovana na potrebama tržišta i na njihovoj kreativnosti.

Istraživački model je testiran korišćenjem AMOS 16.0. Umesto regresione analize korišćena je SEM analiza, jer u isto vreme može da ispita sve veze među zavisnim i nezavisnim varijablama.

Pretpostavke da kreativne strategije, prikupljanje podataka i kreativnost pozitivno utiču na rast održivosti ideje su se pokazale kao tačne, a najveća pažnja usmerena je ka prikupljanju podataka prilikom analize tržišta zato što se ispostavilo da prema mišljenju ispitanika ono ima najveći uticaj kada je u pitanju održivost određene ideje.

Cilj istraživanja bio je da se ispita kako i na koji način kreativne strategije, metode za prikupljanje podataka i kreativnost mogu uticati na održivost ideje a sve sa ciljem da se kod mladih probudi preduzetnička namera i želja da se pokrene samostalni biznis uz realnu i održivu ideju. Iako su rezultati istraživanja prihvatljivi, pozitivni i zadovoljavajući ne može se zaobići činjenica da je ipak istraživanje sprovedeno na manjem uzorku, studenata sa jednog fakulteta. Kako bi u budućnosti istraživanje bilo još efikasnije i imalo širi dijapazon različitih odgovora neophodno je sprovести istraživanje na većem uzorku.

#### 5. ZAKLJUČAK

Razvijene zemlje prepoznale su značaj preduzetništva mladih i okarakterisale ga kao alternativu koja obećava i može pomoći u borbi za smanjenje opšte nezaposlenosti. Ono može doprineti razvoju i napretku privrede jedne zemlje.

Jedna od najvećih zabluda potencijalnih preduzetnika jeste da ideja za pokretanje posla mora da bude jedinstvena. Međutim, ideja sama po sebi nije ono što je presudno. Razvoj ideje, primena i izgradnja uspešnog poslovanja su važni aspekti preduzetništva.

Istraživanje sprovedeno u radu doprinosi tome da se razume značaj individualne kreativnosti koja utiče na održivost ideje, kao i da se ukaže na koji način i kako studenti traže nove poslovne ideje. Preduzetništvo ima važnu ulogu u savremenom poslovanju pa otud i sve veće interesovanje potrošača, poslovnih ljudi, sve veći broj akademskih istraživanja koja se odnose na ovu temu.

Celokupna pažnja u ovom radu usmerena je ka tome da se analizira način razmišljanja budućih diplomiranih menadžera, vezano za njihovo korišćenje različitih tehnika kreativnog razmišljanja prilikom pronalazanja novih ideja. Smisao se pronalazi u podsticanju kreativnog

razmišljanja kako bi se održala postojeća ideja i čak unapredila i dalje razvijala. Problem se manifestuje u nedostatku optimizma i vere u uspešnost poslovne ideje jer ispitanici ne pokazuju dovoljno samopouzdanja i određenu dozu borbenosti za uspešnu realizaciju. Neophodno je pokrenuti preduzetničku samosvest i probuditi inovativnost kod mladih ljudi. U prilog tome, potrebno je promeniti način razmišljanja i pogled na budući posao.

## REFERENCE

1. Amabile T.M., Conti R., Coon H., Lazenby J., Herron M., *Academy of Management Journal* 39 (5), (1996), 1154-1184.
2. Silvia P.J., Kaufman J.C., Pretz J.E., *Psychology of Aesthetics, Creativity and Art*, 3(3), (2009), 139-148.
3. Heinonen J., Hytti U., Stenholm P., *Education+Training*, 56 (8/9), (2011), 659-672.
4. Puhakka V., *Journal of Entrepreneurship*, 16( 1), (2007), 19-51.
5. Arsic M., Nikolić Dj., Živković Ž., Urošević S., Mihajlović I., *Total Quality Management and Business Excellence*, 23 (5/6), (2012), 719-729
6. Molina, M.L., Montes-Lorens, J., Ruiz-Moreno A., *Journal of Operations Management*, 25, (2007), 682-701.
7. Hair, J.F., Anderson, R.E., Tatham, R.L., Black, W.C., *Multivariate data Analysis*. Prentice-Hall, Englewood Cliffs, NJ, 1998.

## **INFLUENCE OF MOTIVATION ON EMPLOYEES IN ORGANIZATIONS**

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**Abstract:** Various operating conditions, business strategies and goals require that each company create its own system of employee motivation. In order to operate successfully, every organization needs to find an optimal combination of factors which would contribute to its staff motivation. The motivation for work is a complex of forces that initiate and keep an employee to work at a certain position in the company. In order to achieve the maximum degree of motivation of employees, managers must be informed of the needs and motives of people whom they are in charge of and also to ensure their satisfaction. People as the potential of a company represent its biggest driving and creative force. The aim of this paper is to present the results of research which attempts to find out which are those segments of work that make the employees feel either more or less satisfied, and to discover whether there is a relationship between the variables: gender, education and type of property and the variables gathered around the various claims related to motivation and satisfaction of employees.

**Keywords:** motivation, employee, job satisfaction, organization

### **1. INTRODUCTION**

Year by year the competition in the global market is becoming stronger, so in order to survive in such a reality, companies have to adapt quickly and change faster than their competition. This means that company needs to be proactive, to predict events and to be ready to adapt itself to them as well as to set the rules of the game on the market, i.e. to keep a watchful eye on what is happening in its surroundings. In order to be able to achieve this, the organizations must have sufficient resources. One of the most important development resources of any organization are the employees who work there. In order for employees to be productive and thus contribute to the organization they must be satisfied and feel motivated to work. Hence, motivation and satisfaction of an employee are becoming basics of world modern business organizations which management is paying more and more attention to. Various business conditions, business strategies and goals require each organization to create its own system of employee motivation.

The motivation for the work is a complex of forces that initiate and keep employee to work at a certain position in the company. Motivation in the organization is efficient if an employee meets his/her own personal needs and goals through organizational goals. Motivation, as such, expresses the volition component of human behavior and represents the energy which drives employees to take specific actions as well as to have certain behaviors [1]. From the standpoint of employees, motivation is the internal state of an individual influenced by many factors, which leads to the realization of the goals. Active management of staff resources for usage of human factor leads to the development of various processes which



encourage increment of motivation for work, where, it is particularly insisted on job satisfaction, as one of the most important indicators of employee motivation. Although motivation is by definition an individual phenomenon, motivation in the organization represents a systemic problem which needs to be addressed and be adjusted to the structure of the organization itself, its goals and real achievements. Awareness of motivation issue and job satisfaction is an important factor for designing the workplace, organizational culture and climate as well as the reward system, promotion system and management style [2].

Employee motivation is one of the key preconditions for the success of the business. It is therefore necessary continuously to study and improving the process of motivation in the organization. Motivated employees know what they should do and which path reach to the set goal in a fast and efficient way, which is important for the organization, but also for employees, which as a reward for his hard work and efforts are accomplishing a certain benefit. Based on this we can conclude that the motivation process of initiating and directing efforts and activities in order to achieve personal and organizational goals [3].

Employee motivation is a subject of interest of a large number of authors, because comprehension of this complex process in an organization can lead to: improvement of both the efficiency and creativity in work, improvement of the quality of working life in the entire company, strengthening of the competitiveness and success of enterprises in the market. In order to increase their motivation, it is necessary that the employees themselves set personal goals and then secure their freedom to choose, find work-life harmony, face new challenging tasks, improve through learning of new skills, collaborate with associates and assist them in their work. It should be noted that no theory is so good that it can predict what will motivate every employee, because what is true for one, does not apply to the other [4].

This was an incentive for authors who, in this study, examined how some basic demographic characteristics of employees affect their motivation to work and their overall job satisfaction. The aim of this paper is to examine the perception of individuals, i.e. employees in companies in Bor depending on gender, level of education and type of property (i.e. whether the employed work in the private or public sector). It is important to emphasize that besides a number of factors that influence the motivation process, differences can also be noticed on the basis of demographic characteristics of employees which are presented below. The reasons for analyzing these aspects can also be found in a need of modeling motivation strategies for various structures of employees according to their needs.

## **2. JOB SATISFACTION AND EMPLOYEE MOTIVATION**

The most important of all attitudes of the employed is an attitude towards their work. This attitude is called job satisfaction and we can define it as the cognitive, affective and evaluative reaction of an individual to one's work [5]. Job satisfaction includes certain assumptions and beliefs concerning the job (cognitive component), feelings towards work (affective component) and evaluation of the work (evaluative component). Given that the widespread belief is that a satisfied worker is a productive worker as well as that the successful performance of an enterprise is impossible with dissatisfied employees, leads us to a conclusion that job satisfaction is one of the most researched topics in the field of human behavior within organizations [6, 7, 8].

Job satisfaction depends not only on the nature of the work but it also largely depends on the expectations of an individual who works in a given workplace. Job satisfaction has a

great impact on the quality and efficiency of the work that has been done in a company. Overall job satisfaction can be influenced by satisfaction disharmony or deviation from expectations in respect of certain aspects of the job, not by the level of satisfaction per se [9]. Job dissatisfaction can be reduced by influence of various factors such as the policy of the company, control, administration, salaries and quality of life [10]. All factors which contribute to increment of employee satisfaction can be grouped into two categories: organizational factors of job satisfaction and personal factors of job satisfaction.

Employees feel more motivated to work if they are satisfied with the job they perform. That feeling is often associated with the fact that they do their job well. Thus they become more experienced professionally and achieve good personal performances. The issue of job satisfaction is very sensitive in Serbia. Employees in the industrial sector are often not satisfied with their job due to the large workload, long working hours and low income [7]. Numerous studies testify of the downward trend of job satisfaction among employees in Serbia [11]. Starting from the fact that the success of a company depends on the ability and motivation of employees, also motivation and success depends on the ability of managers who lead them, we come to the conclusion that the behavior of managers greatly affects employee satisfaction. However, as in other parts of Serbia, companies in Bor operate in changing conditions which surround them. Even when the leadership of a company is willing to change and accept new business methods, with the old technology, the same organizational structure and with the same organizational behavior, any attempt and initiative for something better is destined to achieve only a minor success. Čukanović-Karavidić, (2014) have identified the following positions that employees listed as essential motivational factors which would make them more satisfied and more productive at work and those are: first, the possibility of development and progress in the first place; second, salary which is based on their working performance and righteous reward system in third place [12].

### 3. METHODOLOGY

For the purposes of paper in the municipality of Bor has conducted research related to the examination of employee motivation and their attitudes about job which they do. Surveyed respondents who working in state owned enterprises (102 respondents) and in the private sector (30 respondents).

The survey was conducted in the first half of 2016 and interviewed a total 168 respondents of which the 132 (78.57%) correctly filled out their questionnaires. The questionnaire used in the survey, was made up of 30 questions, and fundamentally consists of two groups of questions. The first group shows the demographic characteristics of the respondents (gender, education, time spent in the current organization). The second group of the questionnaire was composed of 22 questions that were formulated in the form of statements, and related to the examination of the degree of motivation and satisfaction of employees in organizations in Bor.

The survey was anonymous, for gradation of received answers was used Likert five-point scale. After the collected data was performed descriptive statistical analysis and testing hypothesis with one-way ANOVA in SPSS 18.0 [13].

The aim of the research is to analyze and to point to the existence of links between gender, level of education of respondents and type of ownership in relation to the motivation of employees and their satisfaction. Pointing out the different effects of demographic parameters of employed in organizations differ attitudes and perceptions of employees in

relation to the degree of satisfaction of employees with working conditions, environment and rewarding in the organization.

#### **4. ANALYSIS OF THE RESULTS**

##### **4.1. THE DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE**

Results of statistical analysis of demographic variables included the following percentage of participation. The sample included (43.9%) men and a slightly higher percentage of women (56.1%). Most of the respondents were with secondary education (43.2%), followed by with a university degree (37.9%), and significantly smaller were numbered of MSc and PhD respondents (9.1%), with higher education (7.6%) and with elementary education (2.3%). As regards the age structure of the examined population from 18-25 years was (3.8%), respondents from 26-36 years was (24.2%), the majority of respondents were aged between 36-45 years (36.4%), slightly lower the number of respondents was in a group between 46-55 of them (26.5%) and (9.1%) respondents was older than 56 years. Regarding marital status (35.6%) of respondents have not married (59.8%) were married and only (4.5%) in the course of life left without a spouse.

Work experience less than 3 years at least had them all respondents (8.3%), from 3-10 years of work experience was (25%) of 11-20 years old were most of the respondents (30.3%), slightly less respondents had 21-30 years of service and over 30 years was (12.9%). In addition to these data in the context of demographic outcome was treated and statistics concerning the time that employees have spent the last organization where the work involved. In all four sub-categories as there were almost approximate percentage representation was expressed, from 5-10 years and over 20 years (23.5%) and from 1-5 and 10-20 years (26.5%). The largest number of respondents employed in state institutions (77.3%) and private (22.7%). Most of the respondents engaged in scientific research (37.1%), followed by education (21.2%), followed by culture (18.9%), slightly less tested employees who work in trade (8.3%), manufacturing (7.6%) and services (6.8%).

##### **4.2. RELIABILITY OF A SCALE (CRONBACH ALPHA)**

Reliability tested results using the Cronbach alpha test was conducted [14]. According to this test the value of the coefficient  $\alpha$  (internal consistency coefficient) above 0.7 provide a good possibility of modeling of the results obtained from examined population. The examination of metric characteristics of the questionnaire showed that the internal consistency coefficient is 0.876, and determined that reliability criteria was satisfied. Cronbach's alpha coefficient has shown that all the items (which consists of 22 statements from questionnaires) have performed the measurement of the same phenomenon, namely that they are consistent. In our sample of 132 respondents (78.57% a valid sample), the value of Cronbach's alpha coefficient satisfies a criterion of reliability, and the scale has a good internal consistency can be seen in Table 1.

Table 1. Reliability Statistics

Cronbach's Alpha	N of Items
0,876	22

#### 4.3. THE RESULTS OF HYPOTHESIS TESTING

The hypotheses aimed to investigate the relationship between education level and type of activity, years of service and claims respondents to the questionnaire relating to employee motivation. For this purpose the respondents were divided into five groups: lower, middle, senior, high school degree, masters and doctorate. The tested hypotheses are:

**Hypothesis H1.** There are differences in responses to the statements from the questionnaire in relation to their level of their education.

**Hypothesis H2.** There are differences in responses to the statements from the questionnaire in relation gender of respondents.

**Hypothesis H3.** There are differences in responses to the questionnaire in relation to the type of activity.

For testing hypotheses were used univariate analysis of variance ANOVA. Obtained results witch refer on hypothesis H1 are shown in Table 2-3.

Table 2. Descriptive indicators tested characteristics according to level of education

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
My job is interesting and creative	Primary school	3	1.6667	.57735	.33333	.2324	3.1009	1.00	5.00
	Secondary education	57	4.1754	1.00219	.13274	3.9095	4.4414	1.00	5.00
	College degree	10	3.9000	1.44914	.45826	2.8633	4.9367	1.00	5.00
	University degree	50	4.1600	.97646	.13809	3.8825	4.4375	1.00	5.00
	Master's degree and Ph.D.	12	4.4167	.99620	.28758	3.7837	5.0496	1.00	5.00
	Total	132	4.1136	1.08176	.09415	3.9274	4.2999	1.00	5.00
I have opportunity for improvement in the organization	Primary school	3	1.3333	.57735	.33333	-.1009	2.7676	1.00	5.00
	Secondary education	57	2.1404	1.25980	.16686	1.8061	2.4746	1.00	5.00
	College degree	10	1.9000	.99443	.31447	1.1886	2.6114	1.00	5.00
	University degree	50	2.8200	1.33539	.18885	2.4405	3.1995	1.00	5.00
	Master's degree and Ph.D.	12	4.1667	1.19342	.34451	3.4084	4.9249	1.00	5.00
	Total	132	2.5455	1.39445	.12137	2.3054	2.7856	1.00	5.00
The organization was good occupational safety and good working conditions.	Primary school	3	2.6667	1.15470	.66667	-.2018	5.5351	1.00	5.00
	Secondary education	57	3.4737	1.01955	.13504	3.2032	3.7442	1.00	5.00
	College degree	10	3.6000	.96609	.30551	2.9089	4.2911	2.00	5.00
	University degree	50	3.9000	.86307	.12206	3.6547	4.1453	2.00	5.00
	Master's degree and Ph.D.	12	4.1667	.71774	.20719	3.7106	4.6227	3.00	5.00
	Total	132	3.6894	.96609	.08409	3.5230	3.8557	1.00	5.00
I had the opportunity to learn and to improve my knowledge last year	Primary school	3	1.0000	.00000	.00000	1.0000	1.0000	1.00	5.00
	Secondary education	57	2.4912	1.35123	.17897	2.1327	2.8498	1.00	5.00
	College degree	10	2.0000	.94281	.29814	1.3256	2.6744	1.00	5.00
	University degree	50	3.2000	1.42857	.20203	2.7940	3.6060	1.00	5.00
	Master's degree and Ph.D.	12	4.7500	.45227	.13056	4.4626	5.0374	1.00	5.00
	Total	132	2.8939	1.47890	.12872	2.6393	3.1486	1.00	5.00
In the last 6 months anyone had talked to me about my progress	Primary school	3	1.0000	.00000	.00000	1.0000	1.0000	1.00	5.00
	Secondary education	57	1.7018	1.06846	.14152	1.4183	1.9853	1.00	5.00
	College degree	10	1.4000	.69921	.22111	.8998	1.9002	1.00	3.00
	University degree	50	2.5400	1.44575	.20446	2.1291	2.9509	1.00	5.00
	Master's degree and Ph.D.	12	3.5000	1.31426	.37939	2.6650	4.3350	1.00	5.00
	Total	132	2.1439	1.35428	.11788	1.9108	2.3771	1.00	5.00
I know what results are expected from me	Primary school	3	4.0000	1.00000	.57735	1.5159	6.4841	1.00	5.00
	Secondary education	57	3.7368	1.18813	.15737	3.4216	4.0521	1.00	5.00
	College degree	10	4.5000	.52705	.16667	4.1230	4.8770	1.00	5.00
	University degree	50	4.0400	.94675	.13389	3.7709	4.3091	2.00	5.00
	Master's degree and Ph.D.	12	4.4167	1.16450	.33616	3.6768	5.1566	1.00	5.00
	Total	132	3.9773	1.07338	.09343	3.7925	4.1621	1.00	5.00
I think about changing the organization	Primary school	3	1.0000	.00000	.00000	1.0000	1.0000	1.00	5.00
	Secondary education	57	2.7018	1.49958	.19862	2.3039	3.0996	1.00	5.00
	College degree	10	2.4000	1.57762	.49889	1.2714	3.5286	1.00	5.00
	University degree	50	2.5800	1.42986	.20221	2.1736	2.9864	1.00	5.00
	Master's degree and Ph.D.	12	2.2500	1.28806	.37183	1.4316	3.0684	1.00	5.00
	Total	132	2.5530	1.45316	.12648	2.3028	2.8032	1.00	5.00

Table 3. Analysis of variance with one factor (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
My job is interesting and creative	Between Groups	19.847	4	4.962	4.722	.001
	Within Groups	133.449	127	1.051		
	Total	153.295	131			
I have opportunities for promotion in the organization	Between Groups	53.237	4	13.309	8.389	.000
	Within Groups	201.491	127	1.587		
	Total	254.727	131			
The organization has good occupational safety and good working conditions.	Between Groups	10.821	4	2.705	3.083	.018
	Within Groups	111.444	127	.878		
	Total	122.265	131			
I had the opportunity to learn and to improve my knowledge last year	Between Groups	74.020	4	18.505	11.060	.000
	Within Groups	212.496	127	1.673		
	Total	286.515	131			
In the last 6 months anyone had talked to me about my progress	Between Groups	50.515	4	12.629	8.453	.000
	Within Groups	189.750	127	1.494		
	Total	240.265	131			
I know what results are expected from me	Between Groups	8.543	4	2.136	1.905	.014
	Within Groups	142.389	127	1.121		
	Total	150.932	131			
I think about changing the organization	Between Groups	9.869	4	2.467	1.175	.025
	Within Groups	266.760	127	2.100		
	Total	276.629	131			

Based on the obtained results (Table 2) it can be seen that significant differences (p<0,005) can be observed on 7 statements from the questionnaire (Table 3).

Respondents MSc and PhD are largely in agreement with the statement that their job is interesting and creative, as confirmed by the mean score of respondents' answers which is (4,42). Approximate opinions are employees with high (4.16) and secondary education (4.17), while to a lesser extent, agree with this statement employees with higher education and at least as employees with elementary school. However, due to the small number of respondents with primary education (only 3), and with a higher (12), we can conclude that a significantly higher number of employees (90%) think their job is interesting and creative. High satisfaction expressed by respondents in relation to the statement that has work they are doing interesting and creative has a positive impact on the overall process of motivation because only a happy worker is a productive worker.

The following statements can be observed and analyzed together because they relate to group-related statements: the possibility for improvement in the organization, opportunities for learning and training in the past year and whether anyone in the last 6 months of talking with employees about their progress.

Generally observing all these statements with them in largely agree employees who have a PhD degree. Employees with such a high level of education are the most satisfied, which can be related to the fact that the survey was largely attended by educators, which is itself a hierarchical structure that is so placed that they are conditioned to, or advance in their careers based on the results achieved or lose their jobs. Well, they have the possibility of learning and training time, leading to improvements. Apart from the most educated respondents, almost all the others are significantly more dissatisfied with these allegations because they, for example, last 6 months, no one mentioned any possibility of progress where the average score is significantly lower than the average.

Employees with high and secondary education are generally giving approximate answers to these questions. However, according to the results, employees with secondary education had some more chances for learning and advancement based on the average assessment equal to (2.14) of employees with higher education (1.9). In many organizations, there is a need for learning, especially because of the rapid changes in the world of information technology. The statement which is relating to good occupational safety and good working conditions, respondents gave answers in the hierarchy, the greater the qualifications of employees, they are satisfied. For most of the allegations that have statistical significance generally satisfied just been busy with the highest level of education. So it can serve as a good example to qualifications certainly affect the job satisfaction and motivation at the very employees who have demonstrated to the zadovoljiji working conditions, have more opportunities for training and advancement which are employed with lower education levels significantly less exposed.

With regard to the statements relating to the expectations of employers with respect to employees, all respondents regardless of their qualifications, they gave approximately the same answers with a value above the average (mostly above 4). Respondents largely know what results are expected of them, which indicates that they are well aware of the work they do and what is expected of them regardless of the type of activities they perform. In the statement relating to the question of changing jobs almost all respondents gave ratings that are less from the average value. They do not think about changing the organization that they work for, but with this statement at least respondents agree with a doctorate degree. These results were expected because on previous questions show that respondents with the highest education generally satisfied. Regarding respondents with primary education, their average ratings were generally low. Consequently, we can conclude that they are quite dissatisfied with the work they are doing, but they do not think about leaving the organization. Accordingly we come to the conclusion that it was not satisfying the conditions of the workplace for which remain to them, but little opportunity provided by their qualifications, because of which they do not decide to change job. Based on the analysis of respondents' answers, hypothesis H1 is accepted. It was determined that there is a difference in the responses of employees to the statements in the questionnaire with statistical significance compared to level of education of the respondents.

Obtained results of testing the hypothesis H2 are shown in Tables 4-5.

Table 4. Descriptive indicators tested characteristics, according to gender

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
The most important is job security in the organization	Male	58	3.9828	1.08404	.14234	3.6977	4.2678	1.00	5.00
	Female	74	4.4324	.86136	.10013	4.2329	4.6320	2.00	5.00
	Total	132	4.2348	.98740	.08594	4.0648	4.4049	1.00	5.00
My salary is in line with the results of the work and the degree of utilization of my expertise	Male	58	2.2759	1.21096	.15901	1.9575	2.5943	1.00	5.00
	Female	74	2.7432	1.37553	.15990	2.4246	3.0619	1.00	5.00
	Total	132	2.5379	1.32161	.11503	2.3103	2.7654	1.00	5.00
Opportunities for advancement would be the motivation to develop a career in an organization where I work now	Male	58	3.4655	1.35356	.17773	3.1096	3.8214	1.00	5.00
	Female	74	3.9730	1.11002	.12904	3.7158	4.2301	1.00	5.00
	Total	132	3.7500	1.24407	.10828	3.5358	3.9642	1.00	5.00

Table 5. Analysis of variance with one factor (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
The most important is job security in the organization	Between Groups	6.575	1	6.575	7.055	.009
	Within Groups	121.145	130	.932		
	Total	127.720	131			
My salary is in line with the results of the work and the degree of utilization of my expertise	Between Groups	7.103	1	7.103	4.165	.043
	Within Groups	221.708	130	1.705		
	Total	228.811	131			
Opportunities for advancement would be the motivation to develop a career in an organization where I work now	Between Groups	8.373	1	8.373	5.600	.019
	Within Groups	194.377	130	1.495		
	Total	202.750	131			

With respect to gender (Table 4) were statistically significant differences in the responses of respondents ( $p < 0.005$ ) was found answer to the three questions in the questionnaire, can be seen in Table 5 in the column of Sig. The statement "the most important is job security in the organization" to a large extent agree women whose average score is (4.4) while men to a lesser extent, agree with this statement (3.9). Based on this, we conclude that women attach greater importance to the organization of job security than men.

As regards whether the salary in accordance with their performance and the degree of utilization of professional skills of employees, the average score of respondents' answers is below average for women is (2.7) and men's (2.3.). Respondents believe that they should be paid more for the work they do.

Comparing the average salary in Serbia and in other countries of Europe, our country is among the countries with the lowest earnings. With income from € 363 is far from leading



European countries of Switzerland, where the average income is € 5 610. With possibility to advance as a motivator for further career development to a large extent agree women whose average score is (3.9), generally men agree with this statement of their average score is (3.5). So, we can conclude that the women opportunity to progression of greater motivation for career development in the existing organization than men.

The hypothesis H2 is accepted because there is a difference in the responses of employees to the statements in the questionnaire with respect to gender.

The results of testing hypotheses H3 are shown in Tables 6-7.

Table 6. Descriptive indicators studied features by type of ownership

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
Most financial incentives motivate me	Private company	30	4.3333	1.09334	.19962	3.9251	4.7416	1.00	5.00
	State on company	102	3.8137	1.31051	.12976	3.5563	4.0711	1.00	5.00
	Total	132	3.9318	1.27927	.11135	3.7115	4.1521	1.00	5.00
In my organization, the salary increase periodically with the actual effect or a promotion at work	Private company	30	2.9333	1.22990	.22455	2.4741	3.3926	1.00	5.00
	State on company	102	2.3333	1.22137	.12093	2.0934	2.5732	1.00	5.00
	Total	132	2.4697	1.24446	.10832	2.2554	2.6840	1.00	5.00
I have good relations with colleagues	Private company	30	4.6667	.54667	.09981	4.4625	4.8708	3.00	5.00
	State on company	102	4.1569	.97234	.09628	3.9659	4.3478	1.00	5.00
	Total	132	4.2727	.91711	.07982	4.1148	4.4306	1.00	5.00

Table 7. Analysis of variance with one factor (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
Most financial incentives motivate me	Between Groups	6.259	1	6.259	3.909	.050
	Within Groups	208.127	130	1.601		
	Total	214.386	131			
In my organization, the salary increase periodically with the actual effect or a promotion at work	Between Groups	8.345	1	8.345	5.577	.020
	Within Groups	194.533	130	1.496		
	Total	202.879	131			
I have good relations with colleagues	Between Groups	6.025	1	6.025	7.520	.007
	Within Groups	104.157	130	.801		
	Total	110.182	131			

With respect the property of its own (Table 6) were statistically significant differences in the responses of respondents ( $p < 0.005$ ) was found answer to the three questions in the questionnaire (Table 7).

Financial incentives are a very important factor that affects the motivation of employees and they to a greater extent on the basis of these results encourage employees in private company, whose average score is (4.3), as opposed to state-owned companies where the average score of employees slightly lower (3.8). Employees in private company and state-owned enterprises are largely disagreed with the statement that their organization pay a periodic increase in relation to the performance or promotion at work, because both sides share with other average score higher than 2. When it the relationship with colleagues regardless of where employees work largely agreed with this statement (grade point average is above 4).

Based on the above facts, hypothesis H3 is accepted, because there is a difference in the responses of employees to the allegations in the questionnaire in relation to whether they work in private or public institutions.

## 5. CONCLUSION

The modern way of doing business in the world means paying more attention to employees who have become the primary resource for development. Employees as the potential of the organization represent its biggest driving and creative force. Hence it is very important to take care of the motivation and satisfaction of employees that are the basis of modern business organizations.

By building quality motivation system the companies increase their competitive ability in the market. Of course, for practice to be able to work in this direction, it is necessary to thoroughly examine and learn about the influence of many factors which affect the motivation of employees. Demographic factors are just some of the many variations which affect the motivation of employees.

In order to determine the significance of the influence of demographic factors on respondents' answers, we applied the One-way ANOVA test. The paper examined the influence of gender, education and type of property on the claims relating to employee motivation. The obtained results showed confirmation of hypotheses H1, H2 and H3, which thus determined that there is a difference in perception of employed in relation to gender, education and type of property.

Each individual should be approached as an integral personality and it should be discovered what needs are dominant for him/her and keep them in mind in the process of motivation. Managers should organize such meetings with employees where employees would be able to express their views, opinions, suggestions, possible problems and which would help them jointly come up with the solutions.

## REFERENCES

- [1] Kulić, Ž. (2003). Upravljanje ljudskim resursima sa organizacionim ponašanjem. Megatrend univerzitet primenjenih nauka, Beograd.
- [2] Beebea, A., Blaylockb, A. (2008). Job satisfaction in public relations internships. Article in press, 3.
- [3] Bahtijarević, Š. (1999). Management ljudskih potencijala, Goden marketing, Zagreb.

- [4] Unčanin, R., Petković, T., Stanković, R., Jovanović, D. (2006). Operativni i strateški menadžment, Viša poslovna škola, Čačak.
- [5] Grinberg, Dž. (1998). Ponašanje ljudi u organizacijama, Želnid, Beograd.
- [6] Hosseinian, S., Seyedeh-Monavar, Y. (2008). Emotional intelligence and job satisfaction. *Journal of Applied Sciences*, 8, 903-906.
- [7] Terek, E., Vukonjanski, J., Gligorović, B. (2014). Job satisfaction of men and women employed in manufacturing sector and education in Serbia. *Singidunum Journal of Applied Sciences*, 11(1), 25-33.
- [8] Yeh, Y.-P. (2014). Exploring the impacts of employee advocacy on job satisfaction and organizational commitment: Case of Taiwanese airlines. *Journal of Air Transport Management*, 36, 94-100.
- [9] Đukić, D. (2012). Istraživanje povezanosti motivacije za rad i stresa u organizaciji. *Zbornik radova fakulteta tehničkih nauka*, 13, 2769-2771.
- [10] Farooqui, S., Nagendra, A. (2014). The impact of person organization fit on job satisfaction and performance of the employees, *Procedia Economics and Finance*, 11, 122-129.
- [11] Tanasijević, Z. (2008). Job satisfaction - a key indicator of employee motivation. *Quality Festival 2008*, 35. International Quality Conference, Kragujevac.
- [12] Čukanović-Karavidić, M., Jovančević, D. (2014). Motivacioni faktori zadovoljstva zaposlenih u funkciji poboljšanja uspešnosti zaposlenih. *Anali poslovne ekonomije*, 11, 62-68.
- [13] Pallant, J. (2011). *SPSS Priručnik za preživljavanje, Postupni vodič kroz analizu podataka pomoću SPSS-a*. Artprint, Novi Sad.
- [14] Kupermintz, H. (2003). Lee J. Cronbach's contributions to educational psychology. In B.J. Zimmerman and D.H. Schunk (Eds.). *Uducational psychology: A century of contributions*. Mahwah, NJ, US: Erlbaum, 289-302.

## USE OF FINANCIAL INTELLIGENCE IN MAKING FINANCIAL DECISIONS

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**Abstract:** Financial intelligence is an innate ability of man. It is acquired through financial education. In fact, financial intelligence is a set of skills that can and must be learned by managers.

In order to successfully approach to managing the business process, it is necessary financial knowledge is acquired by increasing financial literacy. Financial literacy primarily in itself covers proper interpretation of: balance sheet, income statement and statement of cash flows. Of course beyond these includes other financial items that are intended to produce comprehensive financial process of elaboration.

Global financial intelligence boils down to four basic fundamentals that actually will be the subject of our consideration in this paper and it is;

- Understanding financial grounds by managers,
- Acquiring financial knowledge,
- Using the financial information needs of financial analysis
- Full coverage of organizational functioning.

Financial intelligence enables understanding of finance in order to take steps to improve the operation as a whole. Taking into account the great importance which the financier have companies then pushed as imperative paradigm: knowledge of finance is one of the key organizational elements that need to use managers.

The main objective of the paper is to show the financial intelligence as a component which has its importance in decision-making in the company. In order to successfully run the business process, managers need to have a certain capacity of the financial intelligence. To improve its capacity is necessary to have a degree of knowledge.

Financial reports through figures show overall performance of the company as a whole. But to move the numbers in financial interpretation is necessary to possess the financial intelligence that not only is acquired through learning but must exercise and applied.

**Keywords:** financial, intelligence reports, literacy, information.

### 1. INTRODUCTION

Global financial intelligence boils down to four basic fundamentals that actually will be the subject of our consideration in this paper and it is:(1)

- *Understanding financial grounds by managers managers who are financially intelligent understand financial measurements. They understand the financial statements and are knowledgeable about their reading. Numbers used in the financial statements are known and they can interpret .;*

- *Acquiring financial knowledge and financial knowledge is the basis by which to conduct financial coordination. Every manager is required to dispose of a minimum of financial knowledge. It acquires a process of continuous financial education .;*
- *Using the financial information needs of financial analysis and financial data are transformed into financial information. Information is the basis for making financial decisions. Given the great importance that the financial information they have in the decision-making this paper analytical elaborates them;*
- *Coverage of full-organizational functioning through the financial intelligence are getting into the whole system of organizational functioning. Finances are one of the key components through which the perceived success of the operation of the company and thus the success of the operation of the company in general.*

Financial intelligence enables understanding of finance in order to take steps to improve the operation as a whole. Taking into account the great importance which the financier have companies then pushed as imperative paradigm: knowledge of finance is one of the key organizational elements that need to use managers.

Funding can be interpreted as a discipline that should provide information to managers, heads an organization that will help the process of adoption of adequate business decisions.

First you starting the interpretation of financial information and their importance they have in the decision of odludzki. Content, above all, cost information and economic processes, measurement and communication of financial information. This definition implies the use of information for making business decisions and identifying users of financial information.

Beyond any doubt that the understanding of this definition includes, above all, understanding the concept of economic information. Usually, when attempts are made to define the term information, first distinguishing the term data. The fact is a fact of some kind. Data can be defined as a group of accidentally received symbols representing quantity, events, actions taken or things. The data can be expressed in letters, numbers or symbols.

The information is defined as data processed in the form important or valuable for a particular purpose. Financial information represent the processed information to be used for planning, control and business decision making. The data is raw material base which serves for processing-producing information.

## **2. QUALITY OF FINANCIAL INFORMATION**

It should be borne in mind that in analyzing financial information must be relevant, otherwise it would be useless. This means that the grouping of information on any basis may prove to be useless, if not set in the specified analytical testing, processing and addition or in any way, adapting the set target.

Considering all mentioned above, the term information associated with the place, role and importance and the importance of financial analysis managers, taken as a whole. The overall concept of financial analysis managers must set the most flexible foundation. Hence, the spread of its use, the spread in the area where it is placed, or in a word speaking, lack of limits within which it would not move.

The information produced for the purposes of financial intelligence management must be characterized by relevancy. The information obtained importance only when mean news neochekuvanost, unpredictability. On a single day or hour, we receive an enormous quantity of information that certainly exceeded our requirements and possibilities of perception. However, they use only those that are considered to be relevant. This equally applies to the financial analyst of management. His duty is to carry out the role of producer and coach of information that can be used in the process of governance and management. This clearly shows that the time is exceeded validitetot financial analyst to measure based on quantum information. His validitet today is measured by the quality, relevance and potential that provides some information.

It is claimed that the relevance soul is the financial analysis of management. The information that is not relevant is worthless. One of the elements that make up the definition of financial intelligence is knowledge about the measurement of results of operations. In literature, the measurement of the results of this kind is raised to the level of theory. Through the measurement of results of operations are coming to an assessment of working. C. Drurdz says "measurement refers to rewriting the numbers of things or events, and financial analysis performed the lead role in the process of measuring results by quantifying data." By quantifying data increases their usefulness and informative force.

The use of money as a standard to measure results is a very useful instrument which has a general meaning as a common denominator for many things and many events related to the performance of the organization's activities.

Already we underlined that cash values can not express all possible decisions in operation. Speaking about the behavioral aspects of financial management analysis, no monetary standards of product quality, innovation in manufacturing, employee morale, the extent of the needs of the clientele of the organization and so on. When this in mind, once again confirms the view that non-financial measures of management are equally important as financial.

When it comes to financial standards must never lose the fact that the monetary unit of one country can be unstable. Fluctuations in the value of money anyway, so volatility in financial measure which might lead to the acquisition of completely inaccurate picture of the actual results. Generally known is the fact that it is inflationary monetary movements. Today use a variety of methods to cushion the effects on the results of inflationary effects.

### **3. THE CHARACTERISTICS OF FINANCIAL INFORMATION**

When it comes to the content of the notion of information and information, it is necessary to indicate the properties of the information.

The most important properties of this type are as follows:(2)

- *Information reduces uncertainty, which are otherwise considered as a basic feature in the information system;*
- *The information may be correct or incorrect. If the user of incorrect information is confident that inaccurate information is correct, then that information it really gives the impression as if it was accurate;*

- *The information could lead to further knowledge. Sometimes it can update outdated information, or you can simply upgrade the existing information;*
- *Information can be a correction of the former incorrect information;*
- *Information can confirm a constant information. This information is valid because it boosts the confidence of the user information for its accuracy;*
- *Information has value-surprising role. If it is more likely it will happen an event according to the information, all the smaller the value of such information.*

An important element of information is its role as a system of communication. Under the system of communication means transfer of messages between participants of the information system (preparation of information and their users). In the system of communication, those who prepared the information be guided by the objective to make some impact on the users of information through messages containing information. Those who prepare information and those receiving information that they can use them, are linked together through communication channels.

The data in the communication system have their internal and external origin and are derived from daily operations of the organization. Successive data is processed on the basis of an expert procedure. A comparison based on the data in order to obtain certain information. This information is used to report or review that then through the terminal connects users of information within the communication system.

Based on this brief review of the system of communication, we can conclude that it is a typical system of communication in which the financial analysis of management is just one example.

#### **4. INADEQUATE INFORMATION AND THEIR MANIFESTATION**

The information in the financial system are events that are normally documented in the form of invoices, receipts, bank statements, treasury reports, and more. Financial Analyst acts as an intermediary in the processing of economic events and their recording and processing of certain types of financial statements.

These types of financial statements represent a unique form of communication channels, providing information on the adoption of business decisions, explaining the planned tasks and Performance. However, the distortion of the message making the financial system must be rare because it can occur in the transmission of information or analysis of financial statements. In order to perform minimizing distortion of information in the financial system can be achieved by multiple control and analytical approach to every financial report.

#### ***Objectives of the Organization***

The organization has several goals. The purpose of the organization should be viewed in the context of the interests of various groups (shareholders, employees, customers, suppliers, government bodies, etc.). Each of these groups represents a kind of limiting factor for other groups. Therefore, the organization should take account standpoint of all groups

whose interests should be represented. Organization at different times may have different goals.

### ***The role of financial analyst and its financial intelligence in the management process***

In the process of planning financial analyst helps in formulating future plans by providing information for decision-making: what products to sell, the market will be sold and at what price will sell. He is also responsible for providing permanent data on operations in prior periods that can be extremely important for the direction of future operations.

Financial analysts are organized in a way that could help in the process of control. This process is provided by the preparation of information about the performed comparisons between actual and projected results of the centers of responsibility for a certain period of time. Through these reports, the manager realistically recognizes situation and its action is of greater intensity.

Management by applying the method, frees managers from unnecessary concern for those things that are otherwise not in accordance with the plans. On the other hand, the top management shall be made clear locating specific operations that are not carried out as planned.

In the process of organizing the direction of work, managers have permanent needs for financial information in the routine running of daily operations, in order to ensure efficient operation.

### ***Factors affecting the financial condition of the organization and subject to recognition by the financial intelligence***

The financial condition of the organization affects economic factors necessary to successfully control, financial structure, financial liquidity, solvency and ability of the organization to adapt to changes in the economic environment in which it works. Information about the economic resources controlled by the organization and their former abilities of adjustment of these resources are useful in the prediction capabilities of the organization and creating cash equivalents or cash in the future.

Information about financial structure is useful in predicting future borrowing needs and how future profits and cash flows will allocate those taking part in the organization. They also are useful in the forecast of the possible success of the organization in obtaining future funding. Information about liquidity and solvency is useful in predicting the ability of the organization to meet its financial obligations as they fall due. Liquidity refers to the available amount of cash in future periods, taking into account the financial obligations in the current period.

Information on the success of the organization, in particular its profitability, is required due to the assessment of potential changes in the economic resources that the organization is likely to control in the future. The important information on the different types of performance. Information about performance is useful in predicting the ability of the organization to generate cash flows from its existing resources. These data are also useful in assessing the effectiveness with which the organization could hire additional resources.



Information relating to changes in the financial condition of the organization are useful in assessing the investment, financial and business activities in the reporting period. This information is useful because it allows the user to assess the organization's ability to generate cash or equivalent of cash, as well as useful to use those cash flows.

Information on the financial situation is first perceived in the balance sheet. Information on the success can be seen through the income statement, and information about changes to the financial situation can be seen through a special financial report.

The parts of the financial statements are in mutual relationship, because reflect different aspects of the same transactions or other events transactivated. While every report provides information that is different from the others, none of them serves only a single purpose, nor provided any information about specific needs.

Besides basic statements, balance sheet items may contain additional reporting elements containing images of the risks and uncertainties affecting the organization or any resources and obligations not recognized in the balance sheet. Information on segments of activities and geographical segments, as well as the effects of price changes on the organization can also be given in the form of additional information.

## **5. FINANCIAL INTELIGENCE AND UNDERLYING ASSUMPTIONS OF FINANCIAL STATEMENTS**

To achieve their objectives, financial statements are compiled based on accounting principles of the actual occurrence of the business event. Accordingly, the performance measurement of financial transactions and other events are recognized when they actually occur, recording in the books and participating in the financial statements for the period to which they relate. The financial statements compiled on the basis of the accounting principle of occurrence of a business event, inform users not only of past transactions involving the payment and receipt of money, but also for future liabilities to be settled, regardless of method of payment. Accordingly, financial statements provide information about past transactions and other events najcelishodni to users in making economic decisions.

Financial reports are compiled under the assumption that the organization continuously works in the specified time period. Therefore, it is assumed that the organization does not intend to go into the process of liquidation or substantially reduce the scale of its operations. If that intention is, then, the financial statements should be placed on other grounds published.

Knowledge in finance is knowledge of using the limited data in order to arrive at the most accurate description of the financial position of the company. Accounting and finance are not reality. They reflect the reality that while precision reflection depends on the ability of financial specialists to define reasonable assumptions and calculate reasonable estimates.

## **6. CONCLUSION**

Financial intelgence not an innate ability that man has either gone. It is a set of skills that can and must learn. We have presented financial intelligence in terms of information. Related information represent a basic assumption on which is based decision-making.

In order company to successfully perform their job requires managers and other employees have the appropriate level of financial intelligence. That means they need to be manipulated before to understand financial information, we have a simplified way we presented our work in this.

As mentioned, not every time to trust the numbers. It must bear in mind the reality in terms of possible misuse or misrepresentation of financial results with various types of custom adjustments.

Financial intelligence brings a certain amount of excitement, new ideas concerning about finances and open opportunities for their explanation. Financial intelligence enables a complete paradigm for understanding the real situation, ie, financial organization and functioning of economic systems.

## REFERENCES

1. Karen Berman, John case, Financial Intelligence, 2006, Harvard Business School, Boston, pg. (5-23)
2. Marijan Stevanovski, Kristina Stevanovska, Financial Management, 2011, MIT University Skopje, pg. (200-210)
3. John Ekberg, Cincinnati Enquirer, Real Financial Intelligence, 2010, Sterling Ross Publishers, New York
4. Marijan Stevanovski, Management Information System, 2015, Virtual-M.

## THE ROLE AND IMPORTANCE OF BUSSINESS COMUNNICATIONS ON COMPANY'S IMAGE BUILDING

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**Abstract:** Globalization of world economy and its flows, demands for human beings to be informed about all the things that are happening in their surroundings. Some of the vital functions of the modern doing business are business communications, that have developed rapidly and became very important. Today it is not possible to imagine one successful company doing a certain business and not containing a sector which will be handling business communications whose one of the most important tasks is building trust in company and its work. Company's success like its image in today's world is determined by business communications. This point of view implicates that companies have to build a good communication in all the aspects of its public. Although globalization has caused many changes in organization, some researches show that employees with whom a good communication is established, are more identified with the organization they work in and that they are prepared to invest more effort in order to make its work better and more advanced.

**Keywords:** business communications / globalization / consumers loyalty

### 1. UVOD

Kada je reč o izgradnji imidža kompanije, neizostavni element koji u današnjoj hiperkonkurentnoj privredi igra vrlo važnu ulogu, kako na internom nivou organizacije, tako i na eksternom su poslovne komunikacije. Njihov značaj se ogleda u činjenici da će organizacije upravo putem njih primarno uticati na ostvarenje korporativnih ciljeva, a potom ne manje važno na kreiranje određene uloge koju će ona imati u okruženju u kojem obavlja određenu delatnost. Ovo ukazuje da one imaju vrlo važan kako komunikacijski, tako i organizacijski element, koji determiniše da li će organizacija biti uspešna ili ne. Pod uticajem globalizacije i povećane konkurencije, kao i sve intenzivnijeg razvoja informacionih tehnologija, način komunikacije i ciljevi koji se tom prilikom žele ostvariti su se izmenili i dobili nova odličja. Organizacije koje žele da ostvare tržišni uspeh i dalju tržišnu egzistenciju, moraju da ulažu ogromne napore da upravo element komunikacije ne izostane. Ova činjenica je naročito važna, jer ukoliko se određene poruke ne iskomuniciraju na adekvatan, odnosno ispravan način, to će u velikoj meri uticati na slanje pogrešne slike okruženju o samoj ustanovi, dok će sa druge strane navesti zaposlene da se fokusiraju na ciljeve koji neće biti toliko važni za samu organizaciju. Upravo iz ovih razloga, je vrlo bitno da se komunikacija odvija dvosmerno na internom i na eksternom nivou.

Organizacija će putem povratne sprege tj. informacija koje će dobiti od svojih klijenata biti u mogućnosti da izvrši eventualne modifikacije svoje ponude i na taj način doprinese povećanju kvaliteta svojih proizvoda i usluga. U slučaju zaposlenih, biće u

mogućnosti da identifikuje potencijalne negativne devijacije koje bi dugoročno mogle da naruše ključni aspekt ekonomičnosti, a uzročno posledično i profitabilnosti.

Na samom početku ovog rada biće istaknuta kratka istorija razvoja i etabliranja nauke o komunikacijama kao i njihovom značaju za samu kompaniju.

## **2. RAZVOJ KOMUNIKOLOGIJE KAO NAUČNE DISCIPLINE**

Naziv „komunikologija“ nema dug vek upotrebe. U naš jezik ovaj izraz je ušao postepeno i tek u poslednjoj deceniji. Slično bi se moglo reći i za druge jezike, jer se u njima naziv komunikologija susreće sporadično, a takođe ima mnogo zamena ili sintagmi koje bi mogle da ponesu isto značenje. U svakom slučaju, komunikologija se konstituisala prvo u SAD i anglosaksonskom govornom području, odakle se postupno širila knjigama, davanjem stipendija studentima humanističkih nauka, jačanjem odgovarajućih departmana na univerzitetima i stvaranjem profilisanih međunarodnih organizacija. Jugoslavija je bila među prvim zemljama učesnicama ovog trenda na istoku Evrope. [1]

Komunikologija je relativno mlada interdisciplinarna nauka, u kojoj od biologije, informatike, preko ekonomije, prava, žurnalistike, politikologije i umetnosti veoma važno mesto zauzimaju lingvistika i psihologija. Svaka od tih nauka, sa svojom specifičnom metodom i populacijom, doprinosi modernim komunikološkim saznanjima. [2]

Obzirom na važnost komunikacije i težine koju efektivno prenošenje poruka zaposlenima ima u svrhu njihovog organizovanja, poslovne komunikacije u današnje vreme igraju krucijalnu ulogu kada je u pitanju raspodela zadataka i njihovo efikasno obavljanje.

## **3. KOMUNIKACIJA SA INTERNOM JAVNOŠĆU**

Ako se pod komunikacijom podrazumeva sistem stvaranja, prenošenja i korišćenja relevantnih informacija na kojima se zasnivaju svi kontakti pa i poslovni, svi odnosi i ponašanja, pa i, te sve društvene pojave, onda su komunikacije osnovni instrument organizacije i upravljanja informatičkim tokovima, na kojima se zasniva opstanak. Poslovanje predstavlja zaokružen sistem ljudskih aktivnosti, a ljudska aktivnost je svesna svrsishodna, unapred planirana, kod koje se zna zašto se radi, kada, kako i s kim. Za sve to osnovni preduslov su informacije, koje predstavljaju osnovni element čovekove osobine kakva je svest. Pored ostalog, čovek informacije stvara, prenosi i koristi na poseban način, što ga čini ljudskim bićem. [3]

Pošto provere i izaberu kandidata, menadžeri imaju zadatak da ih obuče da obavljaju svoje nove poslove. Usmeravanje zaposlenih podrazumeva da se zaposlenima pruže osnovni podaci koji su im potrebni da bi mogla da obavlja posao na zadovoljavajući način, kao što su pravila kompanije. Usmeravanje je jedna od komponenata socijalizacije novozaposlenih koju sprovodi poslodavac. Socijalizacija je neprekidan proces čiji je cilj da se svim zaposlenima usade stavovi, standardi, vrednosti i obrasci ponašanja koje organizacija i njena odeljenja očekuju. Programi usmeravanja sežu od kratkog neformalnog uvođenja u posao do formalnih programa koji traju pola dana, a nekada i više. U oba slučaja, novozaposleni obično dobijaju odštampani ili virtuelni priručnik koji obuhvata pitanja kao što su vreme, analiza učinka, isplata nadoknada i godišnji odmori, a dobijaju i vodič kroz objekte kompanije. Tu se takođe mogu naći obaveštenja o beneficijama zaposlenih, personalnim politikama, dnevnim

zadacima zaposlenih, organizaciji i poslovima kompanije, kao i o bezbednosnim merama i propisima. [4]

Shodno vrsti posla koju zaposleni obavljaju u organizaciji, oni se mogu klasifikovati na sektore kao što su računovodstvo, marketing, finansije, odnosi sa javnošću i dr.

Svaki od pojedinačnih sektora u kompaniji će uticati na stvaranje korporativnog identiteta i imidža koji će kompanija tokom vremena svog poslovanja izgraditi i steći.

#### 4. KOMUNIKACIJA SA EKSTERNOM JVNOŠĆU

Svaka poslovna komunikacija ne odnosi se samo na specifični događaj ili poruku, već se uvek dešava i komunikacija imidža organizacije sa javnošću. U radu sa spoljnim zainteresovanim stranama menadžer mora da razmišlja o proizvodu ili uslugama koje nudi, ali i o vrstama imidža koje njegova organizacija ugrađuje u poruke oglašavanja. To znači da oglašavanje ima dve paralelne radnje u sebi:

1. „nešto čini“ (promoviše proizvod ili uslugu)
2. „nešto govori“ (predstavlja imidž organizacije) [5]

Odavde se može izvesti zaključak da je glavna funkcija poslovnih komunikacija koje se odnose na eksterne činioce izgradnja dobrog imidža i posledično izgradnja konkurentskih prednosti organizacije. Sticanjem pozitivnog ugleda i reputacije, kompanija će obezbediti dugoročnu tržišnu egzistenciju. Dok sa druge strane, ukoliko kompanija podbaci da kreira dobar imidž u neposrednom okruženju, biće suočena sa gubitkom redovnih i potencijalnih kupaca.

U nastojanjima preduzeća da se izbore za što veće učešće na tržištu i da povećaju prodaju svojih proizvoda, odnosi sa potrošačima postaju predmet delatnosti odnosa sa javnošću. Delatnosti su najčešće usmerene na unapređenje komuniciranja sa potrošačima kako bi se dočarala namera preduzeća da se interesuje da li su potrošači zadovoljni ili ne. Komunikacija mora da bude dvosmerna. To znači da proizvođač mora da se upozna sa potrebama, stavovima i zahtevima postojećih i potencijalnih potrošača. Poznavanje mišljenja i stavova potrošača, direktno utiče na kreiranje proizvodnog programa preduzeća. Sa druge strane, dvosmerna komunikacija znači da potrošače treba redovno informisati o svim novostima i dostignućima u proizvodnom programu preduzeća, kao i o planovima za naredni period. [6]

Potrošačima je neophodno konstanto ukazivati na spremnost kompanije da usliši njihove zahteve i želje. Ovo će biti opravdano ukoliko se kompanija fokusira na neprestano poboljšanje kvaliteta, kao i ostalih aspekata identifikovanih kao ključnih kod ciljane grupe potrošača.

Svoje ciljeve po pitanju poboljšanja odnosa sa potrošačima kompanija će ostvariti upravo na ovakav način. Kompanija će na taj način poboljšati ličnu percepciju kod potrošača, izgraditi kredibilitet i svakako steći ili obezbediti još veće poverenje javnosti u nju.

## 5. UTICAJ INFORMACIONIH TEHOLOGIJA NA POSLOVNE KOMUNIKACIJE

Ekonomski razvijene zemlje napredak postižu zahvaljajući ubrzanom razvoju tehnologija. [7]

Informatičko razdoblje u kome potrošači danas žive omogućava im dvadesetčetvoročasovni pristup kompanijama, što uzrokuje promene u njihovom ponašanju. Potrošači se sada ohrabruju da učestvuju u aktivnom dijalogu sa kompanijom. [8]

Informatička revolucija je u velikoj meri uticala na promenu načina i vida komunikacije. Ona je izrodila nove kanale komunikacije, koje uspešne, globalne kompanije moraju svakodnevno da koriste i unapređuju načine njihove upotrebe kako bi doprle do potencijalnih konzumenata njenih proizvoda. Kompanije koje prihvate ovaj sistem i način komunikacije će u krajnjoj instanci biti umogućnosti da ga iskoriste kao jedan od vidova izgradnje konkurentskih prednosti.

Internet predstavlja najnoviji i najdimačnije razvijani elektronski medij marketinga, koji ima lako uočljive osobenosti koje ga odvajaju od klasičnih medija. [9]

Preduzetnici su uzeli koristi Interneta da stvore nove usluge koje mogu distribuirati kroz elektronske kanale koji su povezani sa kompjuterima u kućama ili kancelarijalama potrošača. Globalna kompjuterska mreža oličena u Internetu danas je jedna od najbrže rastućih kompjuterskih aplikacija. Mreža je izgrađena od hiljada servera u celom svetu, koji su povezani telefonskim linijama, satelitima i drugim komunikacionim uslugama. [10]

Internet je postao efektivno sredstvo za sve, počev od dobijanja besplatnih informacija i smernica o izvozu, pa do dobavljanja istraživanja tržišta i ponude sigurnog procesa naručivanja i plaćanja proizvoda onim kupcima koji su udaljeni i po nekoliko vremenskih zona. [11]

Kako su ljudi počeli da provode sve više vremena koristeći Internet, kompanije su to identifikovale kao jednu od ključnih društvenih promena prouzrokovanih informatičkom revolucijom i priklonile se tom trendu. Najveći broj globalnih kompanija je danas prisutan na društvenim mrežama koje predstavljaju ključan segment kada je u pitanju interakcija, ali i komunikacija potrošača sa kompanijom. Ovakvo stanovište je u najvećoj meri determinisano ljudskom potrebom za pripadnošću određenoj grupi. Želja za interpersonalnoj privrženosti je fundamentalna ljudska potreba. Organizacije koje pravovremeno identifikuju svoje ciljane potrošače, kao i potrebe koje će oni pokazati, će biti u mogućnosti da iskomuniciraju određene vrednosti karakteristične za datu grupaciju. Pored mnogobrojnih pogodnosti, koje organizacija može da ima koristeći društvene mreže, kao vid komunikacije sa svojim ciljnim auditorijumom, takođe mora da vodi dosta računa o potencijalnim rizicima koji bi mogli da nastanu upotrebom istih.

Pored prisutnosti na društvenim mrežama, za kompanije je takođe naročito važno da poseduju web sajt. Ukoliko organizacija poseduje web sajt, veoma je važno da on bude uređen na način koji će biti orijentisan da pruži potencijalnim kupcima jednostavno iskustvo upotrebe, kao i laku dostupnost informacijama o proizvodima i uslugama kompanije. Putem sajta se takođe može ostvariti kvalitetna komunikacija sa potrošačima formiranjem online platformi u vidu pričaonica na kojima će korisnici proizvoda i usluga steći ali i podeliti informacije o iskustvu upotrebe proizvoda ili usluga dobijenih od strane organizacije. Kompanijama kojima su želje potrošača imperativ i koje teže konstatnom unapređenju svoje ponude, će ove informacije iskoristi u svrhu poboljšanja sopstvene ponude. Web sajtove je neophodno konstantno nadgledati, kako bi se provovremeno mogle uočiti nepravilnosti vezane za funkcionisanje istog.

## 6. ZAKLJUČAK

U skladu sa analizom date problematike u ovom radu, dolazimo do zaključka da su kvalitetne poslovne komunikacije od presudnog značaja za organizaciju koja želi da osigura dugoročnu tržišnu egzistenciju. Održavanje kvalitetne komunikacije u internom okruženju je podjednako važno, kao i komunikacija koja će se odvijati na relaciji između kompanije i potrošača. Oba slučaja će u krajnjoj instanci uticati na pozitivan ili negativan ishod, kada je reč o kreiranju identiteta organizacije, kao i kreiranja imidža.

Uspeh će osigurati samo one kompanije koje uspeju da ostvare pozitivan rezultat u oba slučaja, odnosno da iskomuniciraju dobre poruke i informacije svojim zaposlenima, a potom i potrošačima.

Razvitkom informacionih tehnologija i povećane upotrebe Interneta kao jednog od glavnih media za komunikaciju između potrošača i kompanije, veoma je važno da se kompanije fokusiraju i na ovaj komunikacioni kanal.

Usled svepristupnosti informacija kako o kompanijama, tako i o različitim ponudama, veoma je važno vršiti konstantan monitoring promena ponašanja potrošača. Ove promene će najefikasnije moći da isprate upravo one organizacije koje se fokusiraju na upotrebu Interneta, kao i informacija koje će dobiti od potrošača tom prilikom.

## 7. LITERATURA

1. Radojković M., Đorđević T., Basics of Communicology (Osnove komunikologije), Fakultet političkih nauka, Belgrade, 2005.
2. Mandić T., Communicology (Komunikologija), Tijana Mandić, Belgrade, 1995.
3. Videnov A., Management of Promotion (Menadžment promocije), Beogradska poslovna škola visoka škola strukovnih studija, Belgrade, 2009.
4. Desler G., Basics of Human Resources Management (Osnovi menadžmenta ljudskih resursa), Data Status, Belgrade, 2007.
5. Pavić Ž., Ethics and Business Communicatinos (Etika i poslovne komunikacije), University Singidunum, Belgrade, 2011.
6. Bazić M., Bazić A., Contemporary Public Relations (Savremeni odnosi s javnošću), Naučna KMD, Belgrade, 2010.
7. Milunović M., Bajac M., Proceedings of XIII International Symposium of Knowledge Era Education for Management, 25.09., Sremski Karlovci, Serbia, 2015, 106 – 109.
8. Gilbert M., Goller A., Consumer empowerment via the Web, in Knowledge Management Case Book, in (Davenport T., Probst G.), John Willey & Sons, New York, 2000, 231.
9. Rakita B., International Marketing (Međunarodni marketing), Ekonomski fakultet, Belgrade, 2005.
10. Ljubojević Č., Ćirić M., Marketing service (Marketing usluga), Fakultet za ekonomiju i inženjerski menadžment, Novi Sad, 2017.

11. Kotler Ph., Keller K.L., Marketing Management (Marketing menadžment), Data Status, Belgrade, 2006.
12. Gidens E., Sociology (Sociologija), Ekonomski fakultet, Belgrade, 2007.
13. Poter Dž., Medijska pismenost, Clio, Beograd, 2008.



## GLOBAL MARKETING RESEARCH ON EXAMPLE OF PHARMACEUTICAL INDUSTRY

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**Abstract:** Marketing represents commonly present phenomenon with which we constantly come across in formal and informal manner. Global marketing research represents the result of careful planning and realization of every company present on the global market. While developing marketing plan of global marketing research it is necessary for organization to make series of decisions which will greatly determine doing further business. Organizations which work on global scale and want to secure long term market existence are required to apply researching marketing approach with accent on permanent perfection of its products in order to satisfy consumer needs which are constantly changing. Pharmaceutical industry is not the only one which has to adapt to new consumer needs. Results of marketers research are information. Information which they will then get primarily have to be opportune and correct, because companies through them exactly in the best manner meet with consumers needs and demands. Due to faster communication, transport and great amount of information which consumers can easily find on the Internet, marketers constantly need to monitor changes in surroundings it is very important that knowledge about certain market segment be exact, so they could interpret it in quality way, on the basis of which will make decisions important for organizations' further market survival.

**Keywords:** global marketing / marketing research / pharmaceutical industry

### 1. UVOD

U današnjim uslovima poslovanja, kvalitetno formulisan marketing program, predstavlja jednu od ključnih komponenti tržišnog uspeha ili neuspeha organizacije. Kroz adekvatno formulisane marketing programe organizacije u velikoj meri utiču na našu svakodnevnicu, što se manifestuje kroz informacije do kojih dolazimo, Internet stranice koje posećujemo i medikamente koje po potrebi konzumiramo. Marketinške metode i tehnike koje marketari primenjuju zahtevaju permanento praćenje i prilagođavanje novonastalim promenama i načinima poslovanja kojima, organizacije ukoliko žele da osiguraju dugoročnu tržišnu egzistenciju i uspeh, moraju da se prilagode. Ovakvo stanovište i sama funkcija marketinga je determinisana samom srži njegovog postojanja, a to je zadovoljenje interesa i potreba potrošača uz ostvarenje profita.

Marketinški pristup je postepeno postao kamen temeljac poslovanja, ali i načina razmišljanja velikog broja farmaceutskih kompanija. Praćenje svetskih trendova i prilagođavanje promenama nastalih u industriji zdravlja, predstavlja organizacijski preduslov za ostvarenje uspostavljenih ciljeva. Otuda se sa punom sigurnošću može reći da marketing u farmaceutskoj industriji predstavlja propulzivan element vrlo specifične privredne grane, industrije zdravlja, koja kao i sve ostale industrijske grane nije ostala imuna na nova saznanja iz mnogobrojnih oblasti, koje su sa njome povezane direktno i indirektno. Iteracijom stečenih

znanja, bez adekvatne strategije daljeg istraživanja i razvoja, farmaceutske kompanije neće biti uspešne na globalnom nivou. Uspeh će osigurati isključivo one kompanije koje će vršiti konstantan monitoring zahteva potrošača, razumevanjem njihovih potreba, kao i neprekidne realizacije globalnog istraživanja tržišta kroz koje će pravovremeno identifikovati želje potrošača i eventualno otkriti latentne još nedefinisane potrošačke zahteve.

Na samom početku rada biće istaknuti uloga i značaj marketinga u farmaceutskoj industriji.

## **2. ULOGA I ZNAČAJ MARKETINGA U FARMACEUTSKOJ INDUSTRIJI**

Farmaceutska industrija je grana industrije koja se bavi proizvodnjom farmaceutskih preparata, lekova i drugih proizvoda koji se koriste u medicinske svrhe. Farmaceutska industrija se definiše i kao grupacija preduzeća koje se bave istraživanjem, razvojem, proizvodnjom i prodajom medicinskih proizvoda za humanu i veterinarsku upotrebu. [1]

Finansijski uspeh često zavisi od marketing sposobnosti. Finansije, proizvodnja, računovodstvo i druge poslovne funkcije nemaju smisla ukoliko tražnja za proizvodima i uslugama nije dovoljna za ostvarivanje profita u organizaciji. U tome mora da postoji jasna hijerarhija. Organizacije svih vrsta od proizvođača robe široke potrošnje do onih koji se bave zdravstvenim osiguranjem, od neprofitnih organizacija do proizvođača proizvodnih dobara svoja dostignuća u marketingu ističu u svojim štampanim materijalima i na svojim web sajtovima. [2]

Farmaceutska industrija u osnovi ostvaruje svoju aktivnost u okvirima privrede i okruženja u kome posluje sa odlikama delatnosti od posebnog društvenog interesa, jer predstavlja logističku podršku snabdevanju zdravstvenog sistema lekovima, medicinskim sredstvima i sličnim proizvodima od značaja za zdravlje. Ona ima niz specifičnosti koje je izdvajaju kao npr: visoki zahtevi u IR diktirani tržištem, stroga i specifična regulativa u domenu do i postmarketinga, izuzetno visoki zahtevi za proizvodnju (*High - tech*) i dr. U oblasti veleprometa i distribucije lekova prepliću se interesi širokog slobodnog tržišta (privredna profitna delatnost) sa odlikama posebnosti društvenog značaja (javno zdravstvo). Upravo zbog obeveze ispunjavanja svojih profesionalnih zadataka u oblastima proizvodnje i oblastima usluga farmaceutskeg biznisa, farmaceuti treba da imaju sveobuhvatni pristup poslovnim procesima i sistemima, te da ovladaju menadžment znanjem i veštinama. [3]

Kada se govori o marketing koncepciji, ne može se zaobići Levit koji je istakao važnost saznanja preduzeća da je njihova delatnost proces zadovoljenja potrošača, a ne process proizvodnje proizvoda. [4] Preduzeće treba što pre da se prilagodi zahtevima tržišta. On smatra da preduzeće treba da nauči da o sebi ne misli kao o prodavcu roba i usluga, već kao o kupcu potrošača. Da radi tako da ljudi žele da sklapaju ugovor sa njime. [5]

## **3. CRM U FARMACEUTSKOJ INDUSTRIJI**

Promenjeni uslovi poslovanja u novoj ekonomiji koju karakteriše rast značaja uslužnog sektora, s jedne strane, i savremene informacione tehnologije, s druge, doveli su do razvoja upravljanja odnosima sa klijentima (*eng. customer relationship management - CRM*) kao novog pristupa u menadžmentu. [6]

U današnje vreme usluge su oličenje gotovo svih proizvoda ekonomije, bez obzira da li su oni ponuđeni za potrebe proizvođača, ili za potrebe krajnjeg potrošača. Uslužne aktivnosti su sadržane u svakom procesu ekonomske promene, bilo da je u pitanju restrukturiranje, rast ili opadanje, na lokalnom, regionalnom, nacionalnom ili internacionalnom nivou. [7]

Živimo u doba usluge – najnoviji trendovi pokazuju da većina ljudi radi upravo u oblastima uslužnih delatnosti. Takođe, neprestano stičemo iskustva nekoga ko koristi usluge i svi smo u situaciji da procenjujemo šta znači dobra, a šta loša usluga. Ukoliko želite da postignete najbolje rezultate, potrebno je da se što je moguće više usredsredite na najvredniju imovinu današnjice – kupca. Razvoj veština za uspostavljanje što bolje saradnje sa kupcima, efektivno planiranje ispunjavanja zahteva kupaca i ispunjavanje kupčevih želja i očekivanja, stavlja kupca na prvo mesto. Detaljno razumevanje kupaca je od suštinske važnosti ukoliko želite da ih dobro uslužite. Identifikovanje i učenje o vašim najboljim kupcima pomaže vam da na najbolji mogući način ispunite njihove potrebe. Današnji kupci očekuju pre svega uslugu prve klase – i više od toga. Ne bude li tako biće razočarani. Kupac ne samo da će vas procenjivati sa stanovišta koliko dobro se vi prema njemu ophodite u odnosu na istu vrstu usluge koju može dobiti i od konkurencije, već vas procenjuje i sa stanovišta da li ispunjavate data obećanja, sa stanovišta za njih prihvatljivih standarda. [8]

Svi marketinški naponi koji se ulažu u brend treba da angažuju kupca. To znači da sve marketinške aktivnosti moraju da podupiru vrednost brenda i da doprinesu jačanju brenda, odnosno stepenu do kojeg se brend ocenjuje kao sposoban da odgovori na očekivanja kupaca. [9]

#### **4. ZNAČAJ SPROVOĐENJA GLOBALNOG MARKETING ISTRAŽIVANJA**

Međunarodni menadžment predstavlja sposobnost držanja inicijative, kreiranja perspektivnih međunarodnih biznis planova, definisanja strategijskih pravaca realizacije pozitivnih promena, planskog i strategijskog pozicioniranja, organizovanja i kontrole materijalnih i ljudskih potencijala, kako bi se obezbedila uspešna internacionalizacija poslovnih aktivnosti. Uvažavanje međunarodnih standarda poslovnog i organizacionog ponašanja, ispoljavanje međunarodne vizije i afirmacije logike racionalnog odlučivanja se danas nameću kao imperitive. [10]

Osnovne strategijske odluke koje treba doneti u međunarodnom marketingu jesu: procena međunarodne marketing okoline, odlučivanje da li izvoziti, odlučivanje na kojim tržištima nastupiti, odlučivanje o marketing programu, odlučivanje o marketing organizaciji. [11]

Bez dobrog poznavanja međunarodnog okruženja i adekvatnih tržišnih informacija teško je očekivati da strategijske odluke u međunarodnom marketingu budu racionalne i pouzdane. Poznavanje tržišta se javlja kao preduslov uspešnog marketinga, te otuda i pravilnog tržišnog usmeravanja međunarodnih marketing aktivnosti. Konceptijski posmatrano, osnovna svrha tržišnog istraživanja i marketing – informacija je ista i u nacionalnom i u međunarodnom marketingu. Tržišno znanje, zasnovano na pouzdanim informacijama, u međunarodnom marketingu nije manjeg značaja u odnosu na nacionalni marketing. Pre bi se moglo reći obrnuto. Međunarodno orijentisan marketar je suočen sa dvojakim problemom prilikom obezbeđivanja neophodnih informacija za donošenje međunarodnih marketing odluka. Na jednoj strani nailazi na razvijene zemlje koje raspolažu

obiljem informacija, čiji obim prevazilazi sposobnost bilo koje organizacije ili preduzeća da ih potpuno apsorbuje i iskoristi. Na drugoj strani, nailazi na tržišta nerazvijenih i zemalja u razvoju, u kojima se suočava sa nedostatkom mnogih informacija, sa njihovom nepotpunošću ili nepouzdanošću. [12] Za potrebe planiranja mogu se primenjivati različiti pristupi, metode i tehnike kojima se istražuju i analiziraju stanja, pojave i kretanja što omogućuje managerima da objektivnije sagledaju sadašnju situaciju i ispravno procjene buduća kretanja. Pri tome treba voditi računa da su razlike u pristupu pri izradi marketinških planova za domaća i strana tržišta bitne. [13]

## 5. ZAKLJUČAK

U skladu sa analizom date problematike u ovom radu, dolazimo do zaključka da je značaj globalnog marketing istraživanja, kao i održavanja čvrstih odnosa sa klijentima od velikog značaja za organizaciju.

Konstantnim monitoringom promenljivih zahteva i želja nametnutih od strane potrošača, farmaceutske kompanije će jedino u tom slučaju uspeti da obezbede globalni uspeh i da se pozicioniraju na željeno mesto. Iako specifična privredna grana, kompanije iz domena farmaceutke industrije nikako ne smeju da pokleknju kada je reč o satisfakciji potrošača, kao i o permanentnom nadgledanju novonastalih globalnih trendova i potreba.

Održavanjem i izgradnjom kvalitetnih odnosa sa klijentima, farmaceutske kompanije će obezbediti dugoročan rast i razvoj. Usvajanjem CRM koncepta i prioritizacijom potreba i želja kupaca, farmaceutske kompanije ulažu ogromne napore da poboljšaju kvalitet isporuke uslužnog i fizičkog proizvoda. Apsorpcijom stečenih znanja i njihovom implementacijom u poslovni proces, ostvariće vrhunske poslovne performanse, na zajedničku korist i kompanije i konzumenata njenih dobara.

Realizacijom marketing istraživanja, kako na nacionalnom, tako i na globalnom nivou, farmaceutske kompanije će biti u mogućnosti da isprate novonastale trendove iz oblasti industrije zdravlja i istupe na tržište sa savremenijom i savršenijom ponudom medikamenata. Neprestanom realizacijom globalnog marketing istraživanja uočiće eventualne latentne zahteve potrošača i na bazi toga će potencijalno moći da dopune sopstveni proizvodni portfolio i generišu veće profite.

## 6. LITERATURA

1. Spilker B., *Multinational Pharmaceuticals Companies, Principles and Practices*, Raven Press, New York, 1994.
2. Kotler Ph., Keller K.L., *Marketing Management (Marketing menadžment)*, Data Status, Belgrade, 2006.
3. Tasić Lj., *Pharmaceutical Management and Marketing (Farmaceutski menadžment i marketing)*, Nauka, Belgrade, 2002.
4. Novaković Rajičić B., *Marketing, Privredna akademija*, Novi Sad, 2008.
5. Levitt, Theodore. "Marketing myopia." *Harvard business review* 38.4 (1960): 24-47.

6. Ćirić M., CRM in Banking Institutions (Upravljanje odnosima sa klijentima u bankama), Fakultet za ekonomiju i inženjerski menadžment, Novi Sad, 2013.
7. Ljubojević Č., Ćirić M., Marketing Service (Marketing usluga), Fakultet za ekonomiju i inženjerski menadžment, Novi Sad, 2017.
8. Horvat Z., Bulat I., Proceedings of IV Marketing in Pharmacy Symposium of Business Advantage in Pharmaceutical Sector, Belgrade, Serbia, 2011, 38 – 44.
9. Solomun M., Proceedings of IV Marketing in Pharmacy Symposium of Business Advantage in Pharmaceutical Sector, Belgrade, Serbia, 2011, 44 – 48.
10. Rakita B., International Management (Međunarodni menadžment), Ekonomski fakultet, Belgrade, 2003.
11. Đorđević M., International Marketing (Međunarodni marketing), Ekonomski fakultet, Kragujevac, 2005.
12. Rakita B., International Marketing (Međunarodni marketing), Ekonomski fakultet, Belgrade, 2005.
13. Previšić J., Ozretić Došen Đ., Basics of International Marketing (Osnove međunarodnog marketinga), Masmedia. Zagreb, 2000.

## THEORETICAL AND METHODOLOGICAL APPROACHES IN STUDYING INTELLECTUAL CAPITAL

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**Abstract:** Due to the extremely strong competition that exists in all markets and in all business sectors, as well as a high degree of technological innovations originating from easily accessible information available to all interested companies, it's very difficult to take and maintain a good market position. Therefore, the knowledge in today's business conditions is particularly highlighted as the most important resource of the company, the holder of all the intangible components of business and the basis for the creation of competitive advantage. The higher the intellectual capital of a company is, the greater is its ability to create superior value compared to the competition. The aim of this work is the integration of current knowledge and theoretical perceptions of the phenomenon of intellectual capital, and to make an attempt in terms of setting the guidelines for further research and measurement of intangible assets of the company, as well as exploring the impact of intellectual capital on the business performance of the company.

**Keywords:** Intellectual capital, knowledge, intellectual capital measurement, company performance, competitive advantage

### 1. UVOD

Pojam intelektualnog kapitala sve više dobija na značaju s obzirom na to da materijalna imovina (zemlja, zgrade, oprema, novac) vodećih svetskih kompanija ima manju vrednost nego nematerijalna (neopipljiva) imovina koja nije navedena u njihovim poslovnim bilansima. Teorija intelektualnog kapitala je primer novije teorije koja uveliko objašnjava načine povećanja poslovnih rezultata u budućnosti. Sama teorija polazi od premise da se bogatstvo nekog proizvodnog sistema temelji na ljudskom kapitalu, strukturnom kapitalu i potrošačkom kapitalu.

Znanje je postalo vrednije nego ikada pre u istoriji razvoja proizvodnih organizacija. Znanje je ono što stvara vrednost, ali isto tako i novo znanje. Zaposleni koji konstantno razvijaju nove ideje, stvaraju vrednost i inoviraju poslovanje preduzeća postaju ključni resurs nove ekonomije u kojoj je fizička snaga od sekundarnog značaja.

Vrednost intelektualnog kapitala, kao i njegova korist u budućnosti, od velike je važnosti za organizaciju, njeno vrednovanje, svakodnevno poslovanje, uz uticaj na poslovne odluke koje donose menadžeri.

Kako sa aspekta razvoja, tako i s aspekta upravljanja neopipljivim potencijalima, od velikog su značaja gore pomenuti pokazatelji, što se dalje odražava na poslovanje organizacije u celini. Uočljivo je da su neki metodi bazirani na kvalitativnim veličinama, a drugi su zasnovani na novčanim jedinicama (oni su orijentisani ka eksternim stejkholderima). Težište

ovog rada je upravo na analizi teorijsko-metodoloških pristupa u proučavanju intelektualnog kapitala.

## 2. POJAMI I DEFINISANJE INTELEKTUALNOG KAPITALA

Ekonomski razvoj je oduvek bio bitno determinisan naučno-tehnološkim razvojem. Za vreme prve naučno-tehnološke revolucije, čovek/radnik je bio glavni pokretač promene, a za proizvodnju je bilo važno iskustvo. Za vreme druge naučno-tehnološke revolucije, iskustvo je zamenjeno znanjem. U periodu treće naučno-tehnološke revolucije, za razvoj je ključna nauka. Ona je predvodnička, jer se napredak postiže na temelju rezultata naučnih istraživanja.

Dostignuća treće tehnološke revolucije, to jest inovacije na području informaciono-komunikacionih i proizvodnih tehnologija te prirodnih nauka, omogućile su i ubrzale razvoj globalizacije i prelaz iz tradicionalne ekonomije u „novu ekonomiju” ili „ekonomiju znanja”. Klasični činioći proizvodnje – zemlja, rad i kapital – više ne predstavljaju ključne ekonomske resurse već to mesto pripada znanju, odnosno intelektualnom kapitalu [1].

### 2.1. ISTORIJSKI RAZVOJ TEORIJE INTELEKTUALNOG KAPITALA

Intelektualni kapital se u današnjem značenju te sintagme prvi put primenjuje 1969. godine kada se Džon Kenet Galbrajt (John Kenneth Galbraith) pismom obratio ekonomisti Majklu Kaleku (Michael Kaleck). Stručni članci posvećeni tematici intelektualnog kapitala objavljuvani su u pretposlednjoj dekadi 20. veka. Američki autori Tomas Stjuart (Thomas A. Stewart) i Baruh (Baruch) Lev načinili su pionirske korake u proučavanju intelektualnog kapitala intelektualnog kapitala u Sjedinjenim Američkim Državama. Karl Erik Svejbi (Karl Eric Sveiby), proučavajući ovaj fenomen od druge polovine osamdesetih godina 20. veka, ukazao je na važnost intelektualne imovine kao i na značaj umeća upravljanja njome. Podelio je intelektualni kapital na tri dela, iako tada još koristeći termin „kapital znanja”. Ta podela se i danas smatra osnovnom a diversifikuje se na ljudski, strukturni i relacijski. Svejbi je takođe pripisan i epitet začetnika merenja intelektualnog kapitala. Stjuart smatra da intelektualni kapital predstavlja „sumu svega što svi u kompaniji znaju, a što joj daje konkurentsku prednost na tržištu”. To je intelektualni kapital – znanje, informacije, intelektualna imovina, iskustvo koje može biti iskorišćeno za stvaranje bogatstva [2].

Iako se proučavanje važnosti i uloge znanja može proučavati i dalje, Frederik Tejlor (Frederick Taylor) je bio prvi autor koji je naučno pokušao postaviti znanje, iskustvo i veštine zaposlenih u neki teorijski okvir, kada je 1911. godine objavio delo „Principi naučnog menadžmenta” (*The Principles of Scientific Management*). Nešto kasnije, 1934. godine, Jozef Šumpeter (Joseph Schumpeter) će u svome delu „Teorija ekonomskog razvoja” (*The Theory of Economic Development*), na osnovu proučavanja ekonomskih promena, tvrditi da je za pojavu novih proizvoda važna „rekombinacija” znanja.

Elementi teorije intelektualnog kapitala prepoznaju se u delu „Administrativno ponašanje” (*Administrative Behavior*) koje je Herbert Sajmon (Herbert Simon) objavio 1945. godine. U ovoj studiji Sajmon se usredsređuje na činoce koji ograničavaju ljudske saznanje kapacitete, a kao posebno značajan ističe „ograničena racionalnost” (*bounded rationality*, engl.). Sajmon, pri tome, dovodi u pitanje neoklasične postulate o ograničenim resursima budući da su tradicionalni inputi kapitala ograničeni fizičkim količinama ili finansijskim

pritscima, a intelektualni kapital može biti ograničen samo ograničenom racionalnošću zaposlenih u preduzeću [3].

Vidan doprinos razvoju koncepta intelektualnog kapitala dao je 1967. godine Majkl Polanji (Michael Polanyi) koji, u svom delu „Tacitno znanje” (*The Tacit Dimension*), uvodi eksplicitnu i implicitnu dimenziju znanja. Samo interakcija između eksplicitnih i implicitnih elemenata znanja omogućuje uspeh preduzeća. Polanjijeva potvrda postojanja i uloge implicitnog znanja takođe je bila u konfliktu sa neoklasičnim pretpostavkama koje se odnose na potpunu mobilnost resursa i na savršenu informisanost svih strana na tržištu. Neophodno je pri analizi nastanka teorije intelektualnog kapitala pomenuti i Roberta Solova (Solow), jednog od najpoznatijih ekonomista sredine prošloga veka, vremena kada je dominirala masovna proizvodnja.

Skot Svitlend (Scott R. Sweetland) je 1996. godine u svome članku „Teorija humanog kapitala: osnove istraživanja oblasti” (*Human Capital Theory: Foundations of a Field of Inquiry*) početke razvoja teorije intelektualnog kapitala izmesti daleko u prolost (u 18. vek). Svitlend je mišljenja da proučavanje ljudskog kapitala otpočinje 1776. godine poznatim delom Adama Smitha o poreklu bogatstva naroda, a da se završava 60-ih godinama 20. veka, kada su uveliko postavljene teorijske i empirijske osnove ovog područja. Najveće zasluge se, pri tome, pridaju Gariju Bekeru (Gary Becker), koji je svojom studijom „Humani kapital” (*Human Capital*), u stvari, 1964. godine zasnovao teoriju ljudskog kapitala. Neoklasične pretpostavke maksimizacije profita i korisnosti i savršena konkurencija na tržištu radne snage osnovne su postavke teorije ljudskog kapitala [4].

Razvoju teorije intelektualnog kapitala pridoneli su mnogi ekonomisti. Hronološki sled najvažnijih godina, najzaslužnijih autora i najznačajnijih dela važnih za razvoj te nove teorije o intelektualnom kapitalu prikazan je u tabeli 1.

Tabela 1. Hronološki sled najvažnijih godina, najzaslužnijih autora i najznačajnijih dela važnih za razvoj teorije intelektualnog kapitala [3, 5]

Godina	Autor	Naziv dela
1980.	Hiroyuki Itami	Mobilizing Invisible Assets
1986.	Karl-Erik Sveiby	<i>The Know-How Company</i>
1987.	Debra Amidon	Managing the Knowledge Asset into the Twenty-First Century
1989.	Karl-Erik Sveiby	The Invisible Balance Sheet
1989.	Peter Drucker	The New Realities: in Government and Politics, in Economics and Business, in Society and World View
1990.	Charles Savage	Fifth Generation Management, Dynamic Teaming, Virtual Enterprising and Knowledge Networking
1990.	Karl-Erik Sveiby	Knowledge Management
1990.	Peter M. Senge	The Fifth Discipline
1995.	Ikujiro Nonaka i Hirotaka Takeuchi	Knowledge Creating Company
1997.	Karl-Erik Sveiby	The New Organizational Wealth
1997.	Thomas Stewart	Intellectual Capital
1997.	Leif Edvinsson i Michael Malone	Intellectual Capital



## 2.2. DEFINISANJE INTELEKTUALNOG KAPITALA

Problemi definisanja intelektualnog kapitala nastaju zbog njegovih karakteristika. Intelektualni kapital je proizvod transformacije znanja. Intelektualni kapital može da podrazumeva i ulaz i izlaz procesa stvaranja nove vrednosti. Intelektualni kapital može da bude statičan kao, na primer, patenti ili dinamičan kao, na primer, sposobnosi i veštine zaposlenih. Određenu smetnju u tim istraživanjima predstavlja nedostatak jedinstvene terminologije, odnosno definicije intelektualnog kapitala. Iz tog razloga se pojavljuju različiti termini kao što su: neopipljiva svojina, intelektualna svojina, neopipljivi resursi, kapital znanja, reputacija (*goodwill*) i slično [6].

U definicijama različitih autora naglašavaju se različiti aspekti intelektualnog kapitala u smislu da je on:

- nevidljiva imovina preduzeća koja obuhvata veliki broj elemenata poput tehnologije, lojalnosti klijenata, imidža kompanije, korporativne kulture ili menadžment veština [7];
- pokretač vrednosti, koji transformiše proizvodne resurse u aktivu sa dodatom vrednošću [8];
- imovina koja nema fizički izraz ali je od velikog značaja za poslovanje [9];
- „kolektivna snaga mozga” jedne organizacije sačinjena od znanja, informacija, intelektualne svojine i iskustva koje postoji u preduzeću [10];
- znanje koje se može konvertovati u profit [11];
- polaganje prava na buduće koristi [12];
- stvaralačka primena znanja u proizvodnji i bilo kojoj drugoj kreativnoj delatnosti, sposobnost da se nevidljiva imovina poput znanja pretvara u proizvode i usluge koji donose vrednost [13];
- intelektualni kapital je suma znanja svih ljudi u kompaniji, ali znanja koja doprinose konkurentskoj prednosti na tržištu [14].

## 2.3. SASTAVNI ELEMENTI INTELEKTUALNOG KAPITALA

Najpoznatiju podelu intelektualnog kapitala razvio je Liff Edvinson (Leif Edvinsson) koji posmatra intelektualni kapital kao interakciju ljudskog, strukturnog i potrošačkog kapitala, koja stvara vrednost za preduzeće. Tri osnovna elementa intelektualnog kapitala, prema tome, jesu:

a) *Ljudski kapital* (predstavlja različita znanja, veštine, sposobnosti, kvalifikacije, stavove, iskustvo zaposlenih kojima se oni koriste u poslovnom procesu;

b) *Strukturni kapital* (nastaje transformacijom ljudskog kapitala, a obuhvata različite neopipljive elemente, kao što su organizacioni procesi: rutine, poslovni procesi, planovi, pravila, dokumenti, standardizacija procesa, baze podataka, organizaciona kultura i intelektualno vlasništvo – patenti, licence, autorska prava, franšize i sl.);

c) *Potrošački (relacijski) kapital* (obuhvata poslovne mreže – prodajne, marketinške i distribucijske mreže; odnose s poslovnim partnerima, distributerima, dobavljačima i svim ostalim posrednicima; poslovna interesna udruživanja; odnos i komunikaciju sa potrošačima (postojećim i budućim) u cilju postizanja zadovoljstva i lojalnosti; kao i brend (tržišnu marku) pomoću kojeg preduzeće stvara imidž, ostvaruje značaj na tržištu, privlači kupce i stvara vrednost u očima kupaca.

Intelektualni kapital se ne sastoji od podeljenih sektora ljudskog, strukturnog i relacijskog kapitala već od njihove međusobne spona. Intelektualni kapital je beskoristan ako se ne kreće, a kretanje treba početi od ljudi jer su oni ti koji poseduju znanje, kreiraju proizvode, organizaciju, procese i odnose. Međusobno delovanje komponenti intelektualnog kapitala čini proces stvaranja vrednosti, a ta interakcija je dinamična i kontinuirana. Znanje mora teći i biti optimalno razdeljeno između klasa intelektualnog kapitala radi maksimizacije stvaranja vrednosti. Što je interakcija među komponentama intelektualnog kapitala veća, stvara se veća dodana vrednost [15].

Model tržišne vrednosti preduzeća obuhvata opipljivu i neopipljivu imovinu preduzeća. Prema tom modelu svaka od te tri komponente intelektualnog kapitala može biti merljiva i ocenjena za investiranje. Zbog toga je ova podela postala standard i polazna tačka za dalja istraživanja [16].

Za stvaranje vrednosti jedne organizacije nužna je veza između sastavnih komponenti intelektualnog kapitala, odnosno između ljudskog kapitala, strukturnog i relacijskog kapitala, a da bi se dodatna vrednost stvorila najvažnija je sinergija pomenutih strukturnih segmenata. Stvaranje vrednosti upravo dolazi u slučaju razmene znanja između tri segmenta intelektualnog kapitala i znatno utiče na neprekidan razvoj organizacionih sposobnosti, a razmena znanja olakšava i ubrzava učenje [17]. Hal (Hall) se svrstava u autore čije se polazište ogleda u razdvajanju nematerijalne aktive i ljudskih resursa te je, otuda, podelio nematerijalnu aktivu na onu koja se ne može odvojiti od ljudskih resursa i nematerijalnu aktivu koja se može odvojiti od ljudskih resursa.

Uprkos činjenici da istraživači i teoretičari predlažu i drugačije podele, one su uglavnom nalik jedna drugoj zbog toga što razvrstavaju intelektualnu imovinu na način da se grupišu slični elementi neopipljive imovine preduzeća. Tako se, recimo, kompetencije zaposlenih, njihove veštine i iskustva uvek svrstavaju u ljudski kapital jer ih poseduju ljudi; preduzeća ih, dakle, ne mogu posedovati. U tabeli 2 je dat prikaz nekih elemenata intelektualne imovine.

Tabela 2. Neki elementi intelektualne imovine [18]

<b>Eksterna struktura</b>	<b>Interna struktura</b>	<b>Sposobnosti</b>
<b>Marke</b> - Proizvodne marke - Uslužne marke - Korporativne marke	<b>Intelektualna svojina</b> - Patenti - Zaštićena prava - Tržišne marke i dizajn prava	<b>Sposobnosti ljudi</b> - Profesionalno iskustvo - Nivoi obrazovanja i veština - Metodi obuke - Obrazovanje menadžmenta
<b>Potrošači</b> - Pojedinačni potrošači - Kanali prodaje - Kanali distribucije	<b>Infrastruktura</b> - Proces - IT sistemi i baze podataka - Komunikacioni sistemi - Modeli operacija - Finansijska struktura	<b>Sposobnost učenja</b> - Razmena znanja - Grupe za uvežbavanje - Sposobnost rešavanja problema
<b>Ugovori</b> - Ugovori o franšizingu - Ugovori o licenci - Ostali ugovori	<b>Kultura</b> - Menadžment filozofija - Priznanje i nagrade - Menadžment struktura	<b>Sposobnost menadžmenta</b> - Preduzetništvo - Liderstvo - Podaci o rastu

Adekvatna upotreba i upravljanje znanjem dobrim delom doprinosi povećanju dobitka organizacije. Upravljanje znanjem predstavlja kritičan faktor uspeha jer je to proces koji je „teško ponovljiv, jer su aktivnosti zasnovane na znanju nestrukturirane, intuitivne i dovode često do neopipljivih rezultata” [19].

### 3. METODOLOGIJA MERENJA INTELEKTUALNOG KAPITALA I NJEGOV UTICAJ NA POSLOVNE PERFORMANSE PREDUZEĆA

#### 3.1. METODE MERENJA INTELEKTUALNOG KAPITALA

Uvećanu vrednost koju stvara intelektualni kapital (IK), prema Edvinsonu, moguće je izraziti pozitivnom razlikom između tržišne (TV) i knjigovodstvene vrednosti (KV) preduzeća, [9] odnosno:

$$TV = KV + IK \quad (1)$$

Prilikom određivanja veličine intelektualnog kapitala, kada se dovode u vezu tržišna i knjigovodstvena vrednost preduzeća postoje tri fundamentalna problema. Prvi problem se odnosi na to da se tržišna i knjigovodstvena vrednost mere uz pomoć različitih jedinica, gde se tržišna vrednost izražava pomoću procenjene vrednosti, a knjigovodstvena vrednost uz pomoć realne vrednosti. Pri tome, jednačina gubi smisao jer je zbog različitih elemenata nemoguće rešavanje osnovnih matematičkih operacija. Drugi problem jednačine je taj što knjigovodstvena vrednost i intelektualni kapital nisu međusobno odvojive kategorije kao što je prikazano u jednačini pošto se vrednost u organizaciji stvara međusobnom interakcijom opipljive i neopipljive imovine i ne postoji mogućnost njihovog striktnog odvajanja. Treći problem kod ove jednačine je taj što tržišna vrednost preduzeća zavisi od mnogih eksternih

faktora, dok je vrednost intelektualnog kapitala zavisna od načina posmatranja pojedinca. Jednačina do koje je došao Edvinson može poslužiti samo radi lakšeg konceptualnog razumevanja odnosa između knjigovodstvene vrednosti, intelektualnog kapitala i tržišne vrednosti preduzeća.

I ostali teoretičari su poput Edvinsona pokušavali da razviju metode merenja intelektualnog kapitala. Tokom vremena razvijen je i predložen veliki broj različitih metoda i pokušaja da se intelektualni kapital ili njegovi strukturni elementi prikažu u novčanim jedinicama ili pokazateljima koji bi trebalo da ukažu na stanje i način upotrebe intelektualnih resursa.

Andriesen je razvio nekoliko alternativnih metoda vrednovanja na osnovu opsega vrednovanja, objekta vrednovanja i kriterijuma koji oslikava upotrebljivost i poželjnost objekta vrednovanja [20]. Ukoliko se kriterijum definiše u novčanom obliku, onda se vrednost određuje *metodom finansijske procene*. Ukoliko se vrednovanje izvodi na osnovu nenovčanog kriterijuma a koji se posmatra kao opažanje, onda se vrednost određuje *metodom merenja vrednosti*. Najzad, kada se kriterijum ne može posmatrati kao opažanje jer zavisi od ličnog stava subjekta koji vrednuje, onda se vrednost određuje *metodom procene vrednosti*. Andriesen, prema tome, razlikuje četiri grupe metoda za vrednovanje intelektualnog kapitala, pri čemu se vrednovanje sprovodi procenom ili merenjem [20].

Sličnu klasifikaciju metoda za vrednovanje intelektualnog kapitala predlaže i Svejbi, sa nešto drugačijim kriterijumima. Pomenuti autor deli postojeće metode za vrednovanje intelektualnog kapitala u dve osnovne grupe u zavisnosti od toga da li se vrednost intelektualnog kapitala određuje u novčanom obliku i izražava u novčanim jedinicama:

- *metode za procenu intelektualnog kapitala*, kojima se procenjuje finansijska vrednost intelektualnog kapitala, tj. kojima se intelektualni kapital vrednuje u novčanom smislu;
- *metode za merenje intelektualnog kapitala*, koje ne procenjuju finansijsku vrednost intelektualnog kapitala, već mere njegovu vrednost koristeći nenovčane kriterijume [21].

Tokom poslednje tri decenije razvijene su različite metode za merenje intelektualnog kapitala, koje se uglavnom svrstavaju na sledeći način [22]:

- (1) direktne metode merenja (*Direct Intellectual Capital Methods, DICM*),
- (2) metode tržišne kapitalizacije (*Market Capitalization Methods, MCM*),
- (3) metode zasnovane na prinosu na aktivu (*ROA Methods*) i
- (4) metode izveštaja (*Scorecard Methods*).

Prve tri grupe metoda merenja intelektualnog kapitala kao rezultat daju finansijsku vrednost, dok poslednja grupa ukazuje na nefinansijsku vrednost, odnosno fokusira se na nefinansijska merila vrednosti intelektualnog kapitala. Direktne metode merenja se karakterišu time što nastoje da procene veličinu pojedinačnih elemenata intelektualnog kapitala u novcu. S obzirom na to da knjigovodstvena vrednost preduzeća u praksi nikada nije jednaka njenoj tržišnoj vrednosti, odnosno da je kod uspešnih preduzeća tržišna vrednost iznad knjigovodstvene, osnovna pretpostavka od koje polaze metode tržišne kapitalizacije je to da ova pozitivna razlika može da služi kao aproksimacija vrednosti intelektualnog kapitala.

Metode prinosa na ukupna sredstva su poznatije pod nazivom ROA metode. Ono što je zajedničko metodama u ovoj grupi je način obračuna veličine intelektualnog kapitala, koji, suprotno onome što može da se pretpostavi iz naziva, ne podrazumeva uvek da se polazi od prinosa na ukupna sredstva. Pripadnost ovoj grupi metoda merenja više opredeljuje činjenica da se obračun vrši na bazi finansijskih izveštaja preduzeća i da se koriste različite vrste racio brojeva za dobijanje konačne vrednosti intelektualnog kapitala.

Poslednja grupa metoda za merenje su metode koje se baziraju na prikupljanju podataka u vezi sa elementima intelektualnog kapitala kako bi se dobijeni indikatori prezentovali u formi liste rezultata ili u formi grafičkih prikaza. *Scorecard* modeli su slični modelima iz grupe direktnih metoda merenja, s tim da je razlika u tome što se kod *scorecard* modela ne utvrđuje novčana vrednost elemenata intelektualnog kapitala već se, u najboljem slučaju, može formirati određeni kompozitni indeks [23].

Prisustvo statičke i dinamičke dimenzije intelektualnog kapitala otežava njegovo merenje. Statičku dimenziju intelektualnog kapitala predstavlja vrednost nematerijalne imovine organizacije, kao što su na primer sposobnosti zaposlenih, intelektualna svojina, zadovoljstvo zaposlenih. Pojedini segmenti intelektualnog kapitala čak nemaju vrednost sami po sebi već do stvaranja vrednosti dolazi u odnosima s drugim elementima, a to je zapravo dinamičko svojstvo intelektualnog kapitala. Proces anketiranja zaposlenih je dosta neprecizan jer dobar deo podataka se zasniva na opažanjima i procenama zaposlenih. Sa aspekta potrošača je slično stanje pri merenju ostalih strukturnih segmenata intelektualnog kapitala jer oni, uglavnom, nisu dovoljno zainteresovani za pružanje informacija vezane za kupovinu i pružane usluge. Bitno je da se odaberu pravi pokazatelji kako bi dobijene informacije bile korisne organizaciji.

Model merenja intelektualnog kapitala treba da zadovolji različite kriterijume, tj. on:

- iziskuje fleksibilnost jer treba da se adaptira mnogim tipovima organizacione strukture i kulture;
- iziskuje mnoge mere za praćenje rasta inovacija i dinamičan prenos znanja;
- bazira se na informacijama koje su trenutno dostupne ili se mogu dobiti uz minimum troškova i napora;
- koristi mere koje su relevantne i razumljive za jedinstvene poslovne potrebe organizacije;
- daje zamene ili surogate za „meke“ podatke koji čine mere;
- povezuje s tradicionalnim finansijskim merama, i involvira sve članove organizacije radi obezbeđenja organizacione posvećenosti [24].

Prilikom merenja intelektualnog kapitala u obzir se najčešće uzimaju podaci o zaposlenima i njihove karakteristike kao što su pol, godine starosti, stručna sprema, radno iskustvo, zarada i sl. Zatim se sagledava efekat dodatne obuke, a nakon toga se anketiraju zaposleni o mnogim relevantnim pitanjima i na kraju se koriste podaci o performansama organizacije – od finansijskih do nefinansijskih kao što su kreativnost, inovativnost, liderske sposobnosti, sposobnosti i dostignuća menadžmenta. Kreiranje modela iziskuje izuzetnu

posvećenost i stručnost. Za merenje performansi je vrlo bitno da se odaberu relevantni pokazatelji koje mogu da služe kao podloga za odlučivanje organizaciji i da pomognu u planiranju predstojećih poslovnih ciljeva. Prvi korak je da se odredi predmet merenja, a potom je bitno da se uvažavaju svi strukturni elementi intelektualnog kapitala koji su zaslužni za dodatnu vrednost.

### 3.2. UTICAJ INTELEKTUALNOG KAPITALA NA POSLOVNE PERFORMANSE PREDUZEĆA

U svrhu istraživanja uticaja intelektualnog kapitala na poslovne performanse preduzeća sproveden je veliki broj istraživačkih studija.

Svojevremeno su, na uzorku od preko 5000 francuskih preduzeća ispitivanih u periodu od 1998. do 2000. godine, Kremp i Meriz došli do saznanja da se prilikom povećanja intenziteta upravljanja znanjem za samo 1% nivo inovativnosti u organizaciji podiže za 4%, a produktivnost rada za 3% [25]. Empirijsko istraživanje koje su sprovedeli Firer i Vilijams 2003. godine, na uzorku od 75 kompanija koje su evidentirane na berzi u Johaneshurgu, pokazalo je da se u periodu kada je sprovedeno istraživanje ekonomija Južne Afrike još uvek dominantno oslanjala na eksploataciju fizičkih resursa i sticanje konkurentske prednosti po tom osnovu [26].

U okviru istraživanja japanskog bankarskog sektora Mavridis je, istražujući uticaj intelektualnog kapitala na poslovne performanse 141 banke, zaključio da najbolje performanse ostvaruju banke koje se više oslanjaju na intelektualni kapital [27]. Istraživanja obavljena na Tajvanu (4254 javna preduzeća; od 1992. do 2002. godine) su pokazala da nivo intelektualnog kapitala utiče na rentabilnost preduzeća, rashode i reklamu [28]. Takođe je još jedno tajvansko istraživanje, na uzorku od 81 javnog preduzeća, pokazalo prisustvo komplementarnog uticaja intelektualnog kapitala na tržišnu vrednost kompanije; ovaj uticaj je, pri tome, znatno veći kod visokotehnoloških kompanija [29].

Nelinearni uticaj intelektualnog kapitala na rentabilnost preduzeća pokazalo je istraživanje obavljeno 2003. godine na 297 tajvanskih kompanija [30]. Od 1997. do 2001. godine obavljeno je istraživanje na svim IT kompanijama sa Tajvana. Rezultati su pokazali da pojedine komponente intelektualnog kapitala, kao što su inovacioni kapital, procesni kapital i kapital odnosa sa klijentima, pokazuju jak linearni uticaj na performanse preduzeća, kao i da ljudski kapital utiče na performanse preduzeća isključivo posredno, preko drugih komponenata intelektualnog kapitala [31].

Kada je u pitanju uticaj intelektualnog kapitala na tip inovacionih aktivnosti, može se reći da je on vrlo jak i intenzivan – što je on veći, inovacije su radikalnije. Ovo je pokazalo istraživanje sprovedeno na uzorku od 93 američke kompanije [32].

Uprkos brojnim istraživanjima ovog fenomena, obavljeno je svega nekoliko empirijskih istraživanja u okviru realnog sektora privrede. Jedno takvo istraživanje je sprovedeno u Finskoj [33] gde je istraživao uticaj intelektualnog kapitala na poslovne performanse oko 20.000 preduzeća u periodu od 2001. do 2003. godine.

Erikson i Rotberg [34] su sprovedeli longitudinalnu studiju u okviru tri industrije visokih tehnologija na teritoriji SAD u periodu od osam godina (1993-1996. i 2003-2006.). Jedan od zaključaka studije, izveden za analizirane industrije, odnosio se na to da ne postoji adekvatno deljenje znanja zbog visokog rizika industrijske špijunaže. Međutim, studija je pokazala da intelektualni kapital i efektivno upravljanje znanjem pozitivno utiču na tržišne performanse.

Još jedno istraživanje u bankarskom sektoru, u Australiji [35], bavilo se odnosom između intelektualnog kapitala i poslovnih performansi. Istraživanje je pokazalo da je komponenta intelektualnog kapitala koja poseduje najjači uticaj na performanse ljudski kapital. Takođe, studija je ukazala na to da su male banke (mereno ukupnom aktivom, akcijskim kapitalom i brojem zaposlenih) efikasnije u upotrebi intelektualnog kapitala u poslovanju. U studiji sprovedenoj u italijanskoj prehrambenoj industriji Mura i Longo [36] su istraživali uticaj pojedinih komponenti intelektualnog kapitala na performanse zaposlenih. Autori su potvrdili da ljudski i strukturni kapital imaju jak pozitivan uticaj na performanse zaposlenih ali da uticaj relacionog kapitala nije do kraja jasno identifikovan) [37].

Na našem prostoru nedavno je sprovedeno istraživanje s ciljem sagledavanja stvarnog stanja vezanog za problematiku intelektualnog kapitala, njegovog značaja i uloge u kreiranju superiorne vrednosti MSP u odnosu na konkurenciju, u uslovima savremenog poslovanja u Republici Srbiji, u kojem su učestvovali menadžeri i zaposleni u MSP-a u oblasti proizvodnje, prometa i usluga [38]. Savremena paradigma u prvi plan stavlja MSP kao značajan generator privrednog rasta Republike Srbije, pri čemu se njihovo poslovanje, rast i razvoj u velikoj meri temelji na ulaganje i razvoj intelektualnog kapitala. Zato jedno ovakvo istraživanje istovremeno predstavlja dobru osnovu za sagledavanje mogućnosti na ostvarivanje povoljnije tržišne pozicije i jačanju performansi MSP Republike Srbije kvalitetnim upravljanjem intelektualnim kapitalom. Rezultati istraživanja su pokazali da komplementarna primena koncepta internog marketinga i koncepta menadžmenta znanja može da utiče na delatnost preduzeća i da rezultira sinergetskim efektom uvećanja i usavršavanja resursa znanja - intelektualnog kapitala.

U savremenom poslovanju sve više se ispoljava uticaj nematerijalnih resursa u organizacijama. U tom smislu Dejv Urlih (Dave Urlich) strukturu intelektualnog kapitala izražava kroz proizvod kompetentnosti (K) i posvećenosti (P) zaposlenih unutar jedne organizacije prema jednačini:

$$IK = K \times P \quad (2)$$

Prema Urlihovom mišljenju psvećenost čini unutrašnju rezervu koja ne zahteva ulaganje sredstava ali može da proizvodi rezultate samo ako se razvija. [39] Ukoliko organizacija ima zaposlene sa visokim kompetencijama, ali koji ne rade ni dovoljno ni dobro – nisu u dovoljnoj meri posvećeni organizaciji, onda oni predstavljaju veliki resurs neiskorišćenih ljudskih potencijala.

#### 4. ZAKLJUČAK

Na osnovu analize predočenih definicija i klasifikacija elemenata intelektualnog kapitala autora i istraživača koji su se bavili ovim fenomenom može se konstatovati da među predloženim podelama ima dosta sličnih elemenata, da autori koriste termine sa istim ili sličnim značenjem, premda postoje i tumačenja intelektualnog kapitala koja naglašavaju izvesna specifična obeležja. Kao što je u radu navedeno, po uticajnosti se izdvaja podela intelektualnog kapitala na ljudski, strukturni i potrošački (relacijski) kapital. Premda svaki element deluje zasebno za sebe, tek njihova kombinacija čini ih intelektualnim kapitalom.

Kreiranje modela intelektualnog kapitala iziskuje posebnu pažnju jer je za merenje performansi od velikog značaja izbor relevantnih pokazatelja. Odmah na početku se određuje

predmet merenja, a potom je bitno da se uvažuje svi strukturni elementi intelektualnog kapitala koji su zaslužni za krajnji efekat – stvaranje dodate vrednosti. Svrha merenja intelektualnog kapitala je otkrivanje i definisanje faktora koji generišu vrednost a koji nisu prethodno obuhvaćeni tradicionalnim mernim okvirima. Pre svega je neophodno identifikovati intelektualni kapital organizacije i otkriti kako on funkcioniše i kako stvara dodatnu vrednost, a to zavisi od same organizacije i onoga što ona želi da ostvari. Rezultati intelektualnog kapitala ne mogu da se predstave u finansijskim izveštajima, to su neopipljivi resursi kompanije, sva znanja, veštine i iskustva organizacije. Samim tim teoretičari su razvili brojne metode za procenu i merenje intelektualnog kapitala u cilju izražavanja njegovog rezultata. Konsenzus o najboljem modelu za upravljanje i izveštavanje o neopipljivoj imovini kompanije još nije postignut, merenje još uvek nije standardizovano, kao što je to slučaj sa merenjem vidljivog kapitala, ali su organizacije širom sveta već usvojile stav o intelektualnom kapitalu kao neiscrpnom izvoru bogatstva koji im pomaže da unaprede svoje poslovanje kroz njihova specifična, univerzalna znanja stvarajući dodatnu vrednost i održivu konkurentnost na tržištu.

Konkurentsku prednost i visoke performanse mogu da stiču samo one organizacije koje raspolažu visoko kompetentnim i visoko posvećenim zaposlenima, što se postiže edukacijom, radom i motivacijom zaposlenih. Znanje i iskustvo koje zaposleni u organizaciji unose i stiču obavljanjem poslovnih aktivnosti mogu da imaju pravu vrednost za organizaciju samo ako su dostupni svim zaposlenima. Organizacije koje u svom poslovanju koriste i unapređuju intelektualni kapital mogu da se suprotstave izazovima dinamičnog okruženja, fleksibilnije su u odgovorima na promene tržišta.

## REFERENCE

1. Sundać D., Švast N., *Intelektualni kapital - temeljni čimbenik konkurentnosti poduzeća*, Ministarstvo gospodarstva, rada i poduzetništva RH, Zagreb, 2009, 9.
2. Stewart T.A., *The intellectual capital: the new wealth of organizations*, Doubleday/Currency, New York, 1997, 9.
3. Bontis N., *World congress on intellectual capital readings: cuttingedge thinking on intellectual capital and knowledge management from the world's experts*, Butterworth-Heinemann, 2002.
4. Kolaković M., *Teorija intelektualnog kapitala*, Ekonomski pregled, 54 (11-12), (2003): 925-944.
5. Edvinsson L., *Corporate longitude – navigating the knowledge economy*, Book House Publishing, 2002, 29-31.
6. Orčić D., Urošević S., *Significance of the structural capital identification for the small and medium companies in textile industry*, XII International May Conference on Strategic Management – IMKSM2016, Tehnički fakultet, Bor, 2016: 413-427.
7. Itami H., *Mobilizing invisible assets*, Harvard University Press, Cambridge, 1991.
8. Hall R., *The strategic analysis of intangible resources and capabilities to sustainable competitive advantage*, Strategic Management Journal, 13(2), (1992): 135-144.



9. Edvinsson L., Malone M.S., *Intellectual capital: realizing your company's true value by finding its hidden brainpower*, New York: Harper Business, 1997.
10. Stewart T.A., *Intellectual capital – the new wealth of organizations*, Nicolas Brealey Publishing, London, 1998, 20.
11. Sullivan P.H., *Value – driven intellectual capital: how to convert intangible corporate Assets into market value*, Wiley, New York, 2000, 4.
12. Lev B., *Intangibles: Management, Measurement and Reporting*, Brookings Institution Press, Washington, D.C., 2001, 5.
13. Brunsko Z., Sundać D., *Intelektualni kapital u funkciji razvoja suvremenog gospodarstva, Znanje – temeljni ekonomski resurs*, Ekonomski fakultet Rijeka, Sveučilište u Rijeci, Rijeka, 2002, 115.
14. Stewart T.A., *Brainpower: how intellectual capital is becoming America's most valuable asset*, Fortune, 1991: 44-60.
15. Sundać D., Škalamera-Alilović D., Babić M., *Poslovno okruženje i intelektualni kapital*, Ekonomski fakultet Sveučilišta u Rijeci, Rijeka, 2016, 166-67.
16. Stewart T.A., *The wealth of knowledge: intellectual capital and the twenty-first century organization*, A Currency Book, New York, 2001, 13.
17. Đuričin D., Janošević S., *Strategijska analiza ljudskih resursa*, Ekonomske teme, 47(1), (2009): 1-46.
18. Mašić B., *Knowledge management*, Univerzitet „Braća Karić” – Fakultet za menadžment, Beograd, 2004.
19. Moustaghfir K., Schiuma G., *Knowledge, learning and innovation: research and perspectives*, Journal of Knowledge Management, 17(4), (2013): 495-510.
20. Andriessen D., *Making sense of intellectual capital: designing a method for the valuation of intangibles*, Elsevier Butterworth-Heinemann, Burlington, USA, 2004, 15.
21. Sveiby K.E., *The new organizational wealth: managing and measuring knowledge based assets*, Berrett-Koehler, San Francisco, 1997.
22. Roos G., Pike S., Fernström L., *Managing intellectual capital in practice*, Butterworth-Heinemann, Oxford, 2005: 247-255.
23. Janošević S., Dženopoljac V., *Efikasnost upotrebe intelektualnog kapitala kao determinant finansijskih performansi kod najuspješnijih kragujevačkih preduzeća*, 2014: 312:328.
24. Wall A., Kirk R., Martin G., *Intellectual capital: measuring the immeasurable?*, Elsevier Ltd, Great Britain, 2004: 55-56.
25. Kremp E., Mairesse J., *Knowledge management in the manufacturing industry*, Les 4 Pages des statistiques industrielles, SESSI, Ministere de l'Economie, des Finances et de l'Industrie. Paris, 2002.
26. Firer S., Williams S.M., *Intellectual capital and traditional measures of corporate performance*, Journal of Intellectual Capital, 4(3), (2003): 348-360.

27. Mavridis G.D., *The intellectual capital performance of the Japanese banking sector*, Journal of Intellectual Capital, 5(1), (2004): 92-115.
28. Chen M.C., Cheng S.J., Hwang Y., *An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance*, Journal of Intellectual Capital, 6(2), (2005): 159-176.
29. Tseng C., Goo Y., *Intellectual capital and corporate value in an emerging economy: empirical study of Taiwanese manufacturers*, R&D Management, 35(2), (2005): 187-201.
30. Huang C.J., Liu C.J., *Exploration for the relationship between innovation, IT and performance*, Journal of Intellectual Capital, 6(2), (2005): 237-252.
31. Wang W.-Y., Chang C., *Intellectual capital and performance in causal models: evidence from the information technology industry in Taiwan*, Journal of Intellectual Capital, 6(2), (2005): 222-236.
32. Subramaniam M., Youndt M.A., *The influence of intellectual capital on the types of innovative capabilities*, Academy of Management Journal, 48(3), (2005): 450-463.
33. Kujansivu P., Lönnqvist A., *Investigating the value and efficiency of intellectual capital*, Journal of Intellectual Capital, 8(2), (2007): 272-287.
34. Erickson S., Rothberg H., *Intellectual capital in tech industries: a longitudinal study*, Electronic Journal of Knowledge Management, 7(5), (2009): 559-566.
35. Joshi M., Cahill D., Sidhu J., *Intellectual capital performance in the banking sector – an assessment of Australian owned banks*, Journal of Human Resource Costing & Accounting, 14(2), (2010): 151-170.
36. Mura M., Longo M., *Developing a tool for intellectual capital assessment: an individual level perspective*, Expert Systems, 30(5), (2013): 436-450.
37. Janošević S., Dženopoljac V., *Komparativna analiza performansi intelektualnog kapitala*, Tematski zbornik radova: Ekonomsko-socijalni aspekti priključivanja Srbije Evropskoj uniji, Ekonomski fakultet u Kragujevcu, Kragujevac, (2015): 201-212.
38. Jovkić J., *Uticaj intelektualnog kapitala na ostvarivanje povoljnije tržišne pozicije malih i srednjih preduzeća Republike Srbije*, Master rad, Univerzitet u Beogradu, Tehnički fakultet u Boru, Bor, 2016.
39. Ulrich D., *Intellectual capital = competence x commitment*, Sloan Management Review, 39(2), (1998): 15-27.

## **CUSTOMER SATISFACTION AS A PREDICTOR OF ESTABLISHING AN EFFICIENT AND EFFECTIVE CRM IN THE RETAIL SECTOR IN SERBIA**

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**Abstract:** The Customer Relationship Management (CRM) has the status of an inevitable mechanism of functioning of companies in the market, where the conditions of competition should fight to retain existing and attract new customers. The challenge is to differentiate from the competition and gain customer loyalty. A loyal customer is the most important capital. This study seeks to examine the causal relationship between customer satisfaction and long-term loyalty, as an indicator of the efficiency and effectiveness of CRM. The survey identified factors that determine the competitive position of retailers on the Serbian market. These are the predictors of establishing an efficient and effective CRM. Primary data was collected through questionnaire method. In the study, for the analysis of the data, are used the following analysis: descriptive analysis, correlation and regression analysis. Results of the research showed that there is a strong correlation between satisfaction, trust and loyalty in the retail sector in Serbia. Quality of service in the retail store, along with the level of price and payment terms, singled out as a key determinant of customer satisfaction in Serbia and winning the loyalty of the same. The study indicated that the improvement of quality of service in retail stores (courtesy of staff and their expertise) and the alignment of the price level with the average income of the population, with the ability to use credit cards and checks and special discounts can significantly improve the relationship with customers, gain their trust and loyalty and thus establish an effective and efficient CRM in the retail sector in Serbia.

**Keywords:** customer satisfaction, customer loyalty, efficient and effective CRM, retail sector, Serbia

### **1. INTRODUCTION**

Developing long-term partnerships with customers is a basic prerequisite for the survival and success of the enterprise in the conditions of tough competition in the market. The customer has the status of a modern dictator who needs to adjust operations because of the increasing availability of information and to strengthen its bargaining power in the sales process. Marketing-oriented companies continuously explore attitudes, demands and needs of customers in order to tailor offers the same. Delivering superior value to customer is the key to winning customer loyalty and build long-term partnerships in the supply chain. Identifying predictors of customer satisfaction and a detailed analysis of the same, companies gain insight into what should be corrected to ensure that customers are satisfied, a CRM and SCM efficient and effective [1].

Supply Chain Management (SCM) integrates business processes along the entire chain (procurement, production, sales), with the goal of delivering superior value to customers. SCM is a phenomenon that touches all areas of business and core competency of the successful companies. Companies are a great challenge to be successful in the process of realization of what tends efficient SCM - "delivery of the right product at the right place at the right time, in the appropriate form and at an acceptable cost" [2]. Customer Relationship Management (CRM) and Supplier Relationship Management (SRM), integral parts of SCM, play an important role in the development of partnership and cooperation among the participants in the supply chain in order to effectively deliver superior value to end users (customers) and winning their long-term loyalty.

In conditions of fierce competition among retailers on the Serbian market, the real challenge is to gain customer loyalty, affect his willingness to visit the same store over a longer period of time. Retailers, the financial and human efforts, are trying to keep the existing loyal customers and win the loyalty of new ones. The real challenge is to identify predictors of satisfaction that predominantly affect attracting long-term loyalty, and therefore the efficiency and effectiveness of CRM in the retail sector. The aim of this study is to extract the factors that determine satisfaction and winning customer loyalty in the retail sector, which will be a guideline retailers that offer items to be corrected and improved to ensure that customers are happy to gain their trust and loyalty and establish an efficient and effective CRM and SCM.

## **2. SATISFACTION AS A KEY PREREQUISITE FOR WINNING CUSTOMER LOYALTY**

One of the key growth factors of competitive advantage and profitability of the company is customer satisfaction. It is defined as "direct experience that customers experience buying and using products and services" [3]. Customer satisfaction is a necessary, but not sufficient, condition for winning their loyalty. Between these two variables there is a strong positive correlation.

Customer satisfaction is actually the result created and delivered value to customers, and the goal of the company is that it is not only in line with their expectations and preferences, but also to surpass the same. It is important to distinguish between the expected (real) value of the product and the superior value that is a key to gaining customer loyalty and improving competitive position in the market. Delivering superior value companies develop long-term partnerships with its customers, based on correctness, trust and loyalty. The satisfaction directly depends on the perceived benefits of the products and services for customers. It is essential, combining multiple methods of analyzes in detail the customer satisfaction across the board in order to obtain a complete picture of what is needed to be corrected with the aim of reinforcement of the existing level of satisfaction. Regular study of changes in the demands and needs of customers, along with the predictors of satisfaction, companies receive guidance for customizing marketing strategies to the changes in the environment, which is of crucial importance, not only for survival, but also for the improvement of profitability and competitive position in the market [4]. With increasing degree of customer satisfaction is gradually winning over their loyalty. A loyal customer is, in modern conditions of severe competition in the market, the greatest wealth of any company. The importance of loyal customers for the company lies in the following [5]:

- Loyal customers spend more, buying a longer period of time and make the company more profits.
- Loyal customers understand and appreciate the value of their company provides are the best advertisement for this company.
- Loyal supply: not subject to competitive pressures and will not leave your dealer (company) as long as that competition trying to win them over. They remain with the company, even in difficult times.

Work on developing partnerships with customers, based on correctness, trust and loyalty is a key prerequisite for the establishment of an efficient and effective CRM, and therefore the SCM. It is in this and seeing causal link between customer satisfaction, customer loyalty and an efficient and effective CRM. Customer satisfaction is a necessary condition for gaining loyalty, and loyalty is a key indicator of the success of the implementation of the concept of CRM [6]. Sincere loyalty characterized by a very strong attitude and behavior regarding specific purchases [7].

### **3. THE CONCEPT AND IMPORTANCE OF USING CRM CONCEPT**

The study of relationships within the supply chain has become important in the last decade, both in theory and in practice. The essence of the definition of supply chain management (SCM) indicates that it is a process of managing a network of interconnected businesses aimed at providing products and services in accordance with the requirements and needs of final customers [8]. This phenomenon highlights the importance of cooperation among members of the supply chain in the areas of market research, promotion, sales, information gathering, research and development, product design and analysis of the overall system value chain [9]. Each company is located in the center of the network of suppliers and customers, and its aim is to develop and implement supply chain in the most efficient and effective way possible. The results of research conducted in the last decade have shown that an efficient SCM is an essential factor of reduction of costs and improvement of customer relations [10]. Customer relations management (CRM), together with the management of relationships with suppliers (SRM), is an integral part of SCM.

Customer relations management (CRM) is oriented towards building long-term partnerships with customers. The Implementation of new ideas and build solid partnerships with customers has a greater impact on the success of an enterprise in relation to the reduction of operating costs and increase profits now. Partner relationships with customers, based on correctness, trust and loyalty, generate long-term profits and are a key source of sustainable competitive advantage for any company. The main factors of development of long-term successful cooperation with the customers [11]:

- understand of the market and customer needs,
- gradual adjustment of supply requirements and needs of customers in order to benefit customer and
- deliver of superior value with the aim of customer retention.

Customers should be given the opportunity to present their views and comments because this is the only way to see that the company respects them, listens to their opinions

and take care of their wants and needs. Collecting data on indicators of customer satisfaction with any aspect of business, companies are coming to the valuable sources of information for the analysis of the profitability of existing marketing strategy. Identified changes in the demands and needs of customers should be accompanied by adequate changes in marketing strategies. Thus gained the trust of customers, which is a key factor in winning the loyalty and loyalty ensures the profitability of the business and is a key indicator of the efficiency and effectiveness of the implementation of the CRM concept. Implementation of CRM strategy, in addition to building partnership relations with customers, focused on reducing costs, increasing efficiency, making profits and market survival. Practice has shown that the application of the concept of CRM companies brings multiple benefits: reducing the cost of attracting new customers, increasing the number of long-term customers, reduce cost of sales, increase customer profitability and increase customer loyalty [12]. Generating benefits listed company establishes its supply chain in the most efficient and effective way possible.

#### **4. THE RESEARCH METHODOLOGY**

To identify predictors of customer satisfaction with a dominant influence on attracting long-term loyalty and establish an efficient and effective CRM in the retail sector, empirical research was conducted using the method of interviewing. The study included 206 subjects in Serbia (April, 2017).

The questionnaire contained 3 parts. The first part of the questionnaire aimed to gather data on the respondents (gender, age, qualifications and employment status). The second part consisted of 4-5 statements that relate to the basic determinants of satisfaction of respondents in the same building where usually do the shopping. Respondents expressed their level of agreement with the given findings on Likert five-point scale, where 1 means that the interviewee is absolutely not agree with the above statement, a 5 means absolutely agreeing with the statement. The statements made in this part of the questionnaire were selected and adapted on the basis of the relevant marketing literature [13,14,15]. On the basis of which they formed the following independent variables:

- convenience of retail store (location, facility and arrangement of working hours)
- quality of service (reliability, problem solving and quality of the relationship)
- the assortment (quality, range, depth range and the ratio of product offerings of domestic and foreign origin)
- prices and terms of payment (if the price action and payment terms consistent with average incomes and customers expectations).

The third part of the questionnaire related to the analysis of customer satisfaction, trust and loyalty in the retail sector. This part of the questionnaire was formulated with the aim of presenting the bond strength between the previously defined preconditions for establishing an efficient and effective CRM. The statements (three for each of the variables) are selected on the basis of the relevant marketing literature [1], and the level of compliance with the same is estimated based on a five-point Likert scale (1 strongly disagree; 5 absolutely agree)

For the analysis of the data collected was used IBM SPSS statistical software, with the following statistical analysis: descriptive, correlation and regression analysis. First on the entire sample descriptive analysis conducted with the aim of reviewing the level of

homogeneity of customers attitudes and measurement of satisfaction with various elements of the value of deals in the retail sector. In the second step was conducted correlation analysis to perceive the strength of correlations and relationships among all the variables that are the subject of research. Then regression analysis was conducted in order to identify predictors that dominantly determine customer satisfaction in the retail sector and gaining their loyalty.

Table 1. Demographic characteristics of survey participants (n = 206)

Demographic profile	Number of questioned people (n)	Percentage (%)
<b>Gender</b>		
Male	91	44 %
Female	115	56 %
<b>Age</b>		
18-25	42	21 %
26-35	77	37 %
36-45	17	8 %
46-55	25	12 %
56-65	31	15 %
>65	14	7 %
<b>Education</b>		
Primary School Education	7	3 %
High School Education	61	30 %
College Education	34	17 %
University Degree	81	39 %
MSc/PhD	23	11 %
<b>Employment Status</b>		
Student	24	12 %
Unemployed person	28	13 %
Employed person	135	66 %
Pensioner	19	9 %

Observing the structure of the sample in Table 1, it can be concluded that the sample included more females (115) compared to males (91) and, in terms of age structure, recorded the largest share of questioned people aged 26-35 years (37%) and the smallest proportion over the age of 65 (7%). We can also observe the dominant representation of respondents with a university degree (39%), followed by high school education (30%) and college education (17%). The questioned customers are mostly employed persons (66%).

## 5. DISCUSSION OF THE RESEARCH RESULTS

The results of descriptive statistics are presented in Tables 2 and 3. The implementation of descriptive statistical analysis, calculated the mean and standard deviation for each statement. The results of the analysis to the whole sample (n = 206) suggest that the estimates of respondents, in the first part of the questionnaire, moving in the range 3.02 to 4.39.

Table 2. Results of descriptive statistical analysis - predictors of satisfaction of customers, related to the retailer where they usually shopping

The statements - refer to the predictors of satisfaction	Arithmetic Mean	Standard deviation
Opening hours	4.29	.816
Accessibility locations	4.39	.823
Structure Facility	3.87	.976
The modernity of equipment at the disposal facility	3.77	1.051
Navigating among the shelves	3.76	1.094
Quality of the assortment	3.73	.880
The width of the assortment	3.99	.937
The depth of the assortment	3.80	.908
Balanced ratio of product offerings of domestic and foreign origin	3.20	1.195
Staff friendliness	3.66	1.110
Resolving complaints	3.66	1.051
Knowledge of staff	3.42	1.055
Confidence in staff	3.43	1.092
Compliance with average incomes in western Serbia	3.02	1.106
Compliance with customer expectations	3.17	1.019
Credit cards	4.14	.960
Special offers and discounts	3.59	1.117
Satisfaction level of relationship price/quality of assortment/service quality	3.47	.842

The above table indicates that respondents are moderately satisfied with the value of deals retailer from which you usually buy - convenience of location/facility, quality of products, quality of service and pricing/payment terms. The lowest ratings were given at the conclusion that prices in retail stores in Serbia harmonized with average incomes (mean 3.06). The highest score is recorded for the satisfaction of questioned people with the retail store location in which it is most often bought (mean 4.39). The analysis of results for the full sample, we can conclude that there is a moderate degree of loyalty of subjects. In addition to the arithmetic mean, the above table includes the calculated standard deviations, which measures the degree of agreement or disagreement with the subjects listed findings. The values of the standard deviation is, for all statements, ranging from 0.816 to 1.094, indicating a similar level of disagreement (heterogeneity) of all subjects in grades 18 statements.

Table 3 shows the results of descriptive statistical analysis of the third part of the questionnaire that analyzes satisfaction, trust and loyalty of respondents in the retail sector. The results of the analysis to the whole sample (n=206) suggest that the estimates of respondents, in this part of the questionnaire, moving in the interval 3.66-4.16.



Table 3. Results of descriptive statistical analysis - confidence, satisfaction and loyalty of customers, related to the retailer where they usually shopping

The statements - refer to the trust, satisfaction and loyalty of subjects	Arithmetic Mean	Standard Deviation
Health product safety	3.96	.888
Confidence in the staff and service	3.66	2.174
Safety retail purchase	3.93	.889
Satisfaction 1 - I consider shopping at this store a good decision	3.97	.866
Satisfaction 2 - I believe that this store better than others	3.77	.846
Satisfaction 3 - I am satisfied with this retailer	3.96	.849
I regularly doing shopping at this store	4.16	.775
I prefer shopping at this store more than in other	4.08	.866
I would recommend this store to my friends	3.71	.845

Reviewing the data in the table above, we can conclude that the respondents rated satisfaction /confidence/loyalty to the retailer where purchased mostly moderate grades. The lowest ratings were given at the conclusion that the respondents have confidence in the staff of a retail outlet and service that they provide (mean 3.66). The highest score was given for the conclusion that the respondent regularly buys in a specific retail store, which is one of the key indicators of loyalty to the same subjects (mean 4.16). The values of the standard deviation is, for all the statements in the third part of the questionnaire, ranging from 0775 to 2174, which indicates the most similar to the level of disagreement of the respondents regarding the 9 statement.

Results showed a significant departure from the normal distribution, but the subsequent analysis indicated that virtually no difference between Pearson and Spearman correlation between the previously defined variables. Considering that the three observed variables treated as scale of satisfaction, reliability analysis was performed for them. Analysis was performed by model Cronbach's alpha coefficient, whose values range between 0 to 1 [16]. Nunnally (1978) recommends that the confidence threshold should not be less than 0.7, which is not undermined in this study. High value of Cronbach's alpha ( $\alpha = 0.97$ ) is proof of a high degree of reliability of the statements listed as determinants of satisfaction with the retailer where usually buy. The analysis of the reliability of the statements which measures the confidence of the respondents in the retail store is calculated Cronbach's  $\alpha = 0.52$ , which is unsatisfactory, but again, these are just three observations. High value of Cronbach's alpha coefficient is calculated by measuring the reliability of statements that measure the loyalty of customers, related to retailer where they usually buy ( $\alpha = 0.94$ ).

All predictors of respondents, in the second part of the questionnaire, grouped into four dimensions:

- convenience,
- quality of service,
- assortment and
- prices and conditions of payment.

Analysis of the previously defined predictors started so that each of them is treated as a separate measuring scale that measures one construct. The constructs were briefly called:

convenience, service, assortment and price/payment terms. After that, the analysis of the reliability of the model of Cronbach's alpha to check the validity and reliability of observation predictors in this study on the proposed manner (Table 4). For the convenience of subscale is calculated satisfactory Cronbach's  $\alpha = 0.84$ , assortment  $\alpha = 0.86$ , quality of service  $\alpha = 0.89$  and price/payment terms  $\alpha = 0.75$ , which proves the reliability of dimensions of respondents' satisfaction with the retail object.

Table 4. Values of Cronbach's alpha coefficients

Constructs	Cronbach's Alpha
Trust	0.52
Satisfaction	0.97
Loyalty	0.94
Convenience	0.84
Quality of service	0.89
Assortment	0.86
Prices and conditions of payment	0.75

After the reliability analysis was conducted correlation analysis of all the variables: the convenience, assortment, services, prices, satisfaction, trust and loyalty. The results showed that the correlation between any two of the previously listed variables statistically significant, whereby it is proved the existence of bonds between them. All statistically significant correlations are indicated in Table 5 with \*\* (\*\* denotes  $p < 0.01$ ). Guided by Cohen's recommendation [17] to determine the strength of the correlation between variables, we can conclude that a strong correlation ( $r = 0.50$  to  $1$ ), there is the satisfaction-trust relations ( $r = 0.681$ ), satisfaction-loyalty ( $r = 0.902$ ) and trust-loyalty ( $r = 0.663$ ), which confirms the strong relationship between these variables. The results of correlation analysis pointed out the strong correlation between service-satisfaction ( $r = 0.533$ ) and the level of price/payment terms-satisfaction ( $r = 0.589$ ), indicating that the quality of services and the level of price / payment terms dominantly determine satisfaction of respondents retail facility in which it is most often bought at the same time are strongly correlated to the persuasion of their loyalty (strong correlation between these variables and loyalty).

Table 5. Results of Correlation Analysis

	Satisfaction	Convenience	Assortment	Service	Prices	Trust	Loyalty
Satisfaction	1	.437**	.464**	.533**	.589**	.681**	.902**
Convenience	.437**	1	.676**	.327**	.595**	.323**	.418**
Assortment	.464**	.676**	1	.458**	.631**	.306**	.473**
Service	.533**	.327**	.458**	1	.495**	.384**	.550**
Prices	.589**	.595**	.631**	.495**	1	.393**	.548**
Trust	.681**	.323**	.306**	.384**	.393**	1	.663**
Loyalty	.902**	.418**	.473**	.550**	.548**	.663**	1

(\*\* denotes  $p < 0.01$ )

Implementation of regression analysis, after correlation, aims to identify key predictors of customer satisfaction in the retail sector and winning the loyalty of the same. Firstly, the influence of the independent variables convenience, assortment, service, prices and confidence to the satisfaction of the respondents, as the dependent variable. Model explains in general about 79% of variance of the dependent variable ( $R^2 = .79$ ,  $F(5, 200) = 64.35$ ,  $p < 0.01$ ).

Table 6. Table of regression coefficients - customer satisfaction as a dependent variable

	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Intercept)	.576	.220		2.622	.009
Convenience	.042	.069	.038	.600	.549
Assortment	.042	.066	.042	.637	.525
Service	.169	.047	.190	3.574	.000
Prices	.266	.065	.257	4.088	.000
Trust	.384	.039	.482	9.766	.000

Table 6 shows the results of the regression analysis in which loyalty is defined as a dependent variable, while the convenience, assortment, service, prices and confidence are defined as independent variables. Here, based on the statistical significance of t-tests for regression coefficients shows that a significant contribution to the prediction of loyalty with quality of service, the level of price/payment terms and trust. It is the dominant predictors simultaneously determine customer satisfaction in the retail sector, which is indirectly confirmed by the fact that customer satisfaction in the retail sector a key prerequisite for winning their loyalty.

The results of regression analysis showed the quality of service and the level of price/payment terms as predictors who have the strongest relationship with customer satisfaction, by gaining their trust and loyalty. These elements of the offer in the retail sector are at the same time, the results of the regression analysis, crystallized as the most important determinants of customer satisfaction and winning their loyalty. We come to the conclusion

that improving the quality of services in retail stores (courtesy of staff and their expertise) and the alignment of the price level with the average income of the population, with the ability to use credit cards and checks, and special discounts, significantly improves and develops long-term partnership with customers, with the establishment efficient and effective CRM.

## 6. CONCLUSIONS

In this paper is conducted analyze to determine the impact of predictors of customer satisfaction on the efficiency and effectiveness of CRM in the retail sector. At the same time, the study seeks to examine the causal relationship between customer satisfaction and long-term loyalty, as an indicator of the efficiency and effectiveness of CRM. Survey respondents (n = 206) was conducted in the Serbia, and to analyze the data collected was used IBM SPSS statistical software through which conducted a descriptive analysis, correlation and regression analysis.

Results of descriptive statistical analysis showed that retail store location significantly determines the decision the customer on the purchase of the same. Respondents rated moderate assessments satisfaction / confidence / loyalty to the retailer where usually buy, which is due to the fact that customers are buying at specific retail outlets primarily due affordable location thereof. After conducting correlation analysis showed statistically significant correlations among all the variables that are the subject of research (convenience, service quality, product range, the level of price / payment terms, customer satisfaction, customer confidence and customer loyalty). There existed a strong correlation ( $r > 0.5$ ) at distances customer satisfaction-customer confidence, customer satisfaction-loyalty and trust of the customer-loyalty. The results of correlation analysis pointed out the strong correlation between service-satisfaction ( $r = 0.533$ ) and the level of price / payment terms-satisfaction ( $r = 0.589$ ), indicating that the quality of services and the level of price / payment terms dominantly determine satisfaction of respondents retail facility in which it is most often bought at the same time are strongly correlated to the persuasion of their loyalty (strong correlation between these variables and loyalty). Results of regression analyzes were also crystallized the quality of service and the level of price / payment terms as key factors of customer satisfaction and loyalty. Each of the previously defined dimensions of customer satisfaction is reliable, which has proven by satisfactory values of Cronbach's alpha coefficients.

The interdependence between customer satisfaction - customer confidence – customer loyalty is confirmed in this study, in the same way as they did the authors Chen, Wang, Wang and Tsai 2010. By calculating the correlation coefficients for all variables showed that all correlation coefficients are statistically significant and very high. The conclusion is that satisfaction, loyalty, trust and practical measures one latent construct. The research requirements and needs of customers, as well as their attitudes regarding the current offer specific retail store, the retailer gets an insight into what needs to be improved to ensure that customers are satisfied, a CRM and SCM more efficient and effective. Results of this study indicated that the improvement of the quality of service in retail stores (courtesy of staff and their expertise) and the alignment of the price level with the average income of the population, with the ability to use credit cards and checks and action discounts, significantly improves and develops long-term partnership between retailers and customers in Serbia, with the establishment of an efficient and effective CRM.

## REFERENCES

- [1] Chen, Y-H., Wang, X., Wang, Y-Y., Tsai, S-C., The moderating effect of Retailer Image on Customer's Satisfaction-Loyalty Link, Department of Business Administration, Asia University, Taiwan, China, 2010, 633-638.
  - [2] Ballou, R., Business Logistics/ Supply Chain Management, Pearson-Prentice Hall, New Jersey, USA, 2004, 6-7.
  - [3] Johonson, W., Weinstein, A., Superior Customer Value in The New Economy, CRC Press, New York, 2008.
  - [4] Szwarc, P., Researching Customer Satisfaction and Loyalty: How to find out what people really think, Kogan Page Limited, SAD, 2005, 11-12.
  - [5] Jambulingam, T., Kathuria, R., and Nevin, J.R., Fairness-trust-loyalty relationship under varying conditions of supplier-buyer interdependence, Journal of Marketing, Vol 19, No 1, (2011), 41-42.
  - [6] Rai, K. A., Customer Relationship Management: Concepts and Cases, Faculty of Management Studies, Banaras Hindy University, Varanasi, Second Edition, 2013, 16-20.
  - [7] Kaur, H., Soch, H., Mediating roles of commitment and corporate image in the formation of customer loyalty, Journal of Indian Business Research, 5(1), (2013), 33-51.
  - [8] Cooper, M. C., Lambert, D. M., Pagh, J. D., Supply Chain Management: More Than a New Name for Logistics, The International Journal Of Logistics Management, Vol. 8, No.1, (1997), 2- 10
  - [9] Wisner, J. D., Tan, K-C., Leong, G. K., Principles of Supply Chain Management, Cengage Learning Customer and Sales Support, 2012, 1-20.
  - [10] Güngör, Ö. M., Aktoluğ, K., Understanding the changes in supply chain management: extensions with a strategic marketing perspective, Yeditepe University, Social Sciences Institute, Kayisdagi Yerlesimi, Istanbul, Turkey, 2012, 4-8.
  - [11] Payne, A. and Frow, P., Customer relationship management: from strategy to implementation, Journal of Marketing Management, (2006),136-140.
  - [12] Amoako, G., Emmanuel, A., Christiana B. and Katah, R., The impact of effective customer relationship management (CRM) on repurchase, African Journal of Marketing Management, Vol. 4(1), (2012), 19-22.
  - [13] Parikh, D., Measuring Retail Service Quality: An Empirical Assessment of the Instrument, Vikalpa, Vol. 31, No. 2, (2006), 45-55.
  - [14] Khare, A., Parveen, C., Rai, R., Retailer behavior as determinant of service quality in Indian retailing, Journal of Retail and Leisure Property, 9(4), (2010), 303–317.
- Morgan, R., Hunt, S., The Commitment-Trust Theory of Relationship Marketing, Journal of Marketing, Vol 58, No. 3, (1994), 22.

- [15] Nanic, A., Research about consumer's habits and the country of origin importance, *Socioeconomica- The Scientific Journal for Theory and Practice of Socio-economic Development* 2015, 4(7), (2015), 223-232.
- [16] Leech, N. L., Barrett, K. C., Morgan, G. A., *SPSS for Intermediate Statistics*, London, Second Edition, 2005, 1-188.
- [17] Cohen, J., *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Hillsdale, NJ: Erlbaum, 1988, 79-81.

## REVITALIZATION OF UTVA - AVIO INDUSTRIJA D.O.O. FACTORY

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**Abstract:** This paper analyzes the current state of "Utva Aircraft Industry Ltd", the largest company which manufactures aircrafts in The Republic of Serbia. In the first part, the global pilot training aircrafts market is analyzed. In the second part, emphasis is on analyzing the operations of aircraft factory "Utva" including the last major project.

On the basis of these results, four possible scenarios for the company's future have been proposed. The scenarios include: the transition to the production for civilian purposes; mixed civilian-military program; comprehensive integration of Serbian aviation industry; and, finally, selling the factory.

**Keywords:** Aircraft manufacturing industry, Utva, management, revitalization

### 1. UVOD

Fabrika aviona „Utva - avio industrija d.o.o“ (u daljem tekstu „Utva“) predstavlja najveći privredni subjekt na prostoru Republike Srbije koji se bavi proizvodnjom vazduhoplova, odnosno proizvodnjom lakih školskih aviona za početnu i osnovnu obuku pilota školsko borbenih aviona, kao i strukturnih komponenti za vojne i civilne potrebe. Fabrika aviona „Utva“, nastala je krajem 1930-ih godina prošlog veka i ima izuzetno bogatu tradiciju proizvodnje vazduhoplova. Vrlo brzo po nastajanju, „Utva“ je bila gotovo ugašena u periodu 1941-1945, a najveći udarac doživela je prilikom NATO bombardovanja 1999. godine. U tom periodu u svom tržišnom segmentu, „Utva“ je samostalno ili u kooperaciji predstavila više projekata letelica: *Bücker Bü-131 D* (1940); *251 Trojka* (1948); *212* (1950); *213* (1952); *Aero-3* (1954); *Utva-56* (1959); *Utva-60* (1961); *Utva-65* (1965); *Utva-66* (1966); *Utva-75* (1976); *Lasta* (1985). Početkom 21. veka, „Utva“ je bez većeg uspeha pokušavala da se prilagodi novim zahtevima tržišta, pod uticajem finansijske krize, gubitka tržišta, manjkavosti tehnologije, odliva obrazovanog i iskusnog kadra i nesigurnog statusa. Ovaj rad se bavi analizom trenutnog stanja u kome se nalazi fabrika aviona „Utva - avio industrija d.o.o“, kao i stanjem konkurencije, a po obavljenoj analizi predložen je set mogućih pravaca njene revitalizacije. Predložena su moguća scenarija za budućnost fabrike koja podrazumevaju: prelazak na proizvodnju za civilne potrebe; mešoviti civilno-vojni program; sveobuhvatnu integraciju srpske vazduhoplovne industrije; i, na posletku, prodaju fabrike. U zaključku je dat nacrt optimalnog rešenja za budućnost fabrike, ali i za dalji razvoj industrije vazduhoplova u Srbiji.

## 1. KOMPANIJA UTVA

### 1.1. TRENUTNO STANJE

Fabrika aviona „Utva“ se bavi proizvodnjom lakih školskih aviona za početnu i osnovnu obuku pilota školsko-borbenih aviona, kao i strukturnih komponenti za vojne i civilne potrebe. Smeštena je u Pančevu u blizini dve važne drumske saobraćajnice (Evropski put E-70 i Evropski put E-75), kompleksa luke „Dunav“, u Pančevu, luke „Beograd“, važne železničke saobraćajnice Beograd-Bar, kao i aerodroma „Nikola Tesla“ i vojnog aerodroma „Batajnica“. U okviru fabričkog kompleksa nalazi se uređena travnata poletno-sletna staza sa betonskom stajankom i tornjem kontrole leta.

Fabrika „Utva“ je društvo sa ograničenom odgovornošću i do početka 2017. godine poslovala sa sledećom strukturom kapitala: 45,08% vlasničkog udela imala je Republika Srbija, 43,79% Fond za razvoj Republike Srbije, 7,14% lokalna samouprava i 3,98% ostali. [1]

Od februara 2017. godine, 95,9% vlasništva nad fabrikom „Utva“ preuzela je državna kompanija za trgovinu naoružanjem i vojnom opremom „Jugoimport – SDPR“. [2]

Glavni proizvod fabrike aviona „Utva“ trenutno je laki školski avion za početnu i osnovnu obuku pilota *Lasta-95*. Proizveden je i po jedan prototip letelica *Kobac* i *Sova*. Glavni klijenti su Ratno vazduhoplovstvo Iraka, kome je isporučeno 20 aparata *Lasta-95* (verzija *Lasta-95N*) i Ratno vazduhoplovstvo i protivvazduhoplovna odbrana Republike Srbije, koje je poručilo 15 aparata *Lasta-95* (vojna oznaka *V-54*). Za potrebe RV i PVO zaključno sa 2013. godinom isporučeno je 8 serijskih aviona i 2 prototipa P1 i P2. [3] Ostvarena proizvodnja u periodu od 2011. do 2013. je data u Tabeli 1.

Tabela 1. Ostvarena proizvodnja u periodu 2011 - 2013. količinski po godinama i njena vrednost u RSD [4]

Naziv proizvoda/usluge	j. mere	Količinski			Vrednost u 000 RSD		
		2011.	2012.	2013.	2011	2012.	2013.
Avion „Lasta“	kom.	8	8	/	192.881	511.716	/
Kontejneri	kom.	20	/	14	10.500	/	6.513

Fabrika aviona „Utva“ usled finansijske situacije nije u prilici da ulaže sredstva u unapređenje tehnološkog procesa. Mašine i alati koji se koriste u fabrici datiraju još iz doba SFRJ. [5] Već dugi niz godina unazad fabrika aviona „Utva“ koristi motore inostranog porekla i trenutno je zavisna od nabavke komponenti za proizvodnju iz inostranstva. Fabrika aviona „Utva“ poseduje sertifikat standarda kontrole kvaliteta ISO 9001. Avion *Lasta-95* je projektovan u skladu sa vazduhoplovnim propisima Federal Aviation Regulation (F.A.R. - Part 23). [6], [7] Nema podataka o posedovanju sertifikata CS-23 za avion *Lasta-95*, koji podrazumeva sertifikat za normalno, uslužno, akrobatsko i putničko letenje, a koji izdaje



„Evropska vazduhoplovna agencija za bezbednost” (European Aviation Safety Agency - EASA). [8], [9]

Na osnovu pokazatelja na svetskom tržištu predviđa se pad prodaje vojnih aviona za obuku sa 212 aviona u 2010. godini na 88 aviona do 2020. godine. [10] Postoji više razloga za tako negativnu predikciju. Avioni za obuku dobijaju najniži prioritet, a u prvi plan se pozicioniraju borbeni avioni i avioni za izviđanje. Zatim, došlo je do usavršavanja simulatora zahvaljujući napretku softvera, obuka pilota se obavlja u drugim zemljama ili se piloti šalju u škole za združenu obuku poput NATO škole za pilote u Kanadi, čime se izbegava nabavka aviona za obuku za sopstveno vazduhoplovstvo. [11] Ovakve tendencije na svetskom tržištu se nepovoljno odražavaju na poslovanje fabrika koje se bave proizvodnjom vazduhoplova za potrebe obuke pilota.

Od značaja za razvoj programa fabrike je i nepovoljna starosna struktura zaposlenih u fabrici aviona „Utva“ (Tabela 2). Primetno je da veći deo zaposlenih čine radnici stariji od 50 godina. Broj zaposlenih mlađih od 35 godina je nizak i tu grupu većinom čine zaposleni na određeno vreme, što može da predstavlja veliki problem za revitalizaciju fabrike, jer se ne obučava dovoljan broj stručnjaka za specifične poslove u specifičnoj industriji. Ukupan broj zaposlenih u fabrici „Utva“ je, prema poslednjim zvaničnim podacima, iznosio 257, dok se u natpisima u medijima u 2017. navodi podatak od 200 zaposlenih. Kada je u pitanju avio industrija u svetu, istraživanja navode da najveći procenat radne snage čine zaposleni starosti od 35 do 54 godine (35-44 godine - 21% i 45-54 godine - 33%) i zbirno taj procenat iznosi 54% od ukupne radne snage. U avio industriji se očekuje veliki priliv mlade radne snage do 2028. godine. [12]

Tabela 2. Starosna struktura zaposlenih u fabrici „Utva“ [13]

Starost	-25	25-35	35-40	40-45	45-50	50-55	55+	Ukupno
Broj zaposlenih	8	37	17	16	34	66	79	257
Procenat	3,11%	14,40%	6,61%	6,23%	13,23%	25,68%	30,74%	100%

## 1.2.PROJEKAT LASTA

Kao što je već rečeno, glavni proizvod fabrike aviona „Utva“ trenutno je laki školski avion za početnu i osnovnu obuku pilota *Lasta-95*. Proizveden je i po jedan prototip letelica *Kobac* i *Sova*. Avion *Lasta-95* je započet kao projekat 1995. godine. Avion su projektovali stručnjaci Vojnotehničkog institut (VTI), a proizvodnja je poverena fabrici aviona „Utva“. Prototip je poleteo 5. februara 2009. godine i na projektu *Lasta-95* radilo je oko 100 inženjera i tehničara U decembru 2007. godine Irak je potpisao ugovor za isporuku 20 letelica tipa *Lasta-95* u verziji koja je sposobna za nošenje ubojnog tereta *Lasta-95N*. Prva tri aviona Iračko vazduhoplovstvo je primilo u avgustu 2010. godine. RV i PVO Republike Srbije je poručilo 15 letelica *Lasta-95* čija je vojna oznaka *V-54*. Prva dva aviona su isporučena u oktobru 2011. godine. [14] Poslednji avion iz serije od 20 aviona namenjenih ratnom vazduhoplovstvu Iraka je isporučen u februaru 2012. godine. Cena jedinačne letelice za potrebe RV Iraka je iznosila 300.000 dolara. [15]

Jedna od prednosti aviona *Lasta-95* je činjenica da pored primarne namene, početne i osnovne obuke pilota, pruža mogućnost izvršenja borbenih zadataka. Avion *Lasta-95* ne poseduje izbacivo sedište i ta činjenica predstavlja veliku nedostatak. Na avionu *Lasta-95*, međutim, nije došlo do primene kompozitnih materijala, čime je mogla da se dodatno smanji masa aviona, a poveća eventualno nosivost goriva ili ubojnog tereta. Zbog istorija udesa avion *Lasta-95* nema dobru reputaciju. Promenom taktičko-tehničkih zahteva i realizacijom programa *Lasta-95*, dobijen je avion za početnu i određene segmente osnovne obuke pilota. Ako se pažljivo pogledaju svetski trendovi, može se uočiti tendencija sve veće upotrebe aviona na turboelisni pogon za osnovnu i, delom, naprednu obuku, što svakako ne ide u prilog perspektivi daljeg razvoja i mogućnosti plasmana aviona *Lasta-95*. Danas je segment primarne obuke pilota dobrim delom pokriven savremenim simulatorima, čije je tržište u ekspanziji.

## 2. VODEĆI KONKURENTI NA TRŽIŠTU

U cilju boljeg razumevanja stanja na tržištu na kome se nalazi fabrika „Utva“, u ovom delu kratko su analizirani vodeći konkurenti fabrice aviona „Utva“ koji se bave proizvodnjom aviona za obuku pilota. Taj segment tržišta ne podrazumeva samo avione za početnu (primarnu) i osnovnu obuku pilota, već prošireni segment koji potencijalno može biti primamljiv za „Utvu“ u slučaju uspešne revitalizacije. U segmentu obuke za potrebe odbrane najveći konkurenti fabrike aviona „Utva“ predstavljaju već etablirane kompanije, kao što su Leonardo (bivša Alenia Aermacchi), Pilatus, Embraer, Grob Aircraft i Yakovlev. Međutim, u ovom segmentu, kao i u drugim segmentima avioindustrije pojavljuje se nova konkurencija, koja zauzima mnoge segmente tržišta, jačajući svoju konkurentnost nižom cenom, ali i nešto nižim performansama (Turkish Airspace Industry, Korea Aerospace Industries, Hongdu Aviation Industry Group).

„Leonardo“ (bivša „Alenia Aermacchi“) je italijanska kompanija koja predstavlja jednog od svetskih lidera na polju vazduhoplovne industrije. Oblast njene aktivnosti podrazumeva projektovanje, razvoj, proizvodnju i podršku u pogledu realizacije proizvodnje vazduhoplova za komercijalnu i vojnu upotrebu, aviona za obuku pilota kao i bespilotnih letelica. U 2016. godini kompanija je zabeležila prihod od gotovo 3,5 milijardi evra, a broj zaposlenih je u čitavoj grupi dostigao 45.000. [16] Velika prednost kompanije „Leonardo“ u odnosu na konkurente na tržištu, kada je u pitanju segment koji obuhvata proizvodnju aviona za obuku, leži u činjenici da samostalno proizvodi ceo spektar aviona koji pokriva različite segmente obuke (*SF-260E*, *M-345 HET* i *M-346*). Pored njih ova kompanija proizvodi široki dijapazon borbenih aviona (*Eurofighter*), transportnih aviona, aviona za patrolu i izviđanje iz vazduha, komercijalnih aviona (ATR), helikoptera, kao i delova letelica za kompanije Boeing i Airbus. [17]

Švajcarska kompanija „Pilatus“ osnovana je još 1939. godine. U 2016. godini kompanija „Pilatus“ je ostvarila prodaju vrednu 826 miliona švajcarskih franaka (što predstavlja pad u odnosu na period od 2013. do 2015, kada je prodaja iznosila preko rekordnih milijardu švajcarskih franaka godišnje, ali znatno niži nego što je kompanija očekivala), plasirana je 91 letelica, što predstavlja za 20 letelica bolji rezultat nego u 2015. godini. [18] Ukupan broj zaposlenih u 2016. godini je iznosio 1.961. Proizvodni program kompanije obuhvata letelice namenjene za obuku pilota, tzv. *Short Take Off and Landing* (tzv.

STOL) avione, turboelisne poslovne avione i poslovne avione sa dvoprotočnim turbomlaznim motorom. [19]

„Embraer“ je brazilska kompanija koja slovi za jednu od najvećih kompanija na polju vazduhoplovne industrije. „Embraer“ ima izuzetno bogatu ponudu vazduhoplova, koja obuhvata komercijalnu, poslovnu, vojnu i poljoprivrednu primenu. Fabrika je u 2015. godini isporučila 101 avion, uz naručenih još 170 (zabeležen prihod u iznosu od 6,5 milijardi dolara). [20] Kompanija imala 19.373 zaposlenih, a 90% leaderskih pozicija se popunjava iz same kompanije. [21]

„Grob Aircraft“ je jedan od najpoznatijih svetskih proizvođača aviona, a predstavlja i svetskog lidera kad je u pitanju primena kompozitnih materijala za izradu vazduhoplova. Od svog nastanka fabrika je prodala preko 3.500 aviona na globalnom nivou i broji 150 zaposlenih. Proizvodnja obuhvata letelice namenjene za obuku pilota (*G 120TP*) i avione čija je namena za izviđanje i nadgledanje (*G 520NG*). [22]

Od svog osnivanja 1932. godine biro „Yakovlev“ proizveo je preko 70.000 aviona sa oznakom *Yak*. Od tog broja više od 40.000 aviona je bilo proizvedeno za vreme II svetskog rata. Trenutno se izdvajaju sledeći programi: avioni za obuku pilota: *Yak-52M*, *Yak-152* i *Yak-130*; i bespilotne letelice: *Albatros* i *Expert*. [23]

„Turkish Airspace Industry“ (TAI) je turska kompanija koja je osnovana 2004. godine u saradnji sa američkim partnerima sa ciljem realizacije opremanja Turskog ratnog vazduhoplovstva avionom *F-16 Fighting Falcon*. Kompanija se sastoji od više grupa koje se bave proizvodnjom različitih tipova letelica. Grupa za proizvodnju vazduhoplova se bavi proizvodnjom aviona za obuku (*HÜRKUS*), borbenih aviona (*F-16 Fighting Falcon*), kao i modernizacijom postojećih vazduhoplova. [24]

Kompanija „Korea Aerospace Industries“ (KAI) osnovana je 1999. godine i sa svojim proizvodnim programom napravila izuzetno brz prodor na tržište i u segmentu proizvodnje aviona za obuku pilota zabeležila je veoma zapažene rezultate. Delatnost kompanije obuhvata proizvodnju aviona, helikoptera, bespilotnih letelica, delova konstrukcije za „Boeing“ i „Airbus“, programe modifikacije, programe održavanja, trenažere i razvoj satelita. U 2016. godini kompanija je brojila 3.905 zaposlenih, a preko 40% zaposlenih ima stepen mastera ili viši. [25] Prodaja je u 2016. godini dostigla je 400 jedinica, sa tendencijom daljeg rapidnog rasta. U proizvodni program kompanije KAI uključeni su avioni za obuku pilota: *T-50* (izuzetno tražen, razvijen u saradnji sa čuvenim američkim proizvođačem vazduhoplova „Locheed Martin), *KT-1* i *KC-100* i helikopteri: *KUH SURION* i *LAH/LCH*. [26]

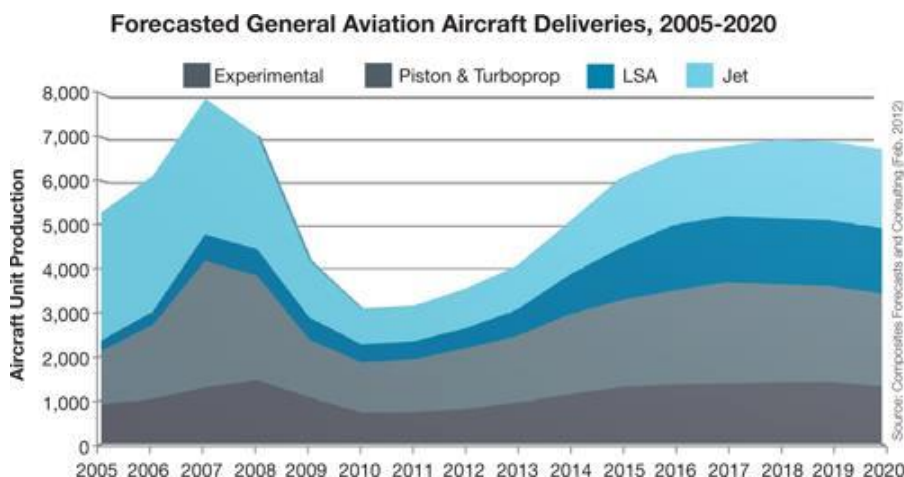
„Hongdu Aviation Industry Group“ je kineska kompanija iz oblasti avioindustrije osnovana 1951. godine i sastavni je deo državne korporacije „[Aviation Industry Corporation of China](#)“ (AVIC). Proizvodni program kompanije obuhvata lake avione za opštu upotrebu, avione za obuku pilota i borbene avione. Od aviona namenjenih za obuku pilota treba svakako apostrofirati *Hongdu JL-8* i *Hongdu L-15 Falcon*. [27] *Hongdu JL-8* je avion sa dvoprotočnim turbomlaznim motorom, čija je namena napredna obuku pilota kao i pojedini segmenti borbene obuke. Cena jedinačne letilice iznosi između 5 i 10 miliona dolara u zavisnosti od broja poručenih aparata i opreme, što ga čini izuzetno popularnim avionom prvenstveno među zemljama sa ograničenim vojnim budžetima. [28]

### 3. PREDLOZI ZA REVITALIZACIJU FABRIKE

Kako je Fabrika aviona „Utva – avio industrija“ od februara 2017. godine u većinskom vlasništvu (96% vlasništva) državne kompanije za trgovinu naoružanjem i vojnom opremom „Jugoimport – SDPR), otvorene su mogućnosti za njenu revitalizaciju. Analizom trenutnog stanja i mogućnosti fabrike „Utva“ i razvoja konkurencije, može se doći do nekoliko scenarija – predloga za revitalizaciju, koji bi obuhvatali: civilni proizvodni program, mešoviti civilno-vojni proizvodni program, integraciju srpske vazduhoplovne industrije, kao i, eventualnu prodaju fabrike. Dat je i optimalan predlog revitalizacije fabrike.

#### 3.1. CIVILNI PROIZVODNI PROGRAM

Fabrika aviona „Utva“ je svoju proizvodnju fokusirala u samo jednom pravcu, na proizvodnju aviona namenjenih za početnu i osnovnu obuku pilota za vojne potrebe. Segment tržišta letelica namenjenih za vojnu obuku ograničenog karaktera, kako po broju letelica tako i po vrednosti zabeleženog prometa. Za razliku od njega, tržište aviona za civilnu upotrebu je u stalnom usponu i veoma je dinamično. Ukoliko pogledamo Sliku 1, videćemo da je prema prognozama koje se odnose na isporuku aviona za potrebe civilne avijacije u periodu 2005 – 2020. godina, primetan rast potražnje na ovom segmentu tržišta i da on obuhvata i one njegove delove koji bi, uz manja finansijska ulaganja, bili dostupni fabrici aviona „Utva“. Treba napomenuti da bi i na tehnološkom nivou razlika bila manje primetna, nego kada je u pitanju proizvodnja vojnih vazduhoplova.



Slika 1. Prognoza isporuka aviona za civilnu avijaciju u periodu 2005 – 2020. [29]

Ukoliko bi fabrika aviona „Utva“ posvetila veću pažnju civilnoj avijaciji, neizbežno bi se suočila sa nekoliko izazova koji bi zahtevali korenitu promenu dosadašnje prakse funkcionisanja. Tu spadaju, prvenstveno standardizacija procesa, razvoj letelice vrhunskih letnih performansi i dizajna, primena novih tehnologija kada je u pitanju primena kompozitnih materijala. Ono što je od 2017. godine olakšavajuća okolnost, je da „Yugoimport SDPR“ može obezbediti angažovanje renomirane agencije na polju marketinga, kao i postprodajne aktivnosti jer se klijentu mora obezbediti redovno snabdevanje rezervnim

delovima kao i dobru razgranata servisna mreža i garancija na celokupnu konstrukciju letelice (sve reklamacije u avijatičarskom žargonu rečeno od „propelera do repa“ u trajanju od najmanje 5 godina). Većina proizvođača nudi taj vremenski period trajanja garancije za pojedine sklopove letelice, ali ne i za vazduhoplov u celini. Ukoliko bi se fabrika aviona „Utva“ opredelila za proizvodnju aviona za civilnu avijaciju jedna varijanta bi podrazumevala univerzalnu letelicu, koja bi predstavljala neku vrstu naslednika aviona *Utva-56/Utva-60/Utva-66*.

### 3.2. MEŠOVIT CIVILNO-VOJNI PROIZVODNI PROGRAM

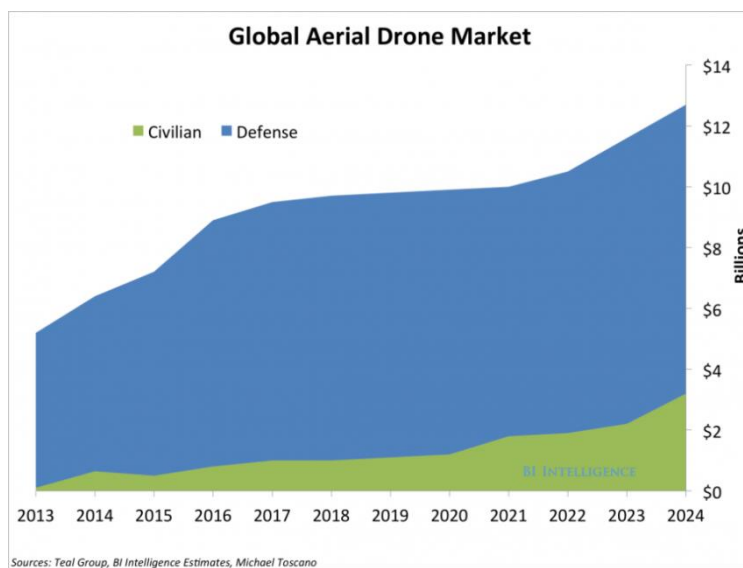
Na osnovu istraživanja, američka Savezna uprava za avijaciju (Federal Aviation Administration) je napravila predikciju po kojoj će doći do rasta potražnje za poljoprivrednim avionima u periodu od 2014. do 2034. godine, pogotovo za onim letelicama koje koriste turboelisne motore. [30] Poljoprivredni avion, kao novi avion namenjen privrednoj avijaciji, morao bi da poseduje turboelisnu pogonsku jedinicu u skladu sa savremenim rešenjima. Brižljivom konstrukcijom potrebno je postići što nižu minimalnu brzinu, kao i dobre manevarske osobine na malim visinama. Maksimalna visina bi iznosila minimalno 10.000 metara. Dolet aviona bi iznosio ne manje od 1.200 km. Integracija savremene navigacione opreme ne bi predstavljala problem, jer su posle realizacije aviona *Lasta-95* stečena korisna znanja na tom polju. Bilo bi poželjno da avion ima rezervoar za smeštaj između 1.800 i 2.000 litara korisnog tereta. Stajni trap bi bio neuvlačeći, ali rešenje tipa tricikl primenjeno na avionu *Utva-75AG* ustupilo bi mesto konvencionalnom stajnom trapu koji je daleko podesniji za poletanje sa travnatih poletno-sletnih staza. Mora da se obezbedi stabilan let u što većem dijapazonu brzina i izuzetno dobra preglednost iz kabine.

Druga letelica koju bi fabrika aviona „Utva“ mogla da proizvede bi obuhvatala avion za osnovnu obuku pilota sa COIN (*Counterinsurgency*) karakteristikama. Poslednji sukobi u Avganistanu i Iraku sugerišu da linija koja razdvaja dve sukobljene strane neće uvek biti jasno definisana i povećava se verovatnoća dejstvovanja po sopstvenim položajima, odnosno dolazi do tzv. „prijateljske vatre“. Suština COIN filozofije je da avion ima stalni vizuelni kontakt sa ciljem na koga može da dejstvuje sa velikom učestalošću, što omogućava velika okretnost aviona, kao i njegova mala brzina. Koncept letelice bi morao biti brižljivo isplaniran i podrazumevao bi izradu savremenog aviona u skladu sa najvišim svetskim standardima za let danju i noću u složenim meteo uslovima. Letelica bi posedovala turboelisnu pogonsku grupu snage od 1200-1600 KS, klimatizovanu kabinu sa savremenim izbacivim sedištimama i oklopnom zaštitom, kao i sa savremenom napadno-navigacionom opremom. Avion bi morao da poseduje HOTAS sistem (*Hands on Throttle and Stick*), savremeni HUD (*Head-Up Display*) i više MFD-a (*Multi Functions Display*). Na avionu bi bili integrisani savremeni opto-elektronski senzori. Oprema aviona bi podrazumevala između ostalog i signalizator radarskog ozračenja kao i signalizator približavanja rakete, GPS/INS uređaj za navigaciju radarski visinomer. Maksimalna brzina bi bila u intervalu od 550-600 km/h. Krstareća brzina ne bi smela biti manja od 450 km/h. Trajanje leta ne bi smelo biti kraće od 4 časa. Maksimalni dolet aviona ne bi smeo biti manji od 1.600 km. Plafon leta bi podrazumevao maksimalnu letnu visinu od oko 10.000 metara. Na krilima bi se nalazila četiri nosača ubojnog tereta, na koje bi se po potrebi mogli smestiti i dodatni rezervoari za gorivo.

### 3.3. INTEGRACIJA SRPSKE VAZDUHOPLOVNE INDUSTRIJE

Sušтина ove integracije je stvaranje kompanije koja bi ujedinila više domaćih preduzeća koja se bave vazduhoplovnom industrijom (bez obzira na strukturu vlasništva) i proizvodnjom raketnog naoružanja, kao i renomirane institute, koji se trenutno nalaze u sklopu Ministarstva odbrane. Pomenuta kompanija bi predstavljala nukleus daljeg razvoja srpske avio industrije. Na jednom mestu bi bio okupljen najkvalitetniji kadar na polju vazduhoplovne industrije sa kojim Srbija u ovom trenutku raspolaže. U njegovom sastavu bi se našli: Utva avio industrija d.o.o; Vazduhoplovni zavod Moma Stanojlović; Vojnotehnički institut – sektor za vazduhoplove; Tehnički opitni centar – sektor za vazduhoplovna sredstva; EDePRO - privatna kompanija.

Može se zaključiti da bi se formiranjem nove, zajedničke, kompanije stekli uslovi da se pristupi daleko ambicioznijim projektima u odnosu na one postojeće, sa većom verovatnoćom njihove uspešne realizacije. Na osnovu udruživanja, bio bi otvoren put za nove, zajedničke projekte: modernizacija aviona *G-4 Super Galeb* do nivoa *G-4MD*; razvoj novog školskog aviona za osnovnu/borbenu obuku; kao i projekat bespilotnih letelica. Segmentu proizvodnje bespilotnih letelica bi se morala posvetiti izuzetno velika pažnja. O razmerama tržišta bespilotnih letelica najbolje svedoči Slika 2, gde je prikazana predikcija tržišnih kretanja kako za vojne, tako i za bespilotne letelice namenjene za civilnu upotrebu. Navedeni podaci opravdavaju stepen ulaganja u ovu oblast avio industrije koja je u velikom usponu.



Slika 2. Svetsko tržište bespilotnih letelica [31]

### 3.4. PRODAJA FABRIKE

Fabrika aviona „Utva“ se čak 16 godina nalazila u fazi restrukturiranja. Za sve to vreme Agencija za privatizaciju nije uspjela da pronade strateškog partnera za fabriku. Fabrici nije produžen rok za privatizaciju i od februara 2017. godine se nalazi u vlasništvu (95,9% vlasništva) državne kompanije za trgovinu naoružanjem i vojnom opremom „Jugoimport –

SDPR“. Postavlja se pitanje kome je u interesu da kupi fabriku koja poseduje zastarele mašine, polurazrušene kapacitete i pri tome nema ugovorenu proizvodnju većeg obima? Prednost fabrike svakako predstavlja vlasništvo nad 481.683 m<sup>2</sup> ili 48,17 hektara zemljišta, od čega su 168.602 m<sup>2</sup> ili 16,86 hektara oranice [32] Međutim ta prednost zbog atraktivne lokacije fabrike predstavlja i opasnost, jer potencijalnom kupcu možda nije u interesu da fabrika nastavi da se bavi svojom dosadašnjom delatnošću. Fabrika aviona „Utva“ ima veliki pokretački potencijal za celokupnu privredu Srbije. Postoji mogućnost realizacije partnerskih odnosa sa pojedinim kompanijama koje se bave avio industrijom, ali se oni mogu štetno odraziti na perspektivu kompanije ukoliko bi se sveli samo na izradu pojedinih komponenti i strukturnih elemenata od strane fabrike Utva, koje bi partneri ugrađivali u svoje vazduhoplove. Takvi poslovi svakako mogu doneti dodatnu finansijsku dobit i doprineti ugledu kompanije, ali uz preduslov da predstavljaju dopunsku delatnost fabrike uz dalji kontinuirani razvoj sopstvenih projekata.

#### 4. ZAKLJUČAK

U okviru predloga za rešavanje teške situacije u kojoj se nalazi fabrika „Utva“ avio industrija d.o.o, ponuđena su 4 moguća rešenja. Prva dva predloga bi od države iziskivala finansijska ulaganja različita kako po obimu, tako i po dinamici. Treći predlog bi, osim velikih finansijskih ulaganja, podrazumevao velike, sa pravom se može reći, tektonske promene u okviru funkcionisanja više privrednih subjekata i korenite promene u dosadašnjoj organizaciji i funkcionisanju Ministarstva odbrane, ali bi to bio jedini put koji bi garantovao očuvanje avio industrije na ovim prostorima. Ključni činilac u realizaciji bilo kog predloga je država i njena spremnost da se aktivnije uključi u rešavanje nagomilanih problema.

Predlog koji bi podrazumevao integraciju vazduhoplovne industrije bi predstavljao najbolje rešenje u ovom trenutku. Jednostavno rečeno, do uspešne realizacije pojedinih projekata može doći samo ukoliko se objedinjeno angažuju svi raspoloživi kapaciteti srpske vazduhoplovne industrije. Navedeni projekti, koji bi mogli da se realizuju su obimniji i zahtevniji u odnosu na projekte koji su pomenuti u drugim predlozima, ali ukoliko se već izvrši tako korenita reforma i fuzija najkvalitetnijeg naučnog kadra iz oblasti avio industrije na jednom mestu, rezultat ne bi smeo da izostane. Naravno ukoliko je izrada novog aviona sa dvoprotočnim turbomlaznim motorom za osnovnu obuku isuviše zahtevna, može se realizovati neki drugi projekat poput COIN aviona. Kompanija ne bi bila vezana samo za poslove iz domena odbrane, već bi mogla da pristupi u kasnijim fazama realizaciji nekih od pomenutih civilnih projekata koji se nalaze u okviru drugih predloga. Treba intenzivirati rad na razvoju bespilotnih letelica, kako za vojnu tako i za civilnu primenu, jer to tržište beleži najveći rast.

Postoje poslovi koji se moraju svakako obaviti bez obzira na dalji pravac u kome bi se kretala fabrika aviona „Utva“. Oni podrazumevaju bolji marketinški nastup koji započinje, simbolično, izradom web prezentacije, a kulminira formiranjem stalne akro grupe koja bi na aeromitinzima demonstrirala kvalitet proizvedenih letelica, bilo da se radi o fabrici aviona „Utva“, ili pak o novonastaloj kompaniji koja objedinjuje kompletnu srpsku avio industriju.

Ukoliko bi fabrika aviona „Utva“ pokrenula masovniju serijsku proizvodnju bilo kog vazduhoplova, to bi se povoljno odrazilo na funkcionisanje celokupne privrede Republike Srbije. Male i srednje kompanije imaju potencijal da povećaju uposlenost radne snage na lokalnom nivou ili da ponude inovativan proizvod tržištu. Samo velike kompanije sa

serijskom proizvodnjom složenog sistema poput vazduhoplova imaju kapacitet da budu pokretači celokupne privrede. Primera radi putnički avion *Boeing 737* se sastoji od 367.000 delova. Avionski mlazni motor može da se sastoji od čak 25.000 delova.

Naravno, broj delova kada je u pitanju školski avion je daleko manji, ali ukoliko bi se angažovalo barem 20 kompanija na jednom takvom projektu, korist po državu bi bila izuzetno velika. Povećala bi se uposlenost kapaciteta, angažovala bi se dodatna radna snaga i na posletku kroz osvajanje proizvodnog programa namenjenog avio industriji podigao bi se tehnološki nivo proizvodnje kooperanata.

## REFERENCE/REFERENCES

- [1] Agencija za privatizaciju Republike Srbije. Preuzeto 10. 05. 2015. sa <http://www.priv.rs/Agencija+za+privatizaciju/90/Utva+avio+industrija+doo.shtml/seo=/companyid=9724>
- [2] Janković, O. (15. 03. 2017) „Utva“ na krilima SDPR-a. Politika. Preuzeto 16. 03. 2017. Sa <http://www.politika.rs/scc/clanak/376214/Utva-na-krilima-SDPR-a>
- [3] Salinger, I. (11. 06. 2013). Utva Resumes Serbian Lasta Trainer Deliveries. Flightglobal. Preuzeto 12. 05. 2015. sa <http://www.flightglobal.com/news/articles/picture-utva-resumes-serbian-lasta-trainer-deliveries-388175/>
- [4] Agencija za privatizaciju Republike Srbije. Preuzeto 12. 05. 2015. sa [http://www.priv.rs/upload/company/contract/9724\\_20140616\\_085231.pdf](http://www.priv.rs/upload/company/contract/9724_20140616_085231.pdf)
- [5] Agencija za privatizaciju Republike Srbije. Preuzeto 30. 05. 2015. sa [http://www.priv.rs/upload/company/contract/9724\\_20140616\\_085231.pdf](http://www.priv.rs/upload/company/contract/9724_20140616_085231.pdf)
- [6] Agencija za privatizaciju Republike Srbije. Preuzeto 21. 05. 2015. sa [http://www.priv.rs/upload/company/contract/9724\\_20140523\\_111527.pdf](http://www.priv.rs/upload/company/contract/9724_20140523_111527.pdf)
- [7] Dević, V. (15. 12. 2008). Lasta-95. Arsenal br. 24. Medija centar Odbrana. Beograd. Str. 4.
- [8] DNV-GL. Preuzeto 21. 05. 2015. sa <http://www.dnvba.com/my/certification/managementsystems/quality/Pages/AS-EN-9100.aspx>
- [9] EASA. CS-23 Normal, Utility, Aerobatic and Commuter Aeroplanes. Preuzeto 21. 05. 2015. sa <http://easa.europa.eu/certification-specifications/cs-23-normal-utility-aerobatic-and-commuter-aeroplanes>
- [10] Braybrook, R. (2009). Trainers at a Cusp. Armada International. 5/2009. Str.22. Preuzeto 18. 05. 2015. sa [http://www.wescam.com/wp-content/uploads/Trainers\\_at\\_a\\_Cusp.pdf](http://www.wescam.com/wp-content/uploads/Trainers_at_a_Cusp.pdf)
- [11] Aboulafia, R. (2010). Trainer Aircraft: Long-term hopes for growth. Aerospace America. May 2010. Str. 20. Preuzeto 19. 05. 2015. sa [http://www.aerospaceamerica.org/Documents/May%202010%20Aerospace%20America%20PDF%20Files/20\\_Aircraft%20Update\\_MAY2010.pdf](http://www.aerospaceamerica.org/Documents/May%202010%20Aerospace%20America%20PDF%20Files/20_Aircraft%20Update_MAY2010.pdf)



- [12] Thomson, R. (2014). What the World's Aerospace Industry Leaders are Thinking: Implications for the Supply Chain. Roland Berger. Str. 19. Preuzeto 27. 05. 2014. sa [http://www.rolandberger.co.uk/media/pdf/Roland\\_Berger\\_Aerospace\\_future\\_20140407.pdf](http://www.rolandberger.co.uk/media/pdf/Roland_Berger_Aerospace_future_20140407.pdf)
- [13] Agencija za privatizaciju. Preuzeto 12. 05. 2015. sa [http://www.priv.rs/upload/company/contract/9724\\_20140616\\_085231.pdf](http://www.priv.rs/upload/company/contract/9724_20140616_085231.pdf)
- [14] Airforce-technology.com. Lasta-95 Advanced Training Aircraft, Serbia. Preuzeto 17. 05. 2015. sa <http://www.airforce-technology.com/projects/lasta-95-advanced-training-aircraft/>
- [15] [www.all-aero.com](http://www.all-aero.com). Utva 95 Lasta. Preuzeto 17. 05. 2015. sa <http://all-aero.com/index.php/55-planes-t-u/11415-utva-lasta>
- [16] Leonardo. (2017). Principali Dati. Preuzeto 02. 04. 2017. sa <http://www.leonardocompany.com/investitori-investors/highlights-finanziari-financial;>
- [17] Leonardo. (2017). Profilo. Preuzeto 02. 04. 2017. sa <http://www.leonardocompany.com/chi-siamo-about-us/profilo-profile-chisiamo-aboutus-2>
- [18] Pilatus. (2016). Pilatus Aircraft LTD. Annual Report 2016. Str. 42. Preuzeto 02. 04. 2017. sa <http://www.pilatus-aircraft.com/00-def/main/scripts/ckfinder/userfiles/files/Downloads/Brochures/Pilatus-Aircraft-Ltd-Annual-Report-2016.pdf>
- [19] Pilatus. About us. Preuzeto 02. 04. 2017. sa <http://www.pilatus-aircraft.com/#61>
- [20] Embraer (2015). Annual Report 2015. Flying in 2015. Online. Preuzeto 02. 04. 2017. [http://www.embraer.com.br/RelatorioAnual2015\\_old/en/o-voo-de-2015.htm](http://www.embraer.com.br/RelatorioAnual2015_old/en/o-voo-de-2015.htm)
- [21] Embraer (2015). Annual Report 2015. Talent Management. Online. Preuzeto 02. 04. 2017. sa [http://www.embraer.com.br/RelatorioAnual2015\\_old/en/gestao-de-talentos.htm](http://www.embraer.com.br/RelatorioAnual2015_old/en/gestao-de-talentos.htm)
- [22] Grob Aircraft. Grob Legacy. Preuzeto 03. 04. 2017. sa <https://grob-aircraft.com/en/company-portrait.html#4>
- [23] IRKUT Corporation. A.S. Yakovlev Design Bureau. Preuzeto 06. 03. 2015. sa <http://www.yak.ru/ENG/FIRM/hist2.php>
- [24] TAI. Company Profile. Preuzeto 04. 04. 2017. sa <https://www.tai.com.tr/en/about-us/company-profile>
- [25] KAI (2017) Development Capability. Preuzeto 01. 05. 2017. sa <http://www.koreaaero.com/english/>
- [26] KAI. (2016). 2016 Business Performance and 2017 Business Goals. Preuzeto 05. 05. 2017. sa [www.koreaaero.com/data\\_file/IR/KAI\\_IR%20Book\\_ENG\\_20170426.zip](http://www.koreaaero.com/data_file/IR/KAI_IR%20Book_ENG_20170426.zip)
- [27] AVIC HONGDU. Preuzeto 06. 03. 2017. sa <http://www.hongdu.com.cn/yw/>
- [28] Perret, B. (04. 05. 2017). Avic Hongdu Rolls Out Upgraded L-15 Trainer-Attacker. Aerospace Daily. Preuzeto 05. 05. 2017. sa <http://aviationweek.com/awindefense/avic-hongdu-rolls-out-upgraded-l-15-trainer-attacker>
- [29] Red,C. (05. 01. 2012). Aviation Outlook: Composites in General Aviation 2011-2020. Preuzeto 21. 06. 2015. sa <http://www.compositesworld.com/articles/aviation-outlook-composites-in-general-aviation-2011-2020>

[30] FAA. FAA Aerospace Forecast Fiscal Years 2014-2034. Str. 56. Preuzeto 26. 05. 2015. sa

[https://www.faa.gov/about/office\\_org/headquarters\\_offices/apl/aviation\\_forecasts/aerospace\\_forecasts/2014-2034/media/2014\\_FAA\\_Aerospace\\_Forecast.pdf](https://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2014-2034/media/2014_FAA_Aerospace_Forecast.pdf)

[31] Business Insider. (27. 05. 2015). THE DRONES REPORT: Market forecasts, regulatory barriers, top vendors, and leading commercial applications. Preuzeto 28. 05. 2015. sa

<http://www.businessinsider.com/uav-or-commercial-drone-market-forecast-2015-2>

[32] Agencija za privatizaciju Republike Srbije. Preuzeto 12. 05. 2015. sa

[http://www.priv.rs/upload/company/contract/9724\\_20140616\\_085231.pdf](http://www.priv.rs/upload/company/contract/9724_20140616_085231.pdf)

## USABILITY OF APPLICATIONS RAILWAY

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**Abstract:** Mobile computing can be seen as a new opportunity for the installation of the information systems and technology. Improving new business transporters organization of joint stock company for rail passenger train Serbia (hereinafter referred to as SV), requires changes in the information and communications infrastructure that can carry out the implementation of advanced Internet technology. The realization of advanced solutions based on the technologies of mobile computing service users to enable faster access to the necessary information. Under the necessary information to include all the services SV in different ways and under different conditions provides users. The aim of introducing the new technology of mobile computing is to prevent technical and technological backwardness of this mode of transport and that the floppy disk offer to create conditions for increasing the share of railways in the market. Implementation of mobile applications and leads to the automation of various business processes. One of the fundamental questions is the extent to which the user is satisfied with the services offered an applications. The subject of this research is the usability of the application user experience.

**Keywords:** Mobile computing, applications, user services, user experience

### 1. INTRODUCTION

Transport is the movement of people from one location to another. Transportation includes transport. To the customer chose to be the means of transport used in the Internet age can obtain the necessary information in addition to a personal computer and a mobile phone with the help of recent production. Statistical Office of the Republic of Serbia presented the use of Internet in organizations in the period from 2006 to 2010. [1]. Wireless internet is transferring data in large and increasing. 2010 is a representation of 47% while in 2006 only 24%. In recent years studies have shown that all organizations use information and communication technologies in their operations. The development of the Internet in the last 40 years leads to new opportunities from which they and applications. These applications allow the present time even e-commerce services and a variety of multimedia content. For the service user's Internet connection with these applications. Greater attention should be given to applications where users via mobile phone or tablet can obtain the necessary information from anywhere and at any time of the day. By using special methods and ways of measuring where researchers collect information about the application and user behavior when performing different tasks. When it comes to detailed measurement acquire new knowledge that can be applied to various future tasks such as solving problems resulting from the interaction, troubleshooting, performance evaluation and course correction.

SV must define and implement strategies to using the Internet and advanced technologies meet the requirements of service users and their natural needs for achieving better financial gain [2].

Through the Internet users via computer services can see a variety of information on the website of the organization and can if you have a printer and a valid payment card to order, pay and receive a printed confirmation of correct driving [3].

## 2. ROLE AND IMPORTANCE OF APPLICATION

Railway transport plays an important role in economic and social development. The request to increase rail transport in recent decades are on the rise. In order to meet the need appears in the new control system. The new control system consists of the collection, transmission, analysis and distribution modules. Such an information transfer system is designed to connect to trains and mall management. However, the infrastructure of the railway system can not provide the required bandwidth for a large amount of data. In this case, the approach to improving system performance [4].

Access application, which is a system based on a mobile device, there is a possibility of mobile data in the train with the help of Wi-Fi network is becoming more prevalent in China. 253 million Internet users is represented where we see great potential in passenger traffic [5].

The electronic map is the subject of much research. A lot of different solutions implemented in the past. New types of solutions comes in the last few years as a mobile map. This concept uses a device user of the service to buy a ticket instead of special devices that are owned railways. Users of locating based on mobile device. The wireless card is a new service where users of public transportation can receive a valid ticket with the help of their mobile phone. To use this service users must be registered through the signing of the contract. Signing a contract to search for a mobile phone to locate. The second condition is that the user has a smart card with which they can be registered via applications. After registration you can immediately use the possibility of application, buy the ticket document. To start the journey in public transport needs to log through where application that has the ability to change the transport resources and to use them as much service spatial coverage. After the voyage customer checks out how it could be interrupted tracking and billing. The next step is to fight the ticket price for all the trips that the beneficiary. At the end of the month gets added up all the transportation costs for the entire month and sent to the billing [6].

Quality of service Chinese Railways not only affects your market, but the entire system of transport services. Of the present application allow the railway of Chinese [7]:

- The navigation system users (multimedia station, the arrival of luggage)
- Timetable information, pricing, driving documents, seat reservation ...

These applications are suitable for the user journey and serve as a guide.

In the present time mobile appliances offer the possibility of communicating with each other, to obtain various information from the applications. Users services via mobile devices and applications interact. Practical user experience and understanding of the application can in some way contribute to the development of new computational models [8].

One of the big challenges is to purchase a ticket for the metro. Just buying means and queuing. Technology with a mobile card was introduced to the customer via the web portal on mobile phone download the app. With the mobile phone and the installed applications can be

purchased ticket under the same conditions as at the point of sale. An app on your mobile phone to some code that can be obviously when entering the metro and to check while driving and even delete after a certain time interval for paid transport [9].

### 3. USABILITY MOBILE APPLICATIONS

Usability means (English word Usability) ease of use and ease of learning about a case of a man like the kind of tool or device. In terms of software usability is the extent to which software can be used by users of services in order to achieve the objectives relating to the effectiveness, efficiency and satisfaction in the context of measurable when using [10].

Object usage can be a software application (which is the main subject of research) where the customer interacts and thus communicate. Usability studies can be conducted as the primary functions of the job by analysts usability or as a secondary function job by the designers of applications. This includes methods of measurement of usability, such as the needs analysis and the study of the principles behind the perception of the effectiveness or elegance of the object. Ergonomics is a tool to be used for the design of wide production. The main focus has been on the design of technology services when the user performs a specific task and to the extent [11]. HCI (English word Human-Computer Interaction) usability studies elegance and clarity with which he designed a computer program or application. Nielsen [12] introduced the basic rules relating to the applicability of which can be quickly and inexpensively to improve the user interface and including heuristic evaluation. It is also defined and high-quality components, such as its five objectives usability. The authors [13] Please note that the usability of the response gives as the entire process is functional and dependent on all of the components which are the main objectives:

- Ease of learning - the ease with which users achieve the main results of the interaction with the device (application design) when it was first used?
- Efficiency - when users learn to design services (applications), how fast they can perform tasks?
- easy to remember - when the user after a while back on a design for how long it would re-establish the interaction?
- Errors - how many errors the client device, the weight of the error, and how quickly they forget the same and normally used?
- Satisfaction - how pleasant to use in the design?

International Organization for Standardization ISO / TR 16982: 2002 ( "Ergonomics of human-system interaction-Usability methods supporting human-centered design") provides information to the utility that can be used when creating the design. The guidelines of the organization may apply for a specific design using a list issues that characterize the context of use of the product to be delivered to the market. In addition the organization provides detailed information about the advantages and disadvantages of the factors affecting the usability methods [14].

The research results that occurred based on heuristics must provide a new level of reliable knowledge of usability user interface the mobile device [16]. Heuristics is a set of indicators that can help in the development of design and to the [15]:

- Visibility of system status, users should receive feedback within a specified time what is happening in the system,
- Step between the system and the environment, it is best when the system's language because of understanding,
- Control user trends, means if the user makes a wrong step can and to step through the system and returned,
- Consistency and standards, the user should not be in doubt gave some words and actions alike,
- Prevention of defects, if there is an error in the design must be eliminated before proceeding with the work,
- Confirmation of a recall, the user manual should be visible,
- The flexibility and efficiency of use and comprises members that are in a learning phase, and subscriber experience,
- Aesthetically minimalist design, means that the dialogues that are not required are not shown to not be impaired visibility,
- Help customers to identify, diagnose and recover from errors, means that the error has been expressed in simple language with the proposed solutions,
- Help and documentation means that the user documentation is available.

#### **4. RELATED RESEARCH**

In the scientific literature in recent years, a large number of works that have a primary objective of the usability of mobile applications. Studies show great interest to designers and users of applications.

Heuristic Revolution is the procedure for acceptance of diagnostic trouble usability user interface. Author [16] notes that compliance usability and design specific and that with the help of heuristics can detect about 75% of the problems. For the case study is necessary to:

- Assessment of service users in order to identify problems and determine the usability of the user interface,
- Experts and researchers in the field of design and usability that will prepare heuristic issues that are relevant for research and
- The procedures that are necessary for the implementation of heuristic research that involves service users which should explain the procedure and purpose of the research; finding users who will assess in advance certain actions on the device and finally determine the seriousness of the problem of usability (there is no problem of

usability, a small problem, the bigger problem and the highest level of usability problems).

Evaluation of usability of mobile applications is a growing trend in the use of electronic mobile devices. Use efficiency is a key factor in the use of applications on the market that provides a variety of benefits. Portable mobile platform thermic units can meet the specific needs of users. The appliance can be installed sensors that collect certain information while the user is using any application. The data collected allow improving inter face where it also increases productivity and of course customer loyalty. With the rapid expansion of the possibilities for smart phone developers focus on applications. For them it is very important to obtain information from users about the usability. Usually as a major component of the user frustration that is reflected in dissatisfaction when not fulfilled their expectations and invested some effort. This occurs in their actions carried out when the product shows more or less differently than those that are predefined. All collected data on the usability can be analysis and it is time consuming. Therefore, the sensors in applications in charge to collect as many different data to analysts in the analysis determine the usefulness [17].

Nowadays we have a lot of functional applications for mobile devices. However, many applications are developed with insufficient attention when it comes to usability and simplicity. As an example can be taken a inter face applications with activated controls movement of the user where, however, difficulties of use, or other inter face containing no universal usability. The result of the user experience in interaction with various applications must have a total pleasure without frustration. Designers of mobile applications need to pay special attention when designing the right cell phones are limited to different screen sizes. Based on the foregoing by [18] proposed a mechanism that can record a negative impact of the limitations and thereafter improve the usability of the application. Mechanisms need to monitor user behavior on your mobile phone and creating a need to make the appropriate changes inter face because of the significant advantages of use and usability. The mechanism is defined as a software package that improves ability to interact with the user based on dynamic user experiences with that. The mechanism allows independent editing and customize the appearance of the user's needs. Since there are different types of user accountability system is to adapt to the real needs (when the application requires the user to pre-determine what suits him, he can hold and display the items you use most often and the other to hide ...).

Visual usability is required for applications on all mobile phones. When designing the designers have focused on visual usability and users needs. Because different users each of which has a variety of needs in the design of inter face. The paper [19] proposes the design of mobile phone applications based on the type of personality profile. This means an approach that is based on the psychological aspects of personality that allow selection of specific need. The study aims to show the relationship between the client's needs and personality profile. The first part presents the six elements (background color, font color, layout navigation area of the screen, and the addition of icons) that represents the inter face design. After that it was established for five personality types to identify the characteristics of the user. The next step is to analysis the relationship between the person and Design inter face. Formulation design inter face based on users' personality. And finally, assessment and evaluation of formulations where the design hierarchy built inter face who lined up in the ranking and selection. This

model represents each component of the visual field of which can be determined by the desirable properties and visual appearance that meets the needs.

Usability testing user interface emphasizes three concepts which are: satisfaction, efficiency and ease of learning. Performance that customers use in applications for mobile phones are used for usability testing. The author [20] conducted research performance mobile applications through usability testing. The application is used in cooking and requires several types of user input. For each type of input, there are two different modes of interaction which requires the use of various additives in the application. For each method were measured by the above-mentioned basic concept. Research carried out an evaluation of usability in terms of user performance between the two applications provides user interface data entry. The difference in applications in color and style. Each type of entry in the system application means to interact with a variety of styles. Doing research mobile phone is connected to a computer to monitor the interaction of. The required number of participants for testing is about five. They can detect usability problems effectively and to a larger number of participants would also completed.

## **5. ANALYSIS OF USE ENABLED APPLICATION RAILWAY**

The author [21] states that to create a new user interface is the best existing. The collection of new data through research usability can provide the solution of similar problems and design a new interface. Research must include interface show the user to the mobile phone. The beneficiary should seek to advance the actions outlined what needs to be done. When interaction is necessary to monitor the reactions of the user and write in order to be able later to consider.

The subject of this paper analysis usability railway applications. The application provides information on timetables BG- Bahn train. Aim of the study should show how the usability of the application by the user of the service who travel the city by rail.

### **5.1. RESEARCH METHODOLOGY**

Further study shows the process evaluacije indicating the three concepts of usability that relate to: the effectiveness of which should be related to the accuracy and completeness of users to achieve the goals that specify the dimensions of a fault, ease of learning, which is part of the effectiveness and refers to the ability of the user to interact with the operating system where the error is measured between the first and second attempts and customer satisfaction relating to customer perception, feelings and opinions about the application that needs to write the next test that is done.

To assess the usability will be used to scale SUS (System Usability Scale) [22]. SUS consists of ten questions. For each question are provided responses based on Likert scale, which includes ranking member services to every question from one to five. One means to disagree as long as five to completely agree. Questions that will be used during the research are as follows:

1. I think I often use this application,
2. I think the application is unnecessarily complex,
3. I think that the application is easy to use,



4. I think we need the support of a professional person to be able to use the app,
5. I think I found a variety of features in this application that are integrated,
6. I think there are too many flaws in this application,
7. I guess most users quickly learn to use this application,
8. I came across an application that is extensive to use,
9. I felt confident the use of applications and
10. I had to learn a lot before you start using apps

After the collection of data is accessed analysis of usability.

## 5.2. THE TESTING PROCESS

Usability testing process applications railways was made at the station Vukov Monument. Given that the research needed five made the selection and are selected agreed to carry out a test in which they received an explanation of the purpose and mode of interaction. Service users are on the mobile phone Samsung A5 task was to find the next train and the nearest railway station in node grads railways. After interaction with the help of the above-mentioned issues, is made in Table 1 showing the raw data based on the Likert scale.

Table 1. Raw data testing

<b>question / user</b>	<b>User 1</b>	<b>User 2</b>	<b>User 3</b>	<b>User 4</b>	<b>User 5</b>
<b>Question 1</b>	5	5	5	5	4
<b>Question 2</b>	1	1	1	1	2
<b>Question 3</b>	5	5	5	5	5
<b>Question 4</b>	1	1	1	1	1
<b>Question 5</b>	3	3	3	3	3
<b>Question 6</b>	5	4	5	4	4
<b>Question 7</b>	5	4	4	5	4
<b>Question 8</b>	1	1	1	1	1
<b>Question 9</b>	4	4	4	3	4
<b>Question 10</b>	1	1	1	1	1

During the interaction with the mobile application service users had to do the next steps that will be shown in Figure 1.

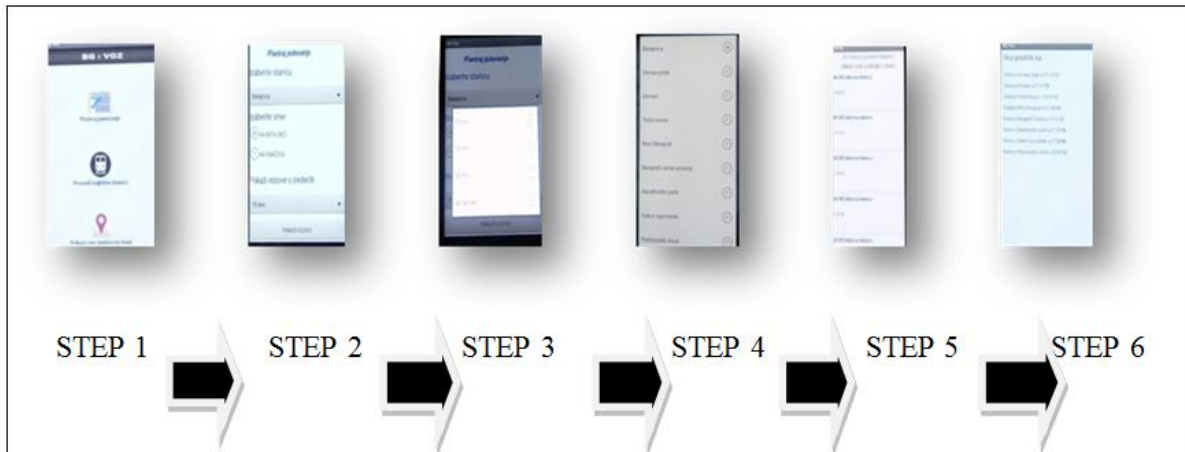


Figure 1. Steps in testing

After summarizing the data collection approach. Based on the SUS test results are shown in Table 2.

Table 2. Results of the questionnaire

question / user	User 1	User 2	User 3	User 4	User 5
<b>The result</b>	82.5	82.5	80.0	82.5	77.5

#### 5.4. DISCUSSION

The paper describes the application of three concepts usability of the mobile phone that displays the schedule of city railways.

The efficiency of the user interface described in the study when users interact came to lock it in step 2 step 3 when selecting application always show the same result in all three choices (15, 20 and 30 minutes). The application can only see the first train on schedule. Users agree that this step is unnecessary and time-consuming. The task of finding the nearest metro users have shown skill and also objected to the folder that shows no marks of road public transport, how or with what to get to the nearest railway station.

The ease of learning has shown good results where it is a five-user services are just one mistake. In step 2, it is necessary to choose the direction of travel. At the moment of interaction the user has not decided when this station when requested display of trains received a notice "Please go back and choose another way, the starting point and direction can not be the same." After reading and understanding the notice is returned to the previous step and changed the direction of travel. Based on the results presented in Table 2 shows the user satisfaction.

The satisfaction that users are shown when testing is very high. Scale is found that if the client has more than 80.3 shows high satisfaction. When measured satisfaction around 68 this means that users are satisfied with the application, but there are also arguments that the same improvement. Service users who were tested in this study achieved even 82.5, while in

one case 77.5. If you look at the average customer satisfaction who participated in testing come to the pleasure that is 81.

## 6. CONCLUSIONS

The main objectives of this paper are met. It shows the role and importance of applications in today's time. Applications have the main task is to facilitate customer service and help in this case, see and plan to travel to meet their daily needs. Designers daily create new applications that can be downloaded from the Play shops. All applications have a place for the user in the mobile phone but also their existence does not mean that they are usable. Because of this, the paper shows the importance of applications primarily in the rail through the various segments where it is used and how. In Chapter usability of mobile applications are shown basic techniques and models to be used in research. In the particular example shown is an application that shows the railway timetables city rail. Was conducted usability testing where there have been positive results. The application is useful and there is a possibility of redesigning services so that users meet their needs.

## REFERENCES

1. Internet 2016, Republic of Serbia Institute of Statistics, use of information and communication technologies in the Republic of Serbia, republican Statistics Institute, Belgrade, 2016 (Internet 2016, Republički zavod za statistiku,, Upotreba informaciono komunikacionih tehnologija u Republici Srbiji, Reublički zavod za statistiku, Beograd 2016) [http://webzrs.stat.gov.rs/WebSite/repository/documents/00/02/15/00/SV10\\_160-srb\\_2015.pdf](http://webzrs.stat.gov.rs/WebSite/repository/documents/00/02/15/00/SV10_160-srb_2015.pdf) accessed 2016
2. Pavlović, Z., Vuksanovic, J., & Gavric, Ž. (2016, July 15). Definition multimedia strategy to increase the number of users of the railway. (Z. Čekerevac, Ed.) *FBIM Transactions*, 4 (2), 111-119. doi: 10.12709 / fbim.04.04.02.11, Belgrade 2016 (Pavlović, Z., Vuksanović, J., & Gavrić, Ž. (2016, July 15). *Definisanje multimedijalne strategije za povećanje broja korisnika usluga železnice*. (Z. Čekerevac, Ed.) *FBIM Transactions*, 4(2), 111-119. doi:10.12709/fbim.04.04.02.11, Beograd 2016.)
3. Pavlovic Z, A Vukmirović; Special offer for railwaysticket issue reserved and bought over the Internet, YU INFO 2016 XXII scientific and business conference on February 28th-02. March 2016, Kopaonik, Serbia, 226-231, ISBN978-86-85525-17-9, available at (Pavlovic Z,Vukmirović A; *Special offer for railwaysticket issue reserved and bought over internet*, YUINFO 2016 XXII naučna i biznis konferencija 28. februar-02. mart 2016 , Kopaonik, Srbija, 226-231, ISBN978-86-85525-17-9, dostupno na: <http://www.yuinfo.org/zbornici/2016/YUINFO2016.pdf> pristupano 2016.)
4. Yangxin L, Ping W, Jiniong L, Meng M, Ling L, Lin M; *Class-based delta-encoding for high-speed train data stream*, Published in: [Computing and Communications Conference \(IPCCC\), IEEE 34th International Performance](#), 2015. <http://ieeexplore.ieee.org/document/7410271/> accessed 2016

5. Fumin Zou; Shuling Zhang ; “An Open Onboard Internet System Model for the M-Commerce on Train”: Management and Service Science, 2009. MASS '09. International Conference on: 2009. <http://ieeexplore.ieee.org/document/5305496/> accessed 2016
6. A. Bohm ; B. Murtz ; G. Sommer; M. Wermuth; *Location-based ticketing in public transport*, Proceedings. 2005 IEEE Intelligent Transportation Systems, 2005. Year: 2005 <http://ieeexplore.ieee.org/document/1520158/> accessed 2016
7. Cuiqing Jiang, Shanlin Yang, Changyong Liang, Zengming Chen; *The study of development strategies of Chinese railway e-business system*, Published in: [Services Systems and Services Management, 2005. Proceedings of ICSSSM '05. 2005 International Conference on](#) Date of Conference: 13-15 June 2005 <http://ieeexplore.ieee.org/document/1499589/> accessed 2016
8. P. Brezillon; *Focusing on context in human-centered computing*, Published in: [IEEE Intelligent Systems](#) ( Volume: 18, Issue: 3, May-Jun 2003 ). Year: 2005, 62 – 66 <http://ieeexplore.ieee.org/document/1200731/> accessed 2016
9. S. Karthick, A. Velmurugan; *Android suburban railway ticketing with GPS as ticket checker*, [Advanced Communication Control and Computing Technologies \(ICACCCT\), 2012 IEEE International Conference on](#) Year: 2012 <http://ieeexplore.ieee.org/document/6320742/> accessed 2016
10. Internet 2017, Usability <https://en.wikipedia.org/wiki/Usability> accessed 2017
11. Waldemar Karwowski, Marcelo M. Soares, Neville A. Stanton; *Human Factors and Ergonomics in Consumer Product Design: Methods and Techniques*, <https://www.crcpress.com/Human-Factors-and-Ergonomics-in-Consumer-Product-Design-Methods-and-Techniques/Karwowski-Soares-Stanton/p/book/9781420046281> accessed 2017
12. Internet 2017a, Jakob Nielsen (usability consultant) [https://en.wikipedia.org/wiki/Jakob\\_Nielsen\\_\(usability\\_consultant\)](https://en.wikipedia.org/wiki/Jakob_Nielsen_(usability_consultant)) accessed 2017
13. Miroslav Minovic, Velimir Štavljanin, Miloš Milovanovic and Dušan Starcevic: *User-centered Design of m-Learning System: Moodle on the Go*, Journal of Computing Science and Engineering, Vol. V, No. N, September 2009, Pages 1-15.
14. Internet 2017b ISO/TR 16982:2002 Ergonomics of human-system interaction -- Usability methods supporting human-centred design [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=31176](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=31176) accessed 2017
15. H. Luna, R. Mendoza, M. Vargas, J. Muñoz, F. J. Alvarez and L. C. Rodriguez: *Using Design Patterns as Usability Heuristics for Mobile Groupware Systems*, IEEE LATIN AMERICA TRANSACTIONS, VOL. 13, NO. 12, DECEMBER 2015, 4004-4010 <http://ieeexplore.ieee.org/document/7404939/> accessed 2017
16. Internet 2017c, Usability <https://en.wikipedia.org/wiki/Usability> accessed 2017
17. Zsolt Medgyesi, Krisztián Pomázi, Luca Szegletes, Dr. Bertalan Forstner: *Evaluating application usability with portable biofeedback system for mobile and desktop*, [IEEE International Conference on Cognitive Infocommunications \(CogInfoCom\)](#) Year: 2015, 279-283 <http://ieeexplore.ieee.org/document/7390604/> accessed 2017

18. Saeed Raheel: *Improving the User Experience using an Intelligent Adaptive User Interface in Mobile Applications*, [IEEE International Multidisciplinary Conference on Engineering Technology \(IMCET\)](#) Year: 2016, <http://ieeexplore.ieee.org/document/7777428/> accessed 2017
19. Riva Aktivia, Taufik Djatna, and Yani Nurhadryani: *Visual Usability Design for Mobile Application Based on User Personality*, [2014 International Conference on Advanced Computer Science and Information System](#) Year: 2014, 177-182 <http://ieeexplore.ieee.org/document/7065893/> accessed 2017
20. Hanifah Muslimah Az-zahra; Aryo Pinandito; Herman Tolle: *Usability evaluation of mobile application in culinary recommendationsystem*, [2015 IEEE Asia Pacific Conference on Wireless and Mobile \(APWiMob\)](#) Year: 2015, 89-94 <http://ieeexplore.ieee.org/document/7374938/> accessed 2017
21. J.Nielsen : *A home-page overhaul using other Web sites*, Published in: [IEEE Software](#) ( Volume: 12, Issue: 3, May 1995 ) Date of Publication: 06 August 2002, 75-78 <http://ieeexplore.ieee.org/document/382190/> accessed 2017
22. Internet 2017d *How To Use The System Usability Scale (SUS) To Evaluate The Usability Of Your Website* <http://usabilitygeek.com/how-to-use-the-system-usability-scale-sus-to-evaluate-the-usability-of-your-website/> accessed 2017

## HUMAN RESOURCE MANAGEMENT CHALLENGE FOR EFFECTIVE LOCAL GOVERNMENT

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**Abstract:** Organizations are a set of people who work together, where they coordinate their activities aimed at effectively and efficiently achieving the goals of the organization. Achieving the goals of the organization are carried out with the managers who manage the human resources and organize, coordinate and control all of the activities of the organization. Human Resource Management presents interdisciplinary science which unites a set of knowledge related to the people in the organization which provides guidance to managers how to manage human resources in the organization in order to achieve higher individual and organizational performance. As a result, this process involves critical analysis of the necessity of human resources, sorting and picking the best people that suit the needs of the organization, integration of the selected candidates into the organization by providing a system of appropriate rewards and career development, advancement of knowledge, assessment, control of operations, adequate protection and establishing responsibility and punishing or firing employees. Hence, the purpose of this paper is aimed at analyzing the human resource management in local government as an independent organization within the social system of the Republic of Macedonia. Considering the fact that people are the most important resource in the organization, the subject of this research is oriented to understand how the local government in the Republic of Macedonia has managed human resources and to explore the attitude of the manager towards the administration and towards all of the processes that encircle the entire management process. The methodology of this research is based on qualitative analysis, content analysis, interview and questionnaire composed of more than eighty participants, with job titles: mayors, administrative representatives and representatives of the local government council. The survey questions refer to the answers relevant to the purpose of the research. The results of the questionnaire suggest that human resource management in the local government is achieved on a satisfactory level. The approach of the human resource management is not fully staffed with organizational units. Adequate evaluation process, proper selection of employees, as well as motivation of the employees is lacking in the organizations. In many cases, there are employees with inadequate education and the process of training is reduced to a formality. It can be concluded that the human resource management in the local government in the Republic of Macedonia is not exercised in accordance with the rules and procedures of the human resources management. The heads of departments especially the employees in the sector of human resource management need to impose their knowledge as a necessity for efficient and effective management. Employees need to provide their own initiatives to their superiors about their capacities and capabilities that can help the success of the organization. Motivating plans and programs in form of benefits, system of awards and trainings need to be developed in order to enable the improvement in each organizational unit.

**Keywords:** management, human recourse, recruitment, selection, training, motivation

## 1. INTRODUCTION

The local self-government in Macedonia is a constitutional category, guaranteed in the Constitution from 1991<sup>9</sup> The main prerequisite for the local development of the Republic of Macedonia is the existence of effective local self-government. The Constitution and laws normatively govern the competences and the independent status of the local self-government in the political system in the country. The Law on self- government provides that municipalities, in accordance with the principle of subsidiarity, have the right to independently perform activities of public interest and their competencies are comprehensive and exclusive and must not be taken away or limited, except in cases established in Article 20 and Article 21 of the Law on local self-government.<sup>10</sup> Law on self-government establishes that the municipalities, in accordance with the principle of subsidiarity, have the right to independently perform activities of public interest and their competencies are comprehensive and exclusive and must not be taken away or limited, except in cases established in Article 20 and Article 21 of the Law on local self-government<sup>11</sup>. Thus, the local self-government undertakes responsibilities that are of importance for the development of the local self-government units and citizens living in the community and they are clearly stated in Article 22 of the Law on Local self-government<sup>12</sup>. The principle of independence means that no state organ can interfere in the work of the local self-government units in performing its independent powers. How far a local community will be developed depends on many factors, but the major effect is on how efficiently the governing bodies of the local self-government fulfill their function, or how they manage it, especially how it is managed with the local government employees (administration and other staff) so-called human resources in the local self-government. The quality of the decision making process in the local self-government will depend on the professional support provided by the local self-government administration. If the local self-government has inadequate or unskilled personnel we cannot expect efficiency and professionalism in making decisions. Although the management function in the municipality is entrusted to the municipal council and the leadership of the mayor, they are not sufficiently competent and professional in each area, in large part they base their decisions on the previous analyzes and expert materials prepared by the administration.

By increasing the powers of the local self-government units, a need to strengthen the political culture of the population in the local community appeared and active participation of citizens in the local processes. A need to increase the level of professionalism of the executive and administrative bodies in the municipality emerged, improved communication between the citizens and their greater involvement in decision making processes, resulting in a positive impact on municipal management.<sup>13</sup> By adopting the Law on Local self-government the authority of the local elected officials has increased as well as the powers of the municipalities.

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<sup>9</sup> Constitution of Macedonia (Official Gazette of Republic of Macedonia no.52/1991, 4/1992, 107/2005)

<sup>10</sup> Law on local self-government (Gazette of Republic of Macedonia no.05/2002)

<sup>11</sup> Law on local self-government (Gazette of Republic of Macedonia no.05/2002)

<sup>12</sup> Law on local self-government (Gazette of Republic of Macedonia no.05/2002)

<sup>13</sup> Law on local self-government (Gazette of Republic of Macedonia no.05/2002)

The Law on self-government<sup>14</sup> increased the efficiency of the local self-government and provided faster, better and cheaper services to citizens, and it represents a qualitative change compared to the previous law, with many functions that were previously common and are now guaranteed as original municipal functions. By giving more responsibility to municipalities the power of the central government has reduced, freeing it with everyday municipal obligations.<sup>15</sup>

Organizations are a set of people who work together, where they coordinate their activities aimed towards effective and efficiently achieving the goals of the organization. Achieving the goals of the organization is carried out with the managers who manage the human resources and organize, coordinate and control all the activities of the organization. The managing the human resources is part of the management activities of the organization that refers to the management of people in the organization. The scientists have concluded that the human resources management is interdisciplinary science, which unites a set of knowledge related to the people in the organization, which provides guidance to managers how to manage human resources in the organization in order to achieve higher individual and organizational performance. Therefore this process involves a critical analysis of the needs of the human resources, recruiting or the manner of securing, sorting and picking the best that suit the needs of the organization, the selected candidates to integrate into the organization by providing a system of appropriate reward and career development, training and continuous improvement of the knowledge, assessment, control of operations and of course providing adequate protection. Finally establishing responsibility and punishing or firing employees.

According to the International Association of managers of local self-government, the management role of local government is exercised in four areas: Human Resource Management, Change Management, Establishment and Fostering cooperative relations and public, and publicity. This association defines the main elements that constitute the local self-government, the orientation towards action, relationship with the citizens, the autonomy and entrepreneurship, orientation to the employees, building a system of values, mission, goals and competence, structure and political relations. Generally the conclusions of the previous researches are that there is no understanding of the need for change, a lack of organizational skills to implement the changes, which means that the process of introducing good governance on the local level faces a number of visible and invisible resistances. Hence, for efficient management in the local self-government units essential changes are needed in order to provide the available human resources and material and technical resources to be able to respond to citizens' demands for better services.

## **2. RESEARCH METHODOLOGY**

The purpose of this paper is aimed at analyzing the management of human resources in local self-government in the eastern planning region as an independent organization within the social system of the Republic of Macedonia. Considering the fact that man is the most important resource in the capital of an organization, the subject of labor is oriented to perceive how the local government in the country to manage human resources, what is the

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<sup>14</sup> Law on local self-government (Gazette of Republic of Macedonia no.05/2002)

<sup>15</sup> Sotir Kostov, The decentralization is our objective, Skopje 2006



attitude of the manager to the administration, what is the attitude towards all the processes that complete the overall management process. If the access the approach to the person in the organization is correct in that case greater effectiveness and efficiency is achieved, and the organization will achieve the goals set on the territory where the local self-government extends, and also it will affect the success of the state. Guided by the strategic goal of effective state a necessity of effective local government occurs as an extended arm to achieve the priorities and objectives of the country. The effort of the government to create effective management of the administration is perceived by introducing legal provisions<sup>16</sup> that refer to mandatory establishment of organizational units for management of human resources that its purpose should exercise in terms of effectively managing of responsible persons in the municipality. These organizational units should have personnel trained to human resources management. Their role is seen in that it should be staffed with persons who have adequate professional preparation in the field of human resources management; to have an educator and psychologist who provide guidance on analysis of the social and mental condition of employees. These employees should not impose their own analysis of the needs of employees, the possibility of their reassignment, to make proposals to motivate and reward employees. To make analysis of the realized training staff and to record and to store the received diplomas, certificates and other certificates of successful training. These organizational units should arise analyzes required for the systematization of jobs, as well as short and long-term plans for the needs of new staff or to indicate the excess personnel, and to offer suggestions for their competence.

Hence the general hypothesis of this paper suggests that the effectiveness of local self-government depends on the way of managing human by the responsible persons in the municipality. Effective human resources management in local self-government means recruiting competent staff, fully equipping municipalities with the necessary personnel, proper analysis of the human resources, using the methods of human resource planning for short and subject timeframe, monitoring the achievement of the results of the municipal staff, training of municipal administration, employee motivation and corrective measures to achieve better results. The methodology of the research is based on qualitative analysis and content analysis, interview and questionnaire over more than a hundred participants, administration and representatives of the council of the local self-government. The questions of the survey refer to the answers relevant to the object and purpose of the research.

### **3. ANALYSIS OF RESEARCH RESULTS**

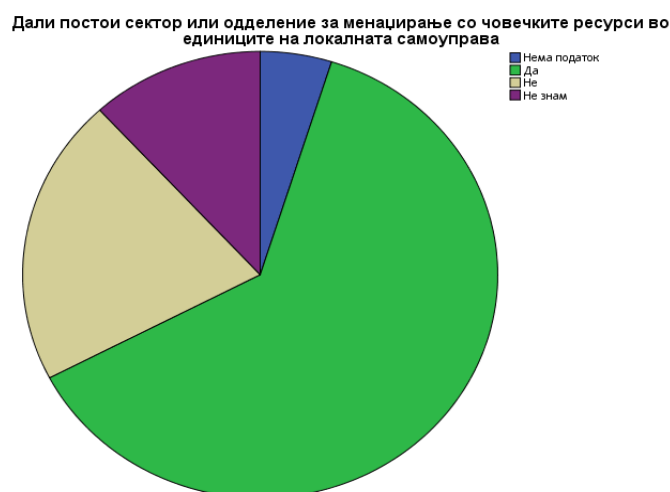
To perceive the way of human resource management in the local self-government in eastern planning region, we conducted a survey on 144 respondents in 11 municipalities. The survey was conducted over various administrative positions relevant to the subject of research. The survey referred to issues related to the way the management of the municipality

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<sup>16</sup>Pursuant to Article 36, paragraph (2) of the Law on Government of Republic of Macedonia ("Official Gazette of RM no. 59/2000, 12/2003, 55/2005, 37/2006), the Government of Republic of Macedonia, at the session held on 29th August, 2007, adopted a Regulation internal organization of state Administration.

by the responsible persons. Despite the survey, the analysis of the results is based on the interview that contained various issues of human resources management question asked to the administration of the local self-government units in Eastern planning region. Mainly, the issues in both instruments include the following: planning and analysis of the needs of human resources in local self-government, recruitment procedures, staffing of the organizational units for human resources, evaluation, motivation, and training of administrative workers, monitor performance and responsibility of the local self-government administration.

By presenting the results in this paper it can be seen how the managing of human resources in local self-government is accomplished, and at the same time to consider the advantages and disadvantages. Therefore, I will start with a presentation on the basis of this research, and that is the conclusion that emerged from the respondents that the function management of human resources is established as organizational unit of the local government in 90% of the municipalities, and from the interviews, we learn that the achievement of this function is formal and is reduced to keeping records of the staff, they are not involved in providing expert suggestions related to staffing and recruiting staff. In the local self-government the units or the sectors of human resources, are formal organizational units which means they are not fully staffed due to lack of adequate professional staff. Such conclusion follows from the fact that the full staffing of public administration is in 39% of the municipalities and partial staffing is in 37% in the local self-government. The formal position of the organizational units for human resources is comprehended from the fact that they had not made plans for the needs of human resources which are a very important segment for timely provision of the required personnel in the local self-government. These sectors are not included in the preparation of the acts for the systematization, as well as the recruitment and selection of the staff. Their function starts from the moment they receive orders to post an ad and to register those who obtain employment decision.<sup>17</sup> See picture No. 1



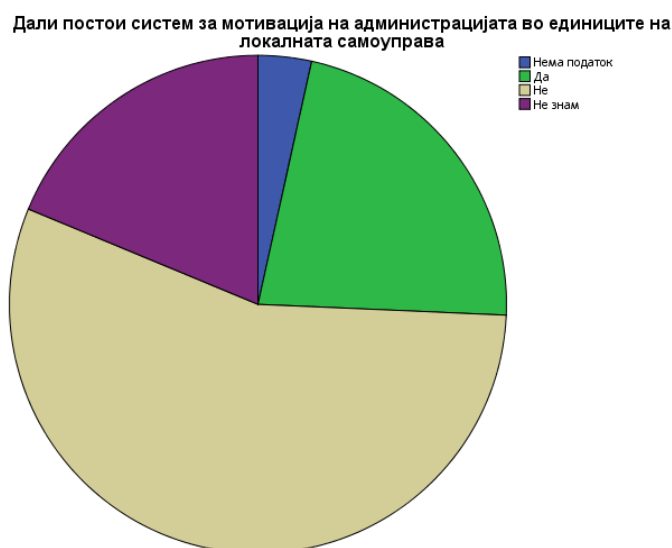
Picture No.1

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<sup>17</sup> The need for staff and the process for determination of need for new employment is performed mayor. For every worker a file is kept, which contains all information about the employee training and other achievements. There is no electronic system of recording and analyzing the files so that the capacity of employees can be electronically monitored (level of education, age, qualifications, etc.)

Considering the fact that in the local self-government does not have full staffing of administration, for failure to managing human resources also points out to the fact that there is a lack of skilled personnel for key positions in the local self-government. From the 11 municipalities, there are municipal secretaries only in two municipalities, and they have the main function of managers in the municipality. Furthermore, this reflects the irregular distribution of staff or lack staff for key positions, such as professional staff for strategic planning, project managers, for international cooperation, communication etc. This means that the municipalities have a lot of employed administrative staff, but they are not evenly distributed in terms of the needs of the municipality and their expertise.<sup>18</sup> This is due to the wrong approach in the process of managing human resources. Such employment is due to the merged system, which gives advantage in employment to the staff that is politically committed to the party in power.

The motivating of the civil servants depends on the knowledge and skills of those responsible or the immediate superiors. The local self-government units do not have any procedure or criteria for motivation. See picture No. 2



Picture No.2

In terms of whether in the local government, the mayors use the system of motivation for the employees in the administration of those surveyed and interviewed administrative officials we have learned that there is no program to motivate the administration. Thus, 80% of respondents and all administrative officers interviewed said they did not receive any motivating rewards or other benefits that motivate for further additional investments in office.

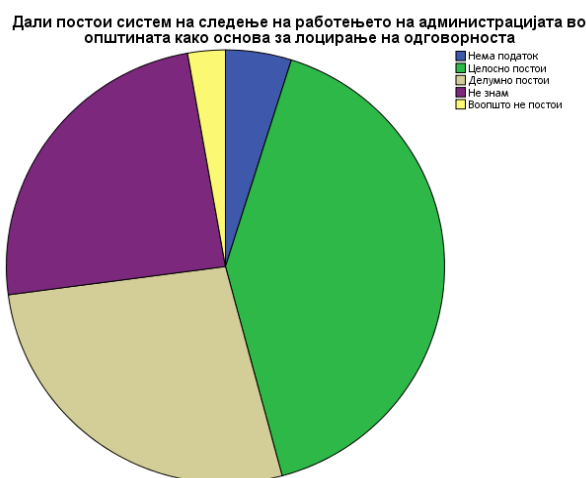
Besides the salary and training related to their professional upgrading they have not received another kind of motivation. This again indicates a deviation from an important segment in the process of managing human resources as the most important for effective local government. However, the motivation in the public authority as a very important factor for

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<sup>18</sup> We have a number of municipal staff and I think they are excessive on the one hand, on the other hand there is a lack of professional staff to increase the efficiency of the municipality.

effective and efficient civil servants in the present moment is a category that is not dealt with even in the administrative laws.<sup>19</sup>

In terms of training, the procedures for training of civil servants in the country and abroad, the criteria for determining the types of training and nomination of trainees, the feedback after completing the training, record keeping and the utilization of the trained staff, the result is that state authorities unless the preparation of the program and training plan, as an obligation imposed by the administration Agency, there are no other written procedures and criteria regarding the training of civil servants. Thus, 80% of the respondents said they made training plans that are not fully implemented, represent a formality. The funds provided for training are converted or the municipalities do not have budgets for training. As for the nomination of persons for training, vocational training or schooling abroad there is no criteria, guidelines and instructions in any local self-government body. The nominations for the training are not transparent in all local self-governments the mayors decide without prior analysis and checking whether there is need for training of those persons. Thus, the respondents say that all employees do not have equal access to exercise their right to apply for some training.<sup>20</sup> As a disadvantage the respondents highlighted the fact that there is no continuity and monitoring program for training in the authority itself, do not act on it, and all this is due to the indiscipline of the first people in the authority. Regarding the question of how to follow the achievements of the administration 50% said they have a system to monitor performance. Their answers suggest to monitoring through the evaluation which is not always a reliable data about the achievement of the administration. There are no other written procedures or measurable indicators of achievement of the administration. See picture 3



Picture No.3

<sup>19</sup> The contemporary managers are faced with the question how to motivate employees to focus their energy, knowledge, skills and abilities to achieve the objectives of the organization. The managers dealing with human resources must know the theory and practice in its use, scientifically based approaches that see the motivation as a mean to shape the behavior of people in the organization. More in M. Pekovich (2003), Organizational behavior: Faculty of Economics, Belgrade, p 212-213.

<sup>20</sup> In this context one of the interviewee says: "There are no criteria and procedures for the implementation and selection of persons that should attend training in order to be able to send the right people to attend these trainings. But I think time should pass to establish it due to the reason that the local self-government employees are still hungry for training so far we had donations, this is the first year we plan funds in the budget of the institutions of the program K2 but with supplementary budgets these means are deducted and there are less remaining funds for training of employees."

In terms of taking disciplinary measures or initiation of disciplinary proceedings as an important corrective segment for the successful operation of human resources and an important part of the process of managing, the data show that no severe disciplinary penalties over the administration were taken. Thus from the answers we may perceive that of all municipalities in over 30% of the administration there are disciplinary proceedings undertaken, and the pronounced penalties are for minor injuries or the penalties are not implemented in practice.

#### 4. CONCLUSION AND RECOMMENDATIONS

Within the research, resulting conclusion is that the function human resources management is an organizational part of the local self-government bodies for which staffing with appropriate professional administrative staffs and completed legal placement is necessary. It is especially necessary setting municipal secretaries as essential factors for effectively managing human resources. It should be particularly mentioned that the mayors and secretaries of the municipalities need to have diplomas for passed training for human resources. Thus it is easier to understand the role of organizational units for human resources, will require them to make contributions that would help to facilitate management of the municipality.

The results point to establishment of procedures for the planning and the analysis of the required staff, the selection and recruitment of the appropriate staff. The managers should ask the experts to assist them in detecting the needs for new jobs, retraining, training and redeployment of administrative staff in local self-government.

In terms of the monitoring the performance and motivation of employees in the public sector, establishment of computer software that will be indicative of measurable data is necessary. In that way you can realistically assess, reward and penalize the public sector workers. This method will produce motivated and responsible administrative officers.

In the laws and bylaws provisions should be introduced that will affect the motivation of the civil servants. The motivation in every aspect through the basic salary component accompanied by other benefits particularly affects the investment and effectiveness of the administrative officials in the local self-government. From that point the law should particularly focus on depth analysis of the motivation.

**In terms of the training, the mayors** have no relation to training as a pressing need for the local self- government units. It is inevitable to approach seriously to the motivation of employees in terms of their professional training and further training, as well as opening opportunities for redeployment of new jobs according to their skills and knowledge. A successful organization is the one that knows how to get the most out of their employees, and for that you need to have motivational plans and programs.

In other words, the recommendation is the organizational unit of human resources should experience a complete transformation in the local self-government units, and that means a serious approach by the responsible officials themselves and the employees, especially those working in organizational units for human resources.

Thus, if the administrative workers are employed under clear legal rules, if they are progressing in the service under the same criteria, and the entry into service is according to

written procedures and the training is an element that affects the motivation and capacity building of the public administration we will have a motivated, effective and responsible local administration that will produce solid results and satisfaction of the citizens.

## REFERENCES

1. Richard D. Bingam, Viljam M. Boyen, Miti Olajon Candler, Teril Lin Kornvel, Gek P. De Sario, Pol R. Domel, Kenet L. Ender, Kler L. Felbinger, Edvard V. Hil, Sanda, Kayfman, V. Denis, Kiting, Lorens F. Keler, Norman Krumolc, etc. Management of local government - public administration practice, Project of the Government of Republic of Macedonia (2009), Skopje.;
2. Илија Тодоровски, Лидија Петковска-Христова, Анета Јовевеска, Весна Стојанова, Мирјана Сланинка Динева, Јорде Јакимовски, Наташа Габер, Маријана Ханциска, Аница Драговиќ Функционирање на системот на локалната самоуправа во РМ, ISPP(2004) Скопје;
3. Сотир Костов, Нов јавен менаџмент во општините, Центар за квалитет Скопје. (2005);
4. Илија Тодоровски, Развојот и карактеристиките на локалната самоуправа во Англија, САД и Југославија, НИО Студентски збор (1991). Скопје;
5. Steven Ott, Alvert C. Hyde, Jay M. Shafritz Public management, (1990) Chicago USA;
7. Husmans J.H. The effectiveness of the cognitive style constraint in implementing operations research proposal, Management Science. (1970);
8. Жан Валин Административно право, Проект на Владата на РМ, (2010) Скопје;
9. Danielle Bossaert. Christoph Demmke, Koen Nomden, Robert Polet Civil services in the Europe of Fifteen - Trends and New development European Institut for public administration. (2002);
10. Мирјана Петровиќ Организационо понашање, (2003) Економски факултет Белград;
11. Прирачник за децентрализација за претставници на граѓански организации за мониторинг на процесот за спроведување на децентрализација во Република Македонија / [автори Јане Вртески, Наташа Илијева-Ацевска, Георги Христов]. - Скопје : Фондација отворено општество - Македонија, 2013. - 160 стр. : илустр. ; 24 см Фусноти кон текстот. - Библиографија: стр. 160. - Содржи и: Анекс 1-3 ISBN 978-608-218-174-5;
12. Breyer Stewart, Sunstein Richard B. Stewart, Cass R. Sunstein, Administrative Law Regulatory Policy, Asjen Law Business, United State (2006);
13. Jay M Shafritz, Albert C. Hyde, Sandra J. Parkes, Classics of Public Administration, Wadsworth, United State (2003);
14. Harry Wore, Carry S. Miller, W. Fred Wegener, Larry S. Miller, Effective Police Supervision, Nexis Matthew Bender, United State (2003);

15. Michael C., Le May, Public Administration-Clashing Values in the administration in public policy, Wadsworth, United State (2005);
16. Lian M. Berman, James. Lonathan Pwest, Human Resource management in Public Service-Paradoxes, Processes and Problem, Sage publication, United State (2000);
17. M. Petkovic, Organizational behavior, Faculty of Economy, Belgrade, (2003);
18. Harry Wore, Carry S. Miller, W .Fred Wegener, Larry S. Miller, Effective Police Supervision, Nexis Matthew Bender, United State (2003);
19. Печијарески, Љ., *Избрани проблеми од менаџмент и развој човечки ресурси*, Економски факултет - Прилеп, (2007);
20. Матис, Ј. Роберт, Џексон Ц. Џон, *Управување со човечки ресурси*, Превод на дванаесетото издание, (2009);
21. Gareth R. Jones. Jenifer M. George, Современ менаџмент, Проект на Влада на РМ за прведудвање на 500 научни и стручни книги и учебници, Скопје (2008);
22. Wiersma Wiliam, Researcx Metxod in Education, (Allsin and Backon), (2000);
23. Danielle Bossaert. Christoph Demmke, Koen Nomden, Robert Polet Civil services in the Europe of Fifteen - Trends and New development European Institut for public administration, (2002);
24. The Liaison Office as a Tool for Successful NGO-Government Cooperation: An Overview of the Central and Eastern European and Baltic Countries' Experiences, by Maria Gerasimova, (2006);
25. „Global Civil Society: An Overview“, Lester M. Salamon, the John Hopkins Comparative Nonprofit Sector Project, (2003);
26. Danielle Bossaert & Christoph Demmke, Main Challenges in the Field of Ethics and Integrity in the EU Member States, (2000);

## THE MOST IMPORTANT DIMENSIONS OF CORPORATE SOCIAL RESPONSIBILITY

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**Abstract:** Modern companies are increasingly becoming involved in society and show a growing interest in corporate social responsibility. Social responsibility represents the obligation of management to undertake certain activities that contribute to improving the welfare of the company and whole society. The paper points to the influence of the most important dimension of the corporate social responsibility (CSR): economic, social, environmental dimensions, stakeholder and voluntariness dimension. The aim of this research is that by consolidating the current literature point out the importance of implementation of this concept in different areas of society. Since this review is starting point for further research with the purpose to develop CSR business model of successful companies, listed literature review has goal to analyze models used by other authors. The influence of the five most important dimensions of CSR was compared by analyzing content of various authors. The programs of corporate social responsibility initiate and undertake activities which are desirable for society and in accordance with social values and goals. Some of the benefits that can thus be accomplished are: creating and maintaining a positive opinion on the company; strengthening the relation with stakeholders; creating a better, safer and more stimulating working environment; improving the efficiency of business management; facilitating access to financing.

**Keywords:** Corporate Social Responsibility, dimensions of CSR

### 1. INTRODUCTION

Entrepreneurial scandals regarding the wrong implementation of doing socially responsible tasks have provoked the emergence of cooperative initiatives by the stakeholders (entrepreneurs, consumers, politicians, the media) in order to establish a common pattern for social responsibility practices (Kolka and van Tulder, 2010; Gonzalez-Rodriguez et al., 2015). In modern business conditions are increasingly pointing to the responsibility of the companies that with their activities are involved in social life. None of the company was not conducting its business in an isolated area, already a work of the company became an important part of society as a whole. Corporate social responsibility (CSR) has become an important research topic in business studies (Sweeney, 2009).

In recent decades there has been increasing attention to the social and environmental impacts of business (Fontaine, 2013). Stakeholders are ever more concerned and responsible about environmental and social issues and linked to this (Rosati, 2015). In order to establish a long-lasting relationship with their stakeholders in general and customers in particular, companies need to consider and manage their increasing awareness and concerns, aligning business activities accordingly (Calabrese et al., 2015). Traditionally, companies have one



responsibility: to make a profit. But the concept of corporate social responsibility holds that companies should be responsible for more than just their owners. Corporate social responsibility consists of several dimensions which have an impact on the activities of some companies (Carroll and Shabana, 2010).

For these reasons, companies must strive to improve their CSR through appropriate actions regarding social, environmental and economic sustainability (European Commission, 2011) and through the avoidance of “corporate social irresponsibility” (CSI). On the other hand, in order to achieve benefits for the company (such as customer loyalty, company reputation - creating and maintaining a positive opinion on the company, and creating a better working environment), companies must continuously be dedicated to activities that contributing to this benefit (Ubrežiová et al., 2015). This was one of the reasons why companies have begun to report to stakeholders about their commitment to CSR activities through reports, published on websites and other CSR communication activities.

People want to work for companies that are responsible, according citizens in their communities. Employees that have a favorable view of an organization's CSR tend to have positive views about the organization in other areas, such as senior management's integrity, senior management's leadership and the organization's competitiveness in the marketplace (Lee et al., 2013). Firms are under increasing pressure to pursue socially responsible behavior from a variety of stakeholder groups. According to academic and practical researchers, several factors affect the strategic application of CSR, such as alignment with business and corporate culture as well as with social needs and sincerity (Porter and Kramer, 2006; Lee et al., 2013).

The history of corporate social responsibility (CSR) dates back to as early as the 1950s, when businesses and academic researchers start exploring the relationship between business and society (Palihawadana et al., 2016). Scholars considered that CSR represents a commitment from the company which with their activities contribute to the society in which the company operates. That implies maintaining an equitable and workable societal balance among the company and various stakeholders (Carroll and Shabana, 2010).

The concept of CSR emerges in developed countries as a result of the concerns of investors, companies, and campaigners. One aspect of CSR helps in the fight against poverty and acting reasonably in developing countries. Due to the lack of constituencies and institutions providing social goods in general, CSR seems more important for developing countries than for their richer counterparts. In fact, Lund-Thomsen, Lindgreen and Vanhamme (2016) confirm that the lack of institutionalization of CSR occurs as a result socially irresponsible behavior in developing countries. Socially irresponsible behavior generates numerous negative moral responses toward companies (Palihawadana et al., 2016).

Despite the growing emphasis on CSR in developing countries, national initiatives in the less developed countries are sparse (Dobers and Halme, 2009). In fact, the extant research on CSR focuses mostly on the context of developed countries, with only a few empirical studies on the developing countries (Pham, 2011).

When we talk about the definition of CSR is still no unified opinion about a universal comprehensive definition. The reason may be rooted in its interchangeable and overlapping character with other terminologies such as ‘corporate citizenship’, ‘the ethical corporation’, ‘corporate governance’, ‘corporate sustainability’, ‘social responsible investment’, and ‘corporate accountability’. The reason may also lie in the fact that the contemporary CSR agenda essentially involves the concept of stakeholders and development as an integral issue of business operation in the present context (Nasrullah and Rahim, 2014).

Another reason for the lack of an agreed definition may lie in the ever-changing and dynamic character of the concept of CSR itself and the expansion of its practices aligning with the increased demands of the society and pressing development issues. From that point of view CSR so far historically can be referred to as a sequence of three approaches, each having a different perspective in terms of definition and boundary of responsibility (Marrewijk, 2003).

For the above reasons, there is no universally agreed upon or recognized definition of CSR. This does not mean that CSR is not defined. Numerous definitions have been proposed at various time intervals, taking into account the different approach to understanding of the concept, its nature and aim (Nasrullah and Rahim, 2014).

Carroll 1999. described the development of definitions CSR beginning from the 1950s to the 1990s. He defines the 1950s as the modern era of CSR in terms of its emergence, the 1960s as a time of expansion and the 1970s as a time of proliferation (Cited in Nasrullah and Rahim, 2014).

Some additional theoretical issues were starting to discuss about the concept of CSR in the 1980s, which included corporate social performance, business ethics theory and stakeholder theory (Nasrullah and Rahim, 2014). In 1990s, these mentioned alternative themes took center stage in the manifestation of CSR. Thereupon all subsequent definitions of CSR were included social, economic, and environmental issues as the basic components of responsibility. As a result later was appeared numerous definitions by the different researchers, scientists, professors, governmental, intergovernmental, and development organizations (Dahlsrud, 2006).

The contribution of this study is based on a unifying theoretical framework of the five most important dimensions of corporate social responsibility: economic, social, environmental, stakeholder dimensions and volunteering dimension. Chronological comparison of the basic principles provides an overview of the relevant developments in this field in the world. A large number of authors investigated the influence of the most important dimension of CSR on the operations of different companies.

## **2. THE RESEARCH MYTHOLOGY**

This research relates to the analysis and integration of literature that includes CSR represents an introductory phase in the extensive research that relates to an examination of the most important dimensions of CSR and the formation of the business model of companies with successful CSR practices. The authors conducted a content analysis, which is a scientific and systematic method for observing and analyzing information (Wang, 2015). The initial search focused on journal articles, but was not restricted to single journals. In order to identify the literature that focuses on the topic under our consideration, following Dahlsrud's dimensions (2006), we applied different keyword combinations that included: “corporate social responsibility” and which were combined with the phrases “dimensions”, “economic”, “social”, “stakeholders”, “environmental” and “voluntariness”. Then we focused on recently published journals and books in the last 10 years with aim to show the most recent findings in this field which can confirm the positive trend of growth in this area and its significance in the future. Papers related to the above mentioned dimensions are chronologically presented in the tables from T1 to T5 in the sequel. Papers were selected based on association with key dimensions in which it was carried out a quantitative analysis of the most important factors

that have an influence on the above mentioned dimensions. Further, in this paper were presented respectively the following dimensions: economic, social, environmental, stakeholder and voluntariness dimension.

### 3. THE DIMENSIONS OF CORPORATE SOCIAL RESPONSIBILITY

According to the analysis of the content of current definitions of CSR what most authors adopted are the three main dimensions of corporate social responsibility and those are: environmental, social and economic dimensions (Nikolau et al., 2013; Gonzalez-Rodriguez et al., 2015). While, in the recent literature appear two new dimensions: volunteering dimensions and stakeholders dimensions (Slack, 2013). Although there are so many definitions of CSR, according to Alexander Dahlsrud of the Norwegian University of Science and Technology almost all of them involve five “dimensions” of CSR (Dahlsrud, 2006). In the review paper of Dahlsrud, 2006, 37 different definitions of CSR are analyzed, and accordingly, above defined five dimensions selected as the most important ones, appearing in most of referring literature. Regarding these dimensions, numerous controversies appeared concerning their relevant priorities and how are they related to each other in terms of integration, communication and synergy between the goals achieved<sup>21</sup>. Today, development and implementation of social responsibility is strategically necessary for the public good for a company.

#### 3.1. THE ECONOMIC DIMENSION

The impact on the company's finances is achieved through the economic dimension of corporate social responsibility.<sup>22</sup> Companies should be motivated by profit and put the company's business in hand of consumers, investors and other stakeholders. From the aforementioned, it follows that the only business world and the community can work together for the benefit of society and the environment from altruistic motives. Enterprises are aware that their survival in today's market depends on sacrifice short-term profits due to the positive effects in the future, which satisfy the owners and managers, not just as they used to maximize profits (Slavić, 2015). A corporation has to meet its economic responsibilities referring to returning money to investors, achievement of leadership position in the market, obtaining maximum possible profits, guaranteeing the customer's satisfaction and loyalty, gives fair compensation to employees, gives goods at fair prices to customers, promotions their products/services through costly advertising campaigns (Gonzalez-Rodriguez, 2015).

Economic value assumes responsibility of the company that it will strive for long-term sustainable business, to adequately respond to business risks and to create the necessary security, how to its shareholders, investors and workers, and thus society in general.

This dimension provides follow economic indicators including, most importantly<sup>23</sup>: direct and indirect economic impact on communities through spending power and geographic,

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<sup>21</sup> <http://www.eoearth.org/view/article/>

<sup>22</sup> <http://smallbusiness.chron.com/five-dimensions-corporate-social-responsibility-54700.html>

<sup>23</sup> [file:///E:/Preuzimanje/9783319023496-c2%20\(6\).pdf](file:///E:/Preuzimanje/9783319023496-c2%20(6).pdf)

economic impact; economic impact through business process; outsourcing, knowledge, innovation, social investments in employees and consumers; and taxes, tax incentives, wages, pensions and other benefits paid to employees (Cited in Nasrullah and Rahim, 2014).

Review of some researchers conducted across the world is presented in Table 1.

Table 1. Papers that dealt with the Economic dimension of CSR

Author(s)	Headline	Theme	Year
<i>Gonzalez-Rodriguez, R., Diaz-Fernandez, C., Simonetti, B.</i>	The social, economic and environmental dimensions of corporate social responsibility: The role played by consumers and potential entrepreneurs	In this paper is developed a research model to examine the drivers which influence consumers and entrepreneurs perceptions of corporate social responsibility (CSR).	2015
<i>Reverte, C., Gomez-Melero, E., Cegarra-Navarro, J.G.</i>	The influence of corporate social responsibility practices on organizational performance: evidence from Eco-Responsible Spanish firms	This study fills in an important gap by analyzing the impact of corporate social responsibility practices on a measure of organizational performance encompassing both financial and non-financial indicators, and by studying the potential mediating role of innovation in the corporate social responsibility performance relationship.	2015
<i>Saeidi, S.P., Sofian, S., Saeidi, P., Saeidi, S.P., Saeidi, S.A.</i>	How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction	This study considers sustainable competitive advantage, reputation, and customer satisfaction as three probable mediators in the relationship between CSR and firm performance. The final findings show that only reputation and competitive advantage mediate the relationship between CSR and firm performance.	2015
<i>Rusmanto, T., Williams, C.</i>	Compliance Evaluation on CSR Activities Disclosure in Indonesian Publicly Listed Companies	The objective of this research is to evaluate disclosure compliance of CSR activities, including policies, programs and cost for sustainable development of the companies.	2015
<i>Fifka, M., Pobizhan, M.</i>	An institutional approach to corporate social responsibility in Russia	The objective of our study is to analyze to what degree the national political and socio-economic institutions determine CSR practice, and how it is influenced by international factors, such as CSR standards, frameworks, and foreign stakeholder expectations.	2014
<i>Waworuntu, S.R., Wantah, M.D., Rusmanto, T.</i>	CSR and financial performance analysis: evidence from top ASEAN listed companies	The purpose of this research is to investigate whether the commitment of companies to their stakeholders has a relationship with better financial results and also to establish the extent and pattern of corporate disclosure in the top listed companies in the ASEAN region.	2014
<i>Tsoutsoura, M.</i>	Corporate Social Responsibility and Financial Performance	Using extensive data over a period of five years, this study explores and tests the sign of the relationship between corporate social responsibility and financial performance. The dataset includes most of the S&P 500 firms and covers the years 1996-2000. The relationship is tested by using empirical methods.	2004

Based on the results presented in Table 1, we can conclude that economic parameters which affecting on social responsibility are numerous. The researches in Table 1 show only some of them, which relating to: examination of the financial and nonfinancial impact on the company's operations as a result of CSR activities; competitive advantage and reputation as the effects of CSR; costs of sustainable development and compliance with the costs that the company set aside for CSR; investigate the impact of national policies and socioeconomic institutions and stakeholders influence on the financial results of CSR activities. Based on the above facts, it can be seen the impact of the economic dimension with the various aspects which were studied by the aforementioned authors.

### 3.2. THE SOCIAL DIMENSION

The social dimension of the CSR is the key factor in setting up the relationships between the business and society. Social responsibility means being accountable for the social effects the company has on people - even indirectly. The basic objective of social dimension is that corporations should work for building up a better society as a whole and integrate social concerns in their business operations and consider the full scope of their impacts on communities (Nasrullah and Rahim, 2014).

A company as a social actor, being itself a part of the human community, should pay its attention to serving the purpose of the internal and external human communities (Szczuka, 2015). It should realize and accordingly respond to their needs, expectations, rights, and demands for the wellbeing of their social life. When addressing the social dimension, you should aim to use your business to benefit society as a whole. This could involve sourcing fair trade products, for example, or agreeing to pay your employees a livable wage. It could also involve taking on endeavors that benefit society, for instance using your resources to organize charitable fundraisers (Sharma and Gupta, 2003).

Review of some researchers conducted across the world is presented in Table 2.

Table 2. Papers that dealt with the Social dimension of CSR

Author(s)	Headline	Theme	Year
<i>Duff, A.</i>	Corporate social responsibility reporting on professional accounting firms	This paper examines the corporate social responsibility (CSR) reporting undertaken by the 20 largest professional accounting firms in the United Kingdom. These social evaluations (prestige) allow them to enhance their intellectual capital and consequently charge premium fees and, effectively increasing partner wealth.	2014
<i>Bonsón, E., Bednárová, M.</i>	CSR reporting practices of Eurozone companies	Communication of social and environmental dimensions of the company plays a key role in the sustainable development of organizations. The aim of this empirical study is to analyze the extent to which Eurozone companies report on CSR indicators.	2014
<i>Bakos, L.</i>	Decision-making and managerial behavior regarding Corporate Social Responsibility in the case of Small and Middle-Sized Companies	This paper presents the preliminary results of a study on Corporate Social Responsibility (CSR) in Small and Medium-sized Enterprises (SMEs) in Romania. The study focuses mostly on decisions regarding the responsibility related to employees, more particularly on occupational illnesses and health conditions.	2014
<i>Jonikas, D.</i>	Value created through CSR measurement possibilities	This paper present a conceptual framework for measurement of value created through CSR. Development of this framework would allow to measure all value created through CSR independently who has received it - company, stakeholders or society.	2014
<i>Mousiolis, D.T., Bourletidis, K.</i>	The Corporate Identity through the CSR's Paths	The purpose of this paper is about how the policies, which have been adopted by CSR's factors, affect the identity of a corporation, the sensitivities of the organizations upon social matters, the critical decisions of the management regarding social matters.	2014
<i>Kim, S., Lee, Y.-J.</i>	The complex attribution process of CSR motives	This study examines how consumers reconcile two possibly contradictory motives (public-serving and firm-serving) to the corporate social responsibility (CSR) initiatives of companies in socially stigmatized industries.	2012

Conducted research presented in Table 2 includes important aspects of the social dimension. The company reports about CSR indicators is a current topic in recent years in the world and a growing number of researchers are dealing with this matter. On the other hand, in the context of this dimension is carried out and assessment society in order to improve

intellectual capital. Responsible for employees, their needs and state of health is another important factor of this dimension, as well as the value which is generated through the activities of the CSR. Also, through the CSR policy in effect on the identity of the company and on a numerous social issues dealing with researchers in recent years.

### 3.3. THE STAKEHOLDER DIMENSION

The idea of stakeholders has its roots in the tradition that sees the business as an integral part of society and not just an isolated element for making profits for shareholders. Stakeholders are the key parts of the system that influence corporate decision making in the way of bringing all sides of business in balance through fulfilling everyone needs without harm to other parts of the system. Mahoney (2012) defines stakeholders as “...*those persons and groups who contribute to the wealth-creating potential of the firm and are its potential beneficiaries and/or those who voluntarily or involuntarily become exposed to risk from the activities of a firm... Thus, stakeholders include shareholders, holders of options issued by the firm, debt holders, employees (especially those investing firm specific human capital), local communities, environment as latent stakeholders, regulatory authorities, the government, inter-organizational alliance partners, customers and suppliers*”. (Mahoney, 2012)

There are several categorizations of stakeholders inter alia one of them focus on attributes: power, legitimacy and urgency. By combining these attributes managers can generate groups of stakeholders that must be paid attention to- definitive and expectant stakeholders and latent stakeholders whose existence is only mentioned (Mitchell et al., 1997).

Managing all stakeholders' needs is almost impossible because there are a lot of opposites in their requests and understanding of purpose of business, so managers permanently seek for balances and trade-offs. The goal has become minimizing conflicts between stakeholders and prevention of all unethical behaviors. The companies adopt different understanding of CSR practice because of different cultural elements in their countries, different levels of socially accepted rules, business standards and policies.

Companies implement SCR activities in order to improve their relationships with stakeholders. However, many researchers pointed out that organization must carry out cultural change when moving toward CSR organizations.

Sustainability is very important part in stakeholder dimension of CSR due to need of companies to take responsibility for wider group of direct and indirect collaborators. They must take in account whole supply chain and establish such level of collaboration that all unsustainable or socially irresponsible practices are detected and prevented. If join global market many companies have faced barriers imposed by industrialized countries because they failed to meet environment, human rights, and safety requirements. To participate in international trade and gain a competitive advantage, companies began to strategically consider the adoption of CSR (Yua and Choi, 2014).

The research field about stakeholder dimension of CSR is very wide due to various groups of stakeholders and aspects have been investigated.

Review of some researchers conducted across the world is presented in Table 3.



Table 3. Papers that dealt with the Stakeholder dimension of CSR

Author(s)	Headline	Theme	Year
<i>Scandeliuss, C., Cohen, G.</i>	Achieving collaboration with diverse stakeholders-The role of strategic ambiguity in CSR communication	This paper seeks to explore how the concept of strategic ambiguity could have a role in CSR communication to stimulate collaboration with diverse stakeholders.	2016
<i>Jo, H., Song, M.H., Tsang, A.</i>	Corporate social responsibility and stakeholder governance around the world	In this paper, it is examined the impact of stakeholder governance on corporate social responsibility (CSR) around the world to determine whether CSR is employed as a mechanism to mitigate conflicts of interest between managers and diverse stakeholders, or used as managerial perquisites.	2015
<i>Fitrijanti, T.</i>	Index of the Company's Stakeholders Welfare	This article proposes a quantitative measurement approach with fundamental principle of the attainment of the most minimal discrepancy between the welfare of the debt holder and shareholder, and the welfare of other stakeholders besides those two parties.	2015
<i>Calabrese, A., Costa, R., Rosati, F.</i>	A feedback-based model for CSR assessment and materiality analysis	This paper proposes a CSR model that classifies customers on the basis of their CSR feedback, measuring both their perceptions and expectations.	2015
<i>Farooq, M., Farooq, O., Jasimuddin, S.J.</i>	Employees response to corporate social responsibility: Exploring the role of employees' collectivist orientation	This study explores how individual employee differences moderate the influence of CSR on employee behavior. Three of the four components (i.e., community, employees, and consumers) of CSR positively affect employees' organizational identification and knowledge-sharing behavior.	2014
<i>Yua, Y., Choi, Y.</i>	Stakeholder pressure and CSR adoption: The mediating role of organizational culture for Chinese companies	This empirical study investigates the driving factors in the adoption of corporate social responsibility (CSR) practices by Chinese firms. Following the stakeholder theory, the hypothesis of this study is that stakeholder pressures positively impact Chinese firms' adoption of CSR practices.	2014
<i>Öberseder, M., Schlegelmilch, B.B., Murphy, P.E.</i>	CSR practices and consumer perceptions	This paper explores corporate practices and consumer perceptions related to CSR. Based on literature and qualitative data from interviews with managers and consumers, a conceptualization of corporate practice and consumers' perceptions of CSR is developed.	2013

<i>Bauman, C.W., Skitka, L.J.</i>	Corporate social responsibility as a source of employee satisfaction	Understanding employee reactions to corporate social responsibility may help answer lingering questions about the potential effects of corporate social responsibility on firms as well as illuminate some of the processes responsible for them.	2012
<i>Steurer, R.</i>	The role of Governments in Corporate Social Responsibility: Characterizing Public Policies on CSR in Europe	The present paper is concerned with the political side of the management approach. By systematically characterizing the public policies on CSR throughout Europe, it complements the existing, often unsystematic, accounts of how governments address CSR and it brings the issue closer to political science.	2010

Papers concerning stakeholder dimension, presented in Table 3, mostly investigate connections between CSR activities done by companies, motives for implementing CSR activities and perception of different stakeholders about those activities. Results show that CSR activities have positive impact on most of stakeholders like consumers, employees and society, while shareholders and investors don't always recognize benefits of CSR. Governments and other organizations with interest in CSR can make bootstrapping impact on companies to implement CSR through legislation and rewarding but those actions give only partial results. On the other side, results suggest that external stakeholder's perception significantly affects the company valuation.

### 3.4. THE ENVIRONMENTAL DIMENSION

In recent years companies have been viewed as major cause of social, environmental and economic problems so as a result of external pressures companies have started to consider their influence on surroundings and advantages and disadvantages of their actions. Aside from pollution prevention, companies must think about energy savings, labor improvements and efficiency in the use of raw materials as well as control and reduction of waste.

Implementation of the environmental CSR depends on different formal, legal and administrative conditions set by governments. The interests of different groups regarding environmental CSR are with significant level of variation. The companies itself, have own interests in implementation of environmental protection activities. They are trying to gain positive public opinion and support of society but achieving those goals will not be possible only by fulfilling legal requirements and avoiding incidents, yet companies should have more proactive approach. Business strategies should consider environmental protection and also investments in CSR and environmental reporting should be above mandatory. Thinking about sustainable development gives numerous opportunities for enrich the way of influence on the surrounding through: resource efficiency, sustainable economy, the development of new processes and technologies, green technologies, reinforcing the competitive advantages of businesses, building consciousness among costumers about the value of resources and energy efficiency, pursuing the reduction of CO<sub>2</sub> emissions, preventing biodiversity harm and climate resilient economy.

Environmental CSR activities cause additional expenses for companies and financial benefits of them are not immediately visible and easy measurable. A large number of

researches have a goal to investigate connections between environmental CSR activities and their economic performance and public opinion (Friedman, 1970). Some results show that business-environment trade-offs have positive impact on economical results in companies (Waddock and Graves, 1997). Other authors criticize these results because they find that companies do not sacrifice their profit for environment protection on voluntary basis, because there is no positive connection between present expenses and later gains (Wagner et al., 2002). Porter and Linde suggest that in a broader sense, CSR environmental activities can trigger innovation, reduce costs, save resources thus making competitive advantage and loyal consumers (Porter and van der Linde, 1995).

Review of some researchers conducted across the world is presented in Table 4.

Table 4. Papers that dealt with the Environmental dimension of CSR

Author(s)	Headline	Theme	Year
<i>Graafland, J., Smid, H.</i>	Reconsidering the relevance of social license pressure and government regulation for environmental performance of European SMEs	Whereas social license pressure is held as a strong motive for the corporate social performance (CSP) of large enterprises, it is argued in literature that it will not sufficiently motivate small and medium-sized enterprises (SMEs). In this view, government regulation is the most effective way to improve the environmental performance of SMEs.	2017
<i>Searcy, C., Dixon, S.M., Neumann, W.P.</i>	The use of work environment performance indicators in corporate social responsibility reporting	Work environment issues refer to all aspects of the design and management of the work system that affect employees' interactions with the workplace.	2015
<i>Cho, C.H., Patten, D.M.</i>	Green accounting: Reflections from a CSR and environmental disclosure perspective	The paper questions Thornton's narrow focus on environmental accounting as it relates to the debits and credits of financial reporting, and it attempts to illustrate the problems that voluntary environmental disclosure creates with respect to reduced incentives for companies to improve environmental performance.	2013
<i>Bönte, W., Dienes, C.</i>	Environmental Innovations and Strategies for the Development of New Production Technologies: Empirical Evidence from Europe	This study empirically investigates whether firms' improvements in energy and material efficiency are related to the extent to which external partners are involved in the development of process innovations, covering 14 European countries.	2013
<i>Flammer, C.</i>	Corporate Social Responsibility and Shareholder Reaction: The Environmental Awareness of Investors	This study examines whether shareholders are sensitive to corporations' environmental footprint.	2013

<i>Babiak, K., Trendafilova, S.</i>	CSR and Environmental Responsibility: Motives and Pressures to Adopt Green Management Practices	This paper examines the diffusion of environmental management initiatives in business and the motives and pressures reported by senior executives to adopt these practices in one industry.	2011
<i>Jindrichovska, I., Purcareea, I.</i>	CSR and Environmental Reporting in the Czech Republic and Romania: Country Comparison of Rules and Practices	The article analyses the short tradition of Corporate Social Responsibility reporting in both countries and the current state of development, as well as its future perspectives .	2011
<i>Wahba, H.</i>	Does the Market Value Corporate Environmental Responsibility? An Empirical Examination	The aim of this research was to present empirical evidence regarding the influence of engaging in environmental responsibility on corporate market value	2008
<i>Dam, L., Scholtens, B.</i>	Environmental regulation and MNEs location: Does CSR matter?	The study investigates whether firms with relatively low environmental standards are more often located in countries that are poor, corrupt or have weak environmental regulations.	2008

Papers concerning environmental dimension, presented in Table 4, mostly investigate connections between investments in environmental CSR activities and economical results of those activities, legal rules and obligatory environmental reporting. There are two groups that follow two main flows of researches: one group of findings confirms hypothesis that implementing of CSR cause costs and economical results are not visible and do not increase value of company, others present results which show positive influence of ecological activities on companies income, innovations and positive image of companies.

### 3.5. THE VOLUNTARINESS DIMENSION

Voluntariness assumes discretionary right to make decisions that are not imposed by the duty to fulfill certain conditions. Voluntariness is largely associated with the proactivity that transcends the imposed standards and rules. Voluntariness dimension means overcoming the minimum of prescribed standards related to product quality or safety, community support, support to charitable institutions, support to employees in social projects engagement through volunteering and establish corporate foundations.

To understand voluntariness in CSR business ethics must be understood. One concept understands corporation as an entity with the power to own, buy, and sell property, to enter into contracts, to sue and be sued and with certain rights over people: financial influence, power to cause physical and psychological injuries to employees, consumers and environment (Nisberg, 1988). Corporations have the responsibility for avoiding bad actions in order to prevent corporate social irresponsibility. This dimension focuses on ethical responsibilities and philanthropic responsibilities.

Review of some researchers conducted across the world is presented in Table 4

Table 5. Papers that dealt with the Voluntariness dimension of CSR

Author(s)	Headline	Theme	Year
<i>Ortas, E., Alvarez, I., Jaussaud, J., Garayar, A.</i>	The impact of institutional and social context on corporate environmental, social and governance performance of companies committed to voluntary corporate social responsibility initiatives	Using a Neo-institutional framework, this paper discusses the role of national-specific social, cultural, legal, regulatory and economic differences when determining the way that companies committed to legal, regulatory and economic differences when determining the way that companies committed to a specific voluntary corporate social responsibility (CSR) initiative operate in different sustainability dimensions.	2015
<i>Lin-Hi, N., Müller, K.</i>	The CSR bottom line: Preventing corporate social irresponsibility	The study here elaborates on the relevance of “avoiding bad” for the perceived social responsibility of corporations and provides a framework which captures the relationship between CSR (“doing good” and “avoiding bad”), CSI, and perceived CSR (CSR).	2013
<i>Aslan, Ş., Şendoğdu, A.</i>	The Mediating Role of Corporate Social Responsibility in Ethical Leader's Effect on Corporate Ethical Values and Behavior	In this study, the correlation between ethical leadership, corporate ethical values, ethical behavior and corporate social responsibility is investigated.	2012
<i>Maloni, M.J., Brown, M.E.</i>	Corporate Social Responsibility in the Supply Chain: An Application in the Food Industry	The food industry faces many significant risks from public criticism of corporate social responsibility (CSR) issues in the supply chain. This paper draws upon previous research and emerging industry trends to develop a comprehensive framework of supply chain CSR in the industry	2006
<i>Kilcullen, M., Kooistra, J.O.</i>	At least do no harm: sources on the changing role of business ethics and corporate social responsibility	The research indicates that, although some corporations are still practicing unethical behavior, many more indicated that they have a social responsibility to their stakeholders	1999

Scientific literature regarding voluntariness dimension of CSR, presented in Table 5, deal with questions of overcoming obligations imposed by rules and regulations and issues like should CSR involve a dilemma if companies are only “doing good” or “avoiding bad” and should they be rewarded for it.

#### 4. CONCLUSION

CSR concept is widespread in the world and it is applied in a number of successful companies. In order to evaluate the current scientific achievements in this field, this paper gives an overview of the most important dimensions with emphasis on scientific contribution.

The findings of prior research do not give an explicit model for research on CSR dimensions. Moreover, the ambiguous and partially contradictory theoretical assumptions and empirical findings indicate the need to use more comprehensive model in order to understand relationship between CSR activities and other business activities.

There is variety of suggestions in the academic literature relate to number and names of CSR dimensions. This article examined literature that has addressed corporate social responsibility issues through 5 dimensions, in this case Dahlsrud concept was been followed (Dahlsrud, 2006; Slack, 2013), highlighting papers connected with each dimension and developed through review of new researches.

Through the dimensions of CSR enables a better understanding of the potential benefits to society, the environment, economy and stakeholders.

Generally speaking, this work can be used as good theoretical base for further researches that are based on the dimensions of corporate social responsibility. The main motive for the implementation of CSR in the company through an understanding of the dimensions, can have positive influence on better corporate image (Maignan and Ferrell, 2004), better competitive position in the market, the increasing of the economic value of company, the well-being of society and preservation of ecology. The ultimate goal of further research, which will present the continuation of this work, is the formation of a business model of companies that have a successful CSR practices. The model defined in this way, will be proposed to the companies without expressed CSR practice but have potential to do so.

## REFERENCE

- Aslan, Ş., Şendoğdu, A. (2012). The Mediating Role of Corporate Social Responsibility in Ethical Leader's Effect on Corporate Ethical Values and Behavior. *Procedia - Social and Behavioral Sciences*, 58, 693-702.
- Babiak, K., Trendafilova, S. (2011). CSR and Environmental Responsibility: Motives and Pressures to Adopt Green Management Practices. *Corporate Social Responsibility and Environmental Management*, 18, 11-24.
- Bakos, L. (2014). Decision-making and managerial behavior regarding Corporate Social Responsibility in the case of Small and Middle-Sized Companies. *Procedia - Social and Behavioral Sciences* 124, 246-254.
- Bauman, C., Skitka, L. (2012). Corporate social responsibility as a source of employee satisfaction. *Research in Organizational Behavior*, 32, 63-86.
- Bonsón, E., Bednárová, M. (2014). CSR reporting practices of Eurozone companies. *Revista de Contabilidad - Spanish Accounting Review*.
- Bönte, W., Dienes, C. (2013). Environmental Innovations and Strategies for the Development of New Production Technologies. *Empirical Evidence from Europe*, 22, 501-516.
- Calabrese, A., Costa, R., Rosati, F. (2015). A feedback-based model for CSR assessment and materiality analysis. *Accounting Forum*, IN PRESS

- Carroll, A.B. (1999). Corporate Social Responsibility: Evolution of a Definitional Construct. *Business and Society*, 38, 268-269.
- Carroll, A.B., Shabana, K.M. (2010). The business case for corporate social responsibility: A review of concepts, research and practice. *International Journal of Management Reviews*, 12(1), 85-105.
- Cho, C., Patten, D. (2013). Green accounting: Reflections from a CSR and environmental disclosure perspective. *Critical Perspectives on Accounting*, 24, 443-447.
- Dahlsrud, A. (2006). How Corporate Social Responsibility is defined: An Analysis of 37 Definitions. *Corporate Social Responsibility and Environmental management*, 15(1), 8-11.
- Dam, L., Scholtens, B. (2008). Environmental regulation and MNEs location: Does CSR matter?. *Ecological Economics*, 67, 55-65.
- Dobers, P., Halme, M. (2009). Corporate Social Responsibility and Developing Countries. *Corporate Social Responsibility and Environmental Management*, 16(5), 237-249.
- Duff, A. (2014). Corporate social responsibility reporting in professional accounting firms. *The British Accounting Review*, 1-13.
- European Commission, (2001). Green paper: Promoting a European framework for corporate social responsibility. Brussels: European Commission.
- European Commission, (2011). A renewed EU strategy 2011-14 for corporate social responsibility. Bruxelles, Belgium: European Commission
- Farooq, M., Farooq, O., Jasimuddin, S. (2014). Employee's response to corporate social responsibility: Exploring the role of employees' collectivist orientation. *European Management Journal*, 32, 916-927.
- Fifka, M., Pobizhan, M. (2014). An institutional approach to corporate social responsibility in Russia. *Journal of Cleaner Production*, 82, 192-201.
- Fitrijanti, T. (2015). Index of the Company's Stakeholders Welfare. *Procedia - Social and Behavioral Sciences*, 211, 1023-1027.
- Flammer, C. (2013). Corporate Social Responsibility and Shareholder Reaction: The Environmental Awareness of Investors. *Academy of Management Journal*, 56(3), 758-781.
- Fontaine, M. (2013). Corporate Social Responsibility and Sustainability: The New Bottom Line?. *International Journal of Business and Social Science*, 4(4), 110-119.
- Friedman, M. (1970). The Social Responsibility of Business is to Increase its Profits, *The New York Times Magazine*.
- Gonzalez-Rodriguez, R., Diaz-Fernandez, C., Simonetti, B. (2015). The social, economic and environmental dimensions of corporate social responsibility: The role played by consumers and potential entrepreneurs. *International Business Review*, 24, 836-848.
- Graafland, J., Smid, H. (2017). Reconsidering the relevance of social license pressure and government regulation for environmental performance of European SMEs. *Journal of Cleaner Production*, 141, 967-977.

- Jindrichovska, I., Purcarea, I. (2011). CSR and Environmental Reporting in the Czech Republic and Romania. *Country Comparison of Rules and Practices*, 10(2), 202-227.
- Jo, H., Song, M., Tsang, A. (2015). Corporate social responsibility and stakeholder governance around the world. *Global Finance Journal*, 27, 18-45.
- Jonikas, D. (2014). Value created through CSR measurement possibilities. 19th International Scientific Conference; Economics and Management 2014, ICEM 2014, Riga, Latvia, 156, 189-193.
- Kilcullen, M., Kooistra, J. (1999). At least do no harm: sources on the changing role of business ethics and corporate social responsibility. *Reference Services Review*, 27(2), 158-178.
- Kim, S., Lee, Y.-J. (2012). The complex attribution process of CSR motives. *Public Relations Review*, 38, 168-170.
- Kolka, A., Van Tulder, R. (2010). International business, corporate social responsibility and sustainable development. *International Business Review*, 19, 119-125.
- Lee, E., Park, S.-Y., Lee, H.J. (2013). Employee perception of CSR activities: Its antecedents and consequences. *Journal of Business Research*, 66, 1716-1724.
- Lin-Hi, N., Müller, K. (2013). The CSR bottom line: Preventing corporate social irresponsibility. *Journal of Business Research*, 66, 1928-1936.
- Mahoney, J.T. (2012). Towards a stakeholder theory of strategic management. University of Illinois at Urbana- Champaign.
- Maignan, I., Ferrell, O.C. (2004). Corporate social responsibility and marketing: an integrative framework. *The Journal of the Academy of Marketing Science*, 32(1).
- Maloni, M., Brown, M. (2006). Corporate Social Responsibility in the Supply Chain: An Application in the Food Industry. *Journal of Business Ethics*, 68, 35-52.
- Marrewijk, M. (2003). Concept and Definitions of CSR and Corporate Sustainability: Between Agency and Communion. *Journal of Business Ethics*, 44(2-3), 95-105.
- Mitchell, R.K., Agle, B.R., Wood, D.J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review*, 22, 853-866.
- Mousiolis, D.T., Bourletidis, K. (2014). The Corporate Identity through the CSR's Paths, International Conference on Strategic Innovative Marketing, IC-SIM 2014, Madrid, Spain, 175, 511-514.
- Nasrullah, N.M., Rahim, M.M. (2014). CSR in Private Enterprises in Developing Countries. *CSR, Sustainability, Ethics and Governance*, DOI 10.1007/978-3-319-02350-2\_2.
- Nikolau, I., Evangelinos, K., Allan, S. (2013). A reverse logistics social responsibility evaluation framework based on the triple bottom line approach. *Journal of Cleaner Production*, 56, 173-184.
- Nisberg, J. (1988). *The Random House Handbook of Business Terms*. New York, NY: Random House.



- Öberseder, M., Schlegelmilch, B., Murphy, P. (2013). CSR practices and consumer perceptions. *Journal of Business Research*, 66, 1839-1851.
- Ortas, E., Alvarez, I., Jaussaud, J., Garayar, A. (2015). The impact of institutional and social context on corporate environmental, social and governance performance of companies committed to voluntary corporate social responsibility initiatives. *Journal of Cleaner Production*, 108, 673-684.
- Palihawadana, D., Oghazi, P., Liu, Y. (2016). Effects of ethical ideologies and perceptions of CSR on consumer behavior. *Journal of Business Research*, 69, 4964-4969.
- Pham, D.H. (2011). Corporate social responsibility: A study on awareness of managers and consumers in Vietnam. *Journal of Accounting and Taxation*, 3(8), 162-170.
- Porter, M., Kramer, M.R. (2006). Strategy and society: The link between competitive advantage and corporate social responsibility. *Harvard Business Review*, 84(12), 78-92.
- Porter, M., van der Linde, C. (1995). Toward a New Conception of the Environment-Competitiveness Relationship, 9, 97-118.
- Reverte, C., Gomez-Melero, E., Cegarra-Navarro, J.G. (2015). The influence of corporate social responsibility practices on organizational performance: evidence from Eco-Responsible Spanish firms, *Journal of Cleaner Production*, 1-15.
- Rosati, F. (2015). Measuring corporate sustainability: models, methods and findings. University of Rome Tor Vergata.
- Rusmanto, T., Williams, C. (2015). Compliance Evaluation on CSR Activities Disclosure in Indonesian Publicly Listed Companies. *Global Conference on Business & Social Science*, 172, 150-156.
- Saeidi, S.P., Sofian, S., Saeidi, P., Saeidi, S.P., Saeidi, S.A. (2015). How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction. *Journal of Business Research*, 68, 341-350.
- Scandellius, C., Cohen, G. (2016). Achieving collaboration with diverse stakeholders - The role of strategic ambiguity in CSR communication. *Journal of Business Research*, IN PRESS
- Searcy, C., Dixon, S., Neumann, W. (2015). The use of work environment performance indicators in corporate social responsibility reporting. *Journal of Cleaner Production*, 1-15.
- Sharma, A., Gupta, N. (2003). The new era of Corporate Social Responsibility. *International Research Journal of Management Science and Technology*, 5(1), 191-205.
- Slack, N., Bardon-Jones, A., Johnston, R. (2013). *Operations Management*, 7th edition, Pearson, United Kingdom.
- Slavić, M. (2015). Društveno odgovorno poslovanje i društvena odgovornost menadžmenta, Karlovac
- Steurer, R. (2010). The Role of Governments in Corporate Social Responsibility: Characterizing Public Policies on CSR in Europe, 43/1, 49-72.

- Sweeney, L. (2009). A Study of Current Practice of Corporate Social Responsibility (CSR) and an examination of the relationship between CSR and Financial Performance.
- Szczuka, M. (2015). Social dimension of sustainability in CSR standards. 6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015) and the Affiliated Conferences. *Procedia Manufacturing*, 3, 4800-4807.
- Tsoutsoura, M. (2004). Corporate Social Responsibility and Financial Performance. University of California at Berkeley, Berkeley, California, 1-21.
- Ubrežiová, I., Kozáková, J., Malejčíková, A. (2015). Corporate Social Responsibility and Perception of Environmental Pillar in the Selected Set of the Slovak Enterprises. *International Scientific Conference: Business Economics and Management*, 34, 542-549.
- Waddock, S., Graves, S. (1997). The corporate social performance - financial performance link, 18, 303-319.
- Wagner, M., Van Phu, N., Azomahou, T., Wehrmeyer, W. (2002). The relationship between the environmental and economic performance of firms: an empirical analysis of the European paper industry, 9, 133-146.
- Wahba, H. (2008). Does the Market Value Corporate Environmental Responsibility? An Empirical Examination. *Corporate Social Responsibility and Environmental Management*, 15, 89-99.
- Wang, S. (2015). Chinese Strategic Decision-making on CSR. *CSR, Sustainability, Ethics and Governance*, 7-28.
- Waworuntu, S.R., Wantah, M.D., Rusmanto, T. (2014). CSR and financial performance analysis: evidence from top ASEAN listed companies. *International Conference on Accounting Studies*, 164, 493-500.
- Yua, Y., Choi, Y. (2014). Stakeholder pressure and CSR adoption: The mediating role of organizational culture for Chinese companies. *The Social Science Journal*.

## NOMINAL AND REAL CONVERGENCE IN EU COUNTRIES IN THE PERIOD 2004-2015

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**Abstract:** Global economic and financial integration has led to the necessity of convergence the financial and economic criteria in all countries that are part of integration. The main criteria that Europe leads are the criteria set by the European Union. Apart from Copenhagen criteria, which are a condition for membership in this integration, it is necessary to fulfill the convergence criteria, which are considered the nominal and real aspect. Bearing in mind the selected nominal and real convergence indicators, the subject of research is a ranking of the countries using the PROMETHEE method. For obtaining the weight coefficients of the selected parameters, used method is the entropy, which demonstrates that there are no significant differences among the indicators. The comparison of nominal and real variables among the EU28 countries through two scenarios, in 2004 and 2015, indicate that there has been a significant movement in countries rank, but no difference between indicators.

**Keywords:** convergence criteria, European Union, PROMETHEE, entropy method.

### 1. UVOD

Ekonomska integracija i stvaranje jedinstvene ekonomske politike u Evropskoj uniji dovela je do ideje o ujednačavanju svih aspekta regulatornog okvira u zemljama članicama pre svega u oblasti privređivanja, ali u domenu socijalnog, političkog, kulturnog razvoja. Upravljanje ekonomskim integracijama, koje je u nadležnosti Evropske komisije i njenih tela, podrazumeva definisanje takve ekonomske politike koja će obezbediti postizanje boljih ekonomskih rezultata u odnosu na one koji bi bili ostvareni bez postojanja integracije.

Imajući u vidu težnju svih zemalja u okviru Evropske unije da dostignu isti ili sličan stepen razvijenosti, veoma je važan koncept konvergencije. Konvergencija označava proces koji se odnosi na približavanje ekonomskih pokazatelja među zemljama na način da slabije zemlje teže da postignu performanse razvijenijih zemalja. Konvergencija, kao proces približavanja jednakosti zemalja članica jedne integracije pominje se još u preambuli Ugovora o Evropskoj uniji koji označava “*odlučnost ka postizanju stabilnosti i konvergencije ekonomija kako bi se uspostavila ekonomska i monetarna unija, jedinstvena i stabilna valuta*” [1].

Približavanje zemalja u okviru jedne integracije ne odnosi se samo na ekonomsku, već i na političku, institucionalnu, socijalnu dimenziju. U tom smislu, konvergencija se može posmatrati kao [2]:

- Nominalna konvergencija (pri čemu se tada najčešće misli na zemlje EU koje imaju tendenciju pristupanje Evropskoj monetarnoj uniji - EMU kao najvišoj, trećoj fazi evropske integracije),

- Realna konvergencija (koja se odnosi na smanjivanje razlika među zemljama članicama u određenim realnim pokazateljima).

Nominalna konvergencija odnosi se na kriterijume iz Mاستrihta definisane još 1992. godine čije ispunjavanje je neophodno za članstvo EMU. Da bi pristupile monetarnoj uniji, zemlje moraju da ispune određene uslove koji se nazivaju uslovi konvergencije. Konvergencija u ovom slučaju predstavlja proces koji ima za cilj da zemlje pripremi institucionalno i strukturno, kako bi uhvatili korak sa vodećim zemljama. Ovi kriterijumi se odnose na dva fiskalna (visina budžetskog deficita i javnog duga) i tri monetarna pravila (visina inflacije i nominalne dugoročne kamatne stope i prihvatni mehanizam deviznog kursa - ERM II).

Osim nominalne konvergencije, kriterijumi koji su značajniji za nove zemlje članice odnose se na dostizanje realne konvergencije koja se oslanja na teoriju optimalnog valutnog područja. Generalno, pod realnom konvergencijom se podrazumeva smanjivanje razlika u razvijenosti zemalja. Uglavnom se realna konvergencija posmatra kroz smanjenje razlika u BDP-u per capita među zemljama. Najčešće se te razlike mere putem  $\beta$  (beta) i  $\sigma$  (sigma) konvergencije. Beta konvergencija meri disperziju dohotka po stanovniku ili produktivnost između zemalja ili regiona tokom vremena [3]. Sigma konvergencija ili varijansa konvergencije podrazumeva da se razlika između bogatstva među zemljama smanjuje tokom vremena. Dokazi  $\sigma$  konvergencije mogu biti korisni, imajući u vidu da mogu posmatrati periode konvergencije ili divergencije kroz vreme. Sa druge strane,  $\beta$  konvergencija ili regresija konvergencije prikazuje stopu konvergencije među zemljama, odnosno da li siromašne zemlje ili regioni imaju tendenciju da rastu brže od bogatih. Ova dva tipa konvergencije su komplementarna, ali ne isključiva, beta konvergencija je neophodan ali ne i dovoljan uslov da se održi sigma konvergencija [4].

Postojanje konvergencije danas sve više dobija na značaju, jer divergencija sa sobom nosi brojne negativne efekte. Situacija je složenija u slučaju integracione celine kao što je to Evropska unija, budući da je potrebno sprovesti zajedničke mere ekonomske politike. Postavlja se pitanje kolike se divergentne vrednosti mogu tolerisati a da one ne predstavljaju veliki problem za sprovođenje zajedničkih politika, pa je neophodno meriti konvergentne (divergentne) vrednosti među zemljama (regionima). U tom smislu, predmet istraživanja ovog rada odnosi se na analizu ispunjenosti nominalnih i realnih kriterijumima konvergencije u EU, u skladu sa razmatranom literaturom. Rad ima za cilj da pruži relevantan teorijski i empirijski okvir za analizu koncepta konvergencije i postavi pravce za buduća istraživanja u ovoj aktuelnoj oblasti istraživanja.

## 2. PREGLED LITERATURE

Pitanje konvergencije je predmet mnogih teorijskih i empirijskih istraživanja koja su imala za cilj da unaprede i upotpune regulatorni okvir koji se odnosi na konvergenciju. Tokom vremena pojavili su se različiti pristupi i metode analize, koji su primenjivani na različite integracione celine. Za razliku od kriterijuma nominalne konvergencije koji su vrlo precizno definisani, kriterijumi realne konvergencije se razlikuju od autora do autora. Kvalitetno istraživanje ovog fenomena zahteva izbor adekvatnih kriterijuma, posebno ukoliko se ima u vidu da se ostvarivanjem nominalne konvergencije može se u velikoj meri doprineti ostvarenju i realne konvergencije, ali one mogu biti i u konfliktnom odnosu [5].

Literatura u oblasti realne konvergencije je brojna i raznovrsna. Incijalno teorijsko objašnjenje procesa konvergencije dato je u radovima teoretičara neoklasičnog modela rasta [4,6,7]. Prema pomenutom modelu, postavljene su osnove  $\beta$  konvergencije (konvergencija postoji ako nerazvijene zemlje rastu brže od razvijenih) i  $\sigma$  konvergencije (konvergencija postoji ukoliko se tokom vremena smanjuje disperzija dohotka među zemljama unutar posmatrane grupe). Pri tom, treba imati u vidu da je većina autora kao osnovnu meru konvergencije uzimala rast GDP per capita u vremenskom periodu. Tako su autori Yin, Zestos i Michelis [8] posmatrali realnu konvergenciju u EU15 u periodu 1960-1995 godine analizirajući sledeće varijable: realni BDP po stanovniku, prosečne privatne investicije (% BDP), prosečna stopa rasta stanovništva, prosečna stopa inflacije, prosečni javni rashodi (% BDP). Osim toga, autori su u razmatranje uzeli i određene socio-političke faktore: prosečna godišnja promena vladajuće partije (kao mera korupcije), prosečan godišnji broj nemira u društvu i godišnja stopa pismenosti nacije, koji takođe doprinose ekonomskoj konvergenciji.

Uzimajući u obzir nužnost koordinacije monetarne i sektorske politike zemlje pri prisupanju EU, autori Ungureanu, Vilag, Ionescu, i Stoian [9] su analizirali nominalnu i realnu konvergenciju Rumunije sa Evropskom unijom. Pored analize kriterijuma iz Mastroihta, u svoje istraživanje uključili su i dve grupe indikatora: indikator konvergencije predloženi od strane Deka banke (Deka Bank & Europe converging Indicator - DCEI) i indikator predloženi od strane Deutsche banke. Prva grupa indikatora uključuje četiri kategorije varijabli: (1) novčana konvergencija (inflacija, kamatne stope i devizni kurs); (2) fiskalna konvergencija (budžetski deficit, javni i spoljni dug); (3) realna konvergencija (BDP po stanovniku, učešće poljoprivrede u BDP-u, stopa nezaposlenosti i učešće trgovine sa EU) i (4) institucionalna konvergencija (EBRD tranzicioni indikator, status implementacije u EU). Druga grupa indikatora ekonomske konvergencije predložena je od strane Deutsche banke, u skladu sa karakteristikama tranzicionih ekonomija: (1) realna ekonomija (BDP po stanovniku, učešće poljoprivrede u BDP, nezaposlenost, učešće privatnog sektora u BDP, učešće investicija, stopa rasta BDP i produktivnosti); (2) kvalitet institucija u skladu sa EBRD indeksom (pravni sistem, vladavina prava, bankarstvo, liberalizacija trgovine i stranog tržišta); (3) eksterni sektor (bilans tekućeg računa, tok stranih direktnih investicija, stepen integracije sa EU); (4) fiskalni i monetarni uslovi (stopa infacije, budžetski deficit i javni dug).

Gáspár [10], pak, ističe da se indikator konvergencije mogu analizirati primenom sledeća tri pristupa: distributivni pristup (sigma konvergencija merena standardnom devijacijom vrednosti  $\log(\text{BDP-a})$ ), beta konvergencija (BDP per capita) i analiza vremenskih serija. U svoj radu naglašava i tri tipa konvergencije poznate ekonomskoj teoriji: apsolutna konvergencija, uslovna konvergencija i klubovi konvergencije. Rezultati Monte Karlo simulacije ukazali su da različiti indikator koji se koriste za merenje konvergencije pokazuju i različite rezultate konvergentnog procesa. Slično tome, i Simionescu [11] je analizirala realnu konvergenciju korišćenjem varijacije BDP *per capita*. Analizirajući sigma konvergenciju analizom varijanse između svih 28 zemalja EU pokazano je da postoji jaka divergencija među zemljama EU28, pri čemu postoji smanjenje divergencije u periodu 1995-2012. Pri tom, smanjenje divergencije u periodu krize niže je u poređenju sa periodom pre krize.

Na osnovu datog pregleda literature, autori su se odlučili da za pokazatelje realne konvergencije izaberu one koji su najčešće korišćeni u radovima pomenutih autora, a da za analizu konvergencije primenjene PROMETHEE metod koji do sada nije primenjivan u ovoj oblasti, što je, između ostalog, i naučni doprinos ovog rada.

### 3. METODOLOGIJA

Kako bi se izvršila komparativna analiza makroekonomske situacije u zemljama članicama EU, izvršeno je njihovo rangiranje na osnovu kriterijuma konvergencije primenom multikriterijumske analize. Multikriterijumska analiza kao podrška odlučivanju (Multi-Criteria Decision Aid - MCDA) je jedna od najbrže rastućih oblasti operacionih istraživanja poslednjih dvadeset godina i nalazi primenu u gotovo svim oblastima ljudskog društva [12]. Jedna od najčešće primenjivanih metoda multikriterijumske analize je PROMETHEE GAIA metod, koji su razvili Brans, Marshal i Vincke tokom zadnje dve decenije XX veka [13,14]. Za rangiranje alternativa, koje u ovom radu predstavljaju članice EU, korišćena je PROMETHEE metodologija.

#### 3.1.PROMETHEE METODOLOGIJA

PROMETHEE GAIA metod je adekvatan metod za rešavanje multikriterijumskih problema koji zahtevaju rangiranje konačnog seta mogućih alternativa na osnovu određenog broja kriterijuma koji trebaju biti maksimizirani ili minimizirani. Za svaku alternativu se izračunava vrednost te alternative izražena u preferencijama, odnosno izračunava se neto tok preferencija koji sintetizuje sve pokazatelje i na osnovu koga se posmatrane alternative rangiraju [15].

Kako bi posmatrane alternative mogle biti rangirane na osnovu posmatranih kriterijuma, PROMETHEE metod zahteva definisanje odgovarajućih parametara za svaki od njih [13,14,16,17]:

1. **smera preferencije**, odnosno da li određeni kriterijum treba minimizirati ili maksimizirati;
2. **težinskih koeficijenata**, koji ukazuju na značaj određenog kriterijuma odnosno učešće određenog kriterijuma u izračunavanju neto toka preferencije na osnovu koga se vrši rangiranje posmatranih alternativa. Što je vrednost težinskog koeficijenta veća, to je kriterijum značajniji za donosioca odluke. Pri tom, težinski koeficijenti dodeljeni kriterijumima moraju biti normalizovani tj. mora važiti jednakost:

$$\sum_{j=1}^k w_j = 1$$

3. **prag preferencije (p)** koji predstavlja najmanju razliku između dve posmatrane alternative po posmatranom kriterijumu koju donosilac odluke smatra značajnom za donošenje odluke;
4. **prag indiferencije (q)**, koji predstavlja najveću razliku između dve posmatrane alternative po posmatranom kriterijumu koju donosilac odluke smatra nevažnom za donošenje odluke.

5. **funkcije preferencije** koja prevodi razliku između dve alternative (npr.  $a$  i  $b$ ) u nivo preferencije koji se kreće od 0 do 1, za svaki posmatrani kriterijum ponaosob. Što je nivo preferencije alternative  $a$  u odnosu na alternativu  $b$  bliži 0, to je alternativa  $b$  bolja u odnosu na alternativu  $a$  po datom kriterijumu, a što je bliži 1 to je alternativa  $a$  bolja od alternative  $b$  po posmatranom kriterijumu. U PROMETHEE metodologiji na raspolaganju su sledeće funkcije preferencije: Linear, Usual, U-shape, V-shape, Level and Gaussian.

Na osnovu definisanih parametara sprovodi se PROMETHEE metodologija, koja se sastoji iz sledećih koraka [13,14,16]:

1. Najpre se računaju odstupanja na osnovu poređenja parova alternative

$$d_j(a, b) = g_j(a) - g_j(b)$$

pri čemu  $d_j(a, b)$  predstavlja razliku vrednosti alternativa  $a$  i  $b$  prema svakom od kriterijuma.

2. Zatim se primenjuje izabrana funkcija preferencije

$$P_j(a, b) = F_j[d_j(a, b)]$$

gde  $P_j(a, b)$  predstavlja preferenciju alternative  $a$  u odnosu na alternativu  $b$  prema svakom od kriterijuma, kao funkciju od  $d_j(a, b)$ . Pri tom, važe sledeća ograničenja:  $0 < P_j(a, b) < 1$  i  $P_j(a, b) \neq P_j(b, a)$ .

3. Na osnovu toga se izračunava opšti indeks preferencija

$$\forall a, b \in A \quad \pi(a, b) = \sum_{j=1}^k P_j(a, b)w_j$$

pri čemu se funkcija  $\pi(a, b)$  kreće od 0 do 1 i definiše kao ponderisana suma  $P_j(a, b)$  za svaki kriterijum imajući u vidu da  $w_j$  predstavlja težinski koeficijent  $j$ -tog kriterijuma. Funkcija  $\pi(a, b)$  izražava nivo preferencije alternative  $a$  u odnosu na alternativu  $b$  uzimajući u obzir sve kriterijume. Što je njena vrednost bliža nuli, to je alternativa  $b$  bolja u odnosu na  $a$ , a što je bliža 1 to je alternativa  $a$  bolja u odnosu na alternativu  $b$ .

4. Zatim se izračunavaju pozitivni i negativni tokovi preferencija

$$\varphi^+(a) = \frac{1}{m-1} \sum_{x \in A} \pi(a, x) \tag{4}$$

$$\varphi^-(a) = \frac{1}{m-1} \sum_{x \in A} \pi(x, a)$$

gde je  $\varphi^+$  pozitivan tok preferencija i pokazuje koliko je alternativa  $a$  bolja u odnosu na sve ostale alternative, a  $\varphi^-$  negativni tok preferencija, koji ukazuje na to koliko je alternativa  $a$  lošija u odnosu na sve ostale alternative. Ovi tokovi se izračunavaju za svaku posmatranu alternativu.

5. Na osnovu izračunatih pozitivnih i negativnih tokova preferencija izračunava se neto tok preferencija na osnovu koga se vrši PROMETHEE konačno rangiranje alternativa

$$\varphi(a) = \varphi^+(a) - \varphi^-(a)$$

pri čemu je  $\varphi(a)$  neto tok preferencija za svaku alternativu.

Na osnovu dobijene vrednost neto toka preferencije za svaku alternativu vrši se njihovo rangiranje od najbolje ka najlošijoj. Vrednost neto toka preferencije se kreće u rasponu od -1 do +1, pri čemu će najbolje rangirana alternativa imati najveći pozitivan neto tok preferencija, a najgore rangirana alternativa imati najveći negativan neto tok preferencija.

### 3.2. ENTROPIJSKI METOD

Adekvatan pristup određivanju težinskih koeficijenata predstavlja osnovni preduslov efikasnog rešavanja problema multikriterijumskog odlučivanja, jer on u velikoj meri utiče na rangiranje alternativa. Težinski koeficijenti mogu biti subjektivni i objektivni, u zavisnosti od izvora informacija za njihovo određivanje [18]. Subjektivno određeni težinski koeficijenti odražavaju subjektivne stavove donosioca odluka, zasnovane na njihovim preferencijama dobijenim putem intervjua, anketiranja i organizovanih sastanaka. Objektivni težinski koeficijenti su oni koji su dobijeni na bazi objektivnih informacija, kao što je matrica odlučivanja [19]. Kako bi se izvršila kvalitetna analiza makroekonomskog problema, kao što je to ovde slučaj, neophodno je koristiti objektivne težinske koeficijente. Jedan od najčešće korišćenih metoda za objektivno određivanje težinskih koeficijenata je entropijska metoda [18,20,21]. Ona je najpre primenjena u termodinamici, a nakon toga ju je Shannon uveo u teoriju informacija [22] Shannon. Trenutno se koristi u brojnim naučnim oblastima kao što su ekologija, inženjerstvo, medicina, ekonomija, finansije i slično [21,23,24,25,26].

Entropija informacije je mera neuređenosti sistema [27]. Ona omogućava merenje količine korisnih informacija u prikupljenim podacima. Kada postoji velika razlika u vrednosti posmatranih podataka o određenom indikatoru, a entropija mala, to ukazuje da taj indikator obezbeđuje više informacija, pa će u skladu sa tim i težina tog indikatora biti određena na višem nivou. Sa druge strane, ukoliko je razlika manja, a entropija veća, relativna težina tog indikatora će biti manja [28].

Primena entropijskog metoda se odvija kroz nekoliko koraka [28]. Prvi korak u primeni entropijskog metoda je normalizacija originalne evaluacione matrice  $X = (x_{ij})_{m \times n}$

$$X = \begin{pmatrix} x_{11}, x_{12}, \dots & x_{1n} \\ x_{21}, x_{22}, \dots & x_{2n} \\ \dots & \dots \\ x_{m1}, x_{m2}, \dots & x_{mn} \end{pmatrix}$$

Normalizacija ove matrice omogućava dobijanje jednačine

$$R = (r_{ij})_{m \times n}$$

gde je  $r_{ij}$  podatak o i-tom posmatranom slučaju j-tog indikatora, pri čemu  $r_{ij} \in [0,1]$ .



Za indikatore koje treba maksimizirati (rastuća funkcija preferencije indikatora) važi jednačina:

$$r_{ij} = \frac{x_{ij} - \min_j \{x_{ij}\}}{\max_j \{x_{ij}\} - \min_j \{x_{ij}\}}; i = 1 \dots m; j = 1 \dots n$$

dok, za indikatore koje treba minimizirati (opadajuća funkcija preferencije indikatora) važi jednačina:

$$r_{ij} = \frac{\max_j \{x_{ij}\} - x_{ij}}{\max_j \{x_{ij}\} - \min_j \{x_{ij}\}}; i = 1 \dots m; j = 1 \dots n$$

Sledeći korak podrazumeva određivanje entropije. Među  $n$  indikatora sa po  $m$  posmatranih slučajeva, entropija  $j$ -tog indikatora je definisana kao

$$H_j = -k \sum_{i=1}^m r_{ij} \ln r_{ij}, j = 1, 2, \dots, n$$

gde je  $k = 1/\ln m$  i podrazumeva da je  $r_{ij} = 0, \ln r_{ij} = 0$

Na kraju, poslednji korak je određivanje entropijskih težina. Entropijska težina  $j$ -tog indikatora se može definisati kao:

$$w_j = \frac{d_j}{\sum_{j=1}^n d_j} = \frac{1 - H_j}{\sum_{j=1}^n (1 - H_j)}$$

gde je  $d_j = 1 - H_j$  nivo diverzifikacije za  $j$ -ti indikator, pri čemu je ( $j=1 \dots n$ ) i  $0 \leq w_j \leq 1, \sum_{j=1}^n w_j = 1$ .

Ovakav način utvrđivanja težina u potpunosti odgovara posmatranom problemu, imajući u vidu da se radi o istraživanju konvergencije među članicama EU. Osim za definisanje težinskih koeficijenata, primena ovog metoda omogućava sagledavanje konvergencije na nivou EU po posmatranim pokazateljima na osnovu visine dobijene entropije.

#### 4. DEFINISANJE MODELA MULTIKRITERIJUMSKE ANALIZE

U cilju sagledavanja performansi članica EU u oblasti nominalne i realne konvergencije sprovedena je multikriterijumska analiza primenom Visual PROMETHEE softverskog paketa. Ovaj softverski paket ima mogućnost grafičkog prezentiranja rezultata i, na taj način, omogućava sveobuhvatnije sagledavanje analiziranog problema. Kao što je već pomenuto, primena multikriterijumske analize zahteva definisanje odgovarajućih parametara

za svaki indikator. Za razliku od nominalnih kriterijuma konvergencije koji su opšte poznati, kriterijumi realne konvergenije se razlikuju od autora do autora. Od kriterijuma nominalne konvergencije u analizu su uključeni: stopa inflacije, javni dug i budžetski deficit. Članstvo u ERM kao kvalitativni kriterijum je isključen iz razmatranja, kao i dugoročna kamatna stopa na državne obveznice isključena zbog nedostupnosti tog podatka za sve razmatrane zemlje članice. Kriterijumi realne konvergencije koji su uključeni u razmatranje su BDP per capita po paritetu kupovne moći, finalna potrošnja domaćinstava (kao % BDP-a), domaće investicije (kao % BDP-a), ravnoteža tekućeg bilansa (kao % BDP-a), realni efektivni devizni kurs (% promene) i stopa nezaposlenosti, kao najčešće korišćeni indikatori realne konvergencije u razmatranim radovima u pregledu literature. U Tabeli 1 prikazani su parametri multikriterijumske analize i izvori sa kojih su prikupljeni podaci.

Tabela 1. Parametri multikriterijumske analize

Parametri	BDP per capita po paritetu kupovne moći	Finalna potrošnja domaćinstava	Domaće investicije	Ravnoteža tekućeg bilansa	Realni efektivni devizni kurs	Stopa nezaposlenosti	Stopa inflacije	Javni dug	Budžetski deficit
Izvor	Eurostat <sup>1</sup>	World Bank <sup>2</sup>	World Bank <sup>3</sup>	IMF <sup>4</sup>	UNCTAD <sup>5</sup>	IMF <sup>6</sup>	Eurostat <sup>7</sup>	IMF <sup>8</sup>	IMF <sup>9</sup>
Jedinica	ratio	ratio	ratio	ratio	ratio	percent	ratio	ratio	ratio
Min/max	max	min	max	max	max	max	min	min	max
Težina (2004)	0,1111	0,1111	0,1111	0,1110	0,1112	0,1111	0,1111	0,1111	0,1111
Težina (2004)*	0,1111	0,1111	0,1111	0,1110	0,1112	0,1111	0,1111	0,1111	0,1111
Težina (2015)	0,1111	0,1111	0,1111	0,1110	0,1112	0,1111	0,1111	0,1111	0,1111
Funkcija preferencije	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear
Način izražavanja pragova	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute
q (2004)	8868,79	6,52	3,54	4,99	2,22	3,42	2,52	21,76	2,33
p (2004)	19437,05	15,62	8,19	11,89	4,34	7,57	4,98	50,78	5,65
q (2015)	12642,98	8,05	3,24	3,38	2,27	4,87	0,53	32,09	1,66
p (2015)	25019,70	18,57	7,31	8,01	4,86	9,85	1,22	74,35	3,76

\*Težinski koeficijenti izračunati na osnovu podataka za tadašnje zemlje članice EU25.

<sup>1</sup> Eurostat: GDP, Real expenditure per capita (in PPS\_EU28): <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00114&plugin=1>; <sup>2</sup> World Bank, World Development Indicators, Household final consumption expenditure, etc. (% of GDP): <http://data.worldbank.org/indicator/NE.CON.PETC.ZS>; <sup>3</sup> World Bank, World Development Indicators, Gross capital formation (% of GDP): <http://data.worldbank.org/indicator/NE.GDI.TOTL.ZS>; <sup>4</sup> International Monetary Fund, World Economic Outlook Database, October 2016, Current account balance (% of GDP): <https://www.imf.org/external/pubs/ft/weo/2016/02/weodata/index.aspx>; <sup>5</sup> UNCTAD, Real effective exchange rate (CPI based), annual, Index base 2005: <http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=32085>; <sup>6</sup> International Monetary Fund, World Economic Outlook Database, October 2016, Unemployment rate-Percent of total labor force: <https://www.imf.org/external/pubs/ft/weo/2016/02/weodata/index.aspx>; <sup>7</sup> Eurostat, HICP - inflation rate, Annual average rate of change (%): <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00118&plugin=1>; <sup>8</sup> International Monetary Fund, World Economic Outlook Database, October 2016, General government gross debt (% of GDP): <https://www.imf.org/external/pubs/ft/weo/2016/02/weodata/index.aspx>; <sup>9</sup> International Monetary Fund, World Economic Outlook Database, October 2016, General government net lending/borrowing: <https://www.imf.org/external/pubs/ft/weo/2016/02/weodata/index.aspx>

Iz Tabele 1 se može zaključiti da ni kod jednog indikatora ne postoje značajne razlike među zemljama članicama, na šta ukazuju jednaki težinski koeficijenti za sve posmatrane indikatore i u 2004. i u 2015. godini. Imajući u vidu da su u izračunavanje težinskih koeficijenata za 2004. godinu bile uključene i zemlje koje tada nisu bile članice EU (Rumunija, Bugarska i Hrvatska), izračunati su i težinski koeficijenti bez podataka za te tri zemlje. Kako su i u tom slučaju dobijeni isti težinski koeficijenti, može se zaključiti da uključivanje podataka za te tri zemlje nije uticalo na povećanje ili smanjenje razlika po bilo kom od kriterijuma i da u tom trenutku one nisu postale članice EU zbog neispunjavanja određenih uslova u domenu određenih regulatornih, institucionalnih i drugih reformi. Može se primetiti značajna razlika u pragovima preferencije i pragovima indiferencije kod pojedinih indikatora, što ukazuje da je došlo do značajnih promena u vrednostima posmatranih indikatora u periodu 2004. i 2015. godine. U cilju analize tih razlika u Tabeli 2 su prikazane minimalne, maksimalne i prosečne vrednosti posmatranih indikatora i standardna devijacija.

Tabela 2 – Deskriptivna statistika

Parametri	BDP per capita (PPP)	Finalna potrošnja domaćinstava	Domaće investicije	Ravnoteža tekućeg bilansa	Realni efektivni devizni kurs	Stopa nezaposlenosti	Stopa inflacije	Javni dug	Budžetski deficit
Min. (2004)	7700,00	37,57	17,49	-12,31	-1,00	3,72	0,10	5,10	-8,80
Min. (2004)*	10300,00	37,57	17,49	-12,31	-1,00	3,72	0,10	5,10	-8,80
Min. (2015)	13600,00	30,66	9,83	-5,36	-6,70	4,63	-1,50	9,70	-7,50
Max. (2004)	53600,00	68,66	34,54	11,92	9,80	18,97	11,90	102,90	2,40
Max. (2004)*	53600,00	65,91	34,54	11,92	9,80	18,97	7,50	102,90	2,40
Max. (2015)	76100,00	69,91	27,36	10,23	5,40	25,03	1,20	176,90	1,60
Mean (2004)	21271,43	56,56	24,29	-2,26	1,71	8,81	3,16	47,41	-2,23
Mean (2004)*	22716,00	55,49	24,20	-1,90	1,62	8,50	2,73	49,15	-2,31
Mean (2015)	28592,86	54,69	20,62	2,34	-2,49	9,66	-0,09	72,09	-2,02
Stand. deviation (2004)	9579,81	7,78	4,06	5,92	2,13	3,73	2,44	25,19	2,82
Stand. deviation (2004)*	9096,40	7,43	4,24	6,14	2,20	3,74	1,75	25,95	2,80
Stand. deviation (2015)	12285,12	9,20	3,61	3,98	2,39	4,83	0,61	36,85	1,86

\*Težinski koeficijenti izračunati na osnovu podataka za tadašnje zemlje članice EU25.

Analiza podataka u Tabeli 2 omogućava da se stekne slika o razlikama među posmatranim zemljama članicama EU, ali i ostvarenog napretka u posmatranim oblastima u periodu od 2004. do 2015. godine. Ukoliko se uporede minimalne vrednosti posmatranih pokazatelja nominalne i realne konvergencije za sadašnje i tadašnje zemlje članice može se zaključiti da je postojala jedino razlika u visini BDP per capita. Najniži BDP per capita među zemljama članicama imala je Letonija u iznosu od 10300 internacionalnih dolara, dok su Bugarska i Rumunija među sadašnjim zemljama članicama imale najniži BDP per capita u iznosu 7700 internacionalnih dolara. Taj donji prag u nivou razvijenosti je značajno podignut 2015. godine i iznosio je 13600 internacionalnih dolara, a zabeležen je u Bugarskoj. To ukazuje na činjenicu, da iako je dosta napredovala u ovom pogledu, ova zemlja još uvek nije značajno smanjila gep u nivou privrednog rasta i standarda stanovništva. Pored BDP-a per capita, i kod svih ostalih kriterijuma su zabeležene određene promene u minimalnim vrednostima. Najznačajnije od njih su: pad minimalnih domaćih investicija sa 17,49% BDP-a (u Velikoj Britaniji) na tek 9,83% (u Grčkoj); smanjenje minimalnog deficita tekućeg bilansa sa -12,31% BDP-a (u Letoniji) na -5,36% BDP-a (u Velikoj Britaniji); od minimalne inflacije

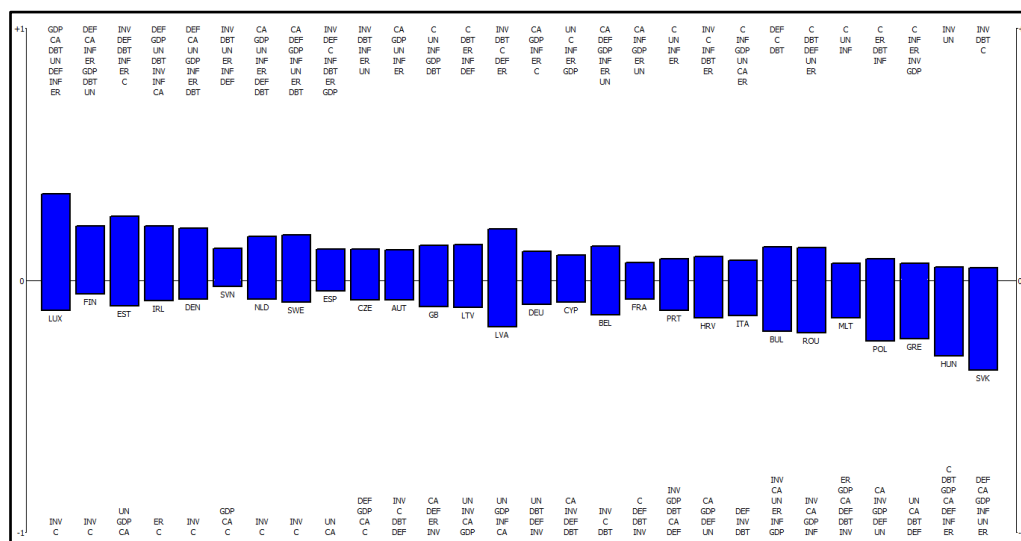
u Finskoj od 0,1% pojavila se deflacija u velikom broju zemalja, pri čemu je najveća zabeležena na Kipru (1,5%); povećanje minimalnog javnog duga sa 5,1% BDP-a na 9,7% BDP-a (u Estoniji).

Ukoliko se posmatraju maksimalne vrednosti posmatranih kriterijuma najpre treba sagledati razlike između tadašnjih i sadašnjih članica EU 2004. godine. Na osnovu prezentiranih podataka se može zaključiti da postoje samo razlike u oblasti finalne potrošnje i stopi inflacije, pri čemu podaci zabeleženi u Rumuniji povećavaju maksimalne vrednosti u pomenutim oblastima. Značajne razlike u maksimalnim vrednostima u posmatranom jedanaestogodišnjem periodu su vidljive u gotovo svim analiziranim oblastima. Najznačajnije među njima su svakako: povećanje maksimalnog BDP-a per capita u Luksemburgu sa 53600 na 76100 internacionalnih dolara; smanjenje maksimalnih domaćih investicija sa 34,54% BDP-a (u Estoniji) na 27,36% BDP-a (u Češkoj); povećanje maksimalne stope nezaposlenosti sa 18,97% (u Poljskoj) na 25,03% (u Grčkoj); smanjenje maksimalne stope inflacije sa 11,9% (u Rumuniji) na 1,2% (u Malti); povećanje maksimalnog javnog duga u Grčkoj sa 102,9% na 176,9% BDP-a.

Zemlje koje još uvek nisu bile članice EU 2004. godine nisu bitnije izmenile prosečne vrednosti pokazatelja. Uključivanje ovih zemalja u analizu samo je neznatno promenilo prosečne vrednosti posmatranih pokazatelja, što ukazuje da u trenutku najvećeg proširenja EU ove zemlje nisu značajno zaostajale za zemljama članicama. Najznačajnije promene prosečnih vrednosti 2015. godine su povećanje prosečnog BDP-a per capita i javnog duga, suficit umesto deficita tekućeg bilansa i deflacija umesto inflacije. Analogno prosečnim vrednostima, ni prosečna odstupanja nisu bitnije izmenjena uključivanjem zemalja koje 2004. godine nisu bile članice, dok su prosečna odstupanja 2015. godine značajnije promenjena u slučaju BDP-a per capita i javnog duga (u oba slučaja se radi o povećanju). Pomenute razlike u posmatranim pokazateljima značajno su uticale na promene u redosledu zemalja 2015. u odnosu na 2004. godine definisane primenom PROMETHEE metode.

## 5. REZULTATI I DISKUSIJA

Rezultati rangiranja u trenutku najvećeg proširenja 2004. godine, prikazani su na Slici 1.

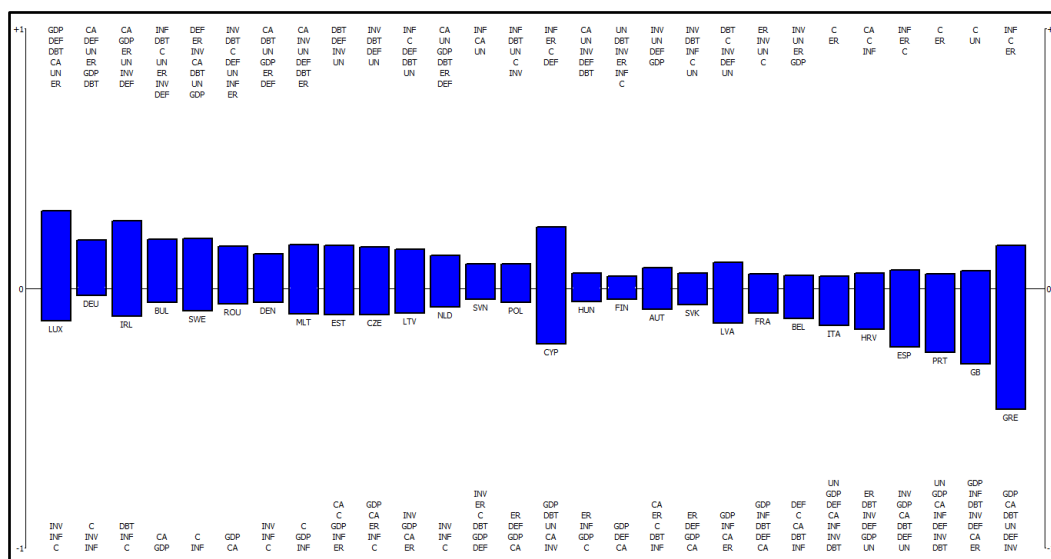


Slika 1. Rangiranje zemalja EU u 2004. godini

Slika 1 ukazuje na to da je najbolje rangirana zemlja članica Luksemburg, koji je pozata kao poreski raj, pre svega za firme iz finansijskog sektora. Zatim slede Finska, Estonija, Irska i Danska. Ovako povoljnoj poziciji prvorangiranih zemalja doprineli su, pre svega, nizak javni dug i budžetski deficit i stabilnost cena i deviznog kursa. Osim Estonije, preostale zemlje su imale i visok BDP per capita, povoljno stanje u tekućem bilansu i nisku nezaposlenost. Estonija je, pak, imala povoljnu poziciju u oblasti domaćih investicija i potrošnje domaćinstva.

Nasuprot tome, domaće investicije (INV) i domaća potrošnja (C) predstavljaju prednosti najlošije rangiranih zemalja. Naime, poslednje rangirana zemlja je Slovačka, a zatim slede Mađarska, Grčka, Poljska i Malta. Ove zemlje su ili prema većini kriterijuma bile u lošijoj poziciji ili su u pojedinim oblastima imale toliko nepovoljnu situaciju da je to prevazišlo prednosti u ostalim segmentima. Najviše slabosti imala je Mađarska, koja je imala nepovoljnu situaciju u gotovo svim oblastima, osim visine domaćih investicija i nezaposlenosti. Malta i Slovačka sa po šest i Poljska sa pet, takođe spadaju u grupu zemalja sa nepovoljnom situacijom u velikom broju segmenata, dok je Grčka, i pored prednosti u većini kriterijuma, tek na 26. poziciji, usled visoke nezaposlenosti, budžetskog deficita, javnog duga i deficita tekućeg bilansa. Interesantno je primetiti i to da su Bugarska, Rumunija i Hrvatska imale relativno povoljniju poziciju u odnosu na pojedine zemlje koje su te godine pristupile Uniji (Poljska, Mađarska i Slovačka).

Kako bi se ocenila promena u makroekonomskim performansama zemalja članica EU u posmatranom periodu, izvršeno je njihovo rangiranje za 2015. godinu, koje je prikazano na Slici 2.



Slika 2. Rangiranje zemalja EU u 2015. godini

Sa Slike 2 se može zaključiti da je Luksemburg i u 2015. godini zadržao vodeću poziciju, zahvaljujući, pre svega, razvoju finansijskog sektora, koji je te godine učestvovao sa 88% u stvaranju BDP-a. Nemačka je sa 15. pozicije u 2004. godini postigla poboljšanje većine kriterijuma (sem domaće potrošnje i investicija, inflacije) i pomerila se na drugu poziciju. Takođe, Irska, Bugarska i Švedska se nalaze među prvih pet zemalja, prema posmatranim kriterijumima. Interesantna je pozicija Bugarske (4. pozicija) i Rumunije (6.

pozicija) iz razloga što su znatno poboljšale stanje u velikom broju segmenata, naročito nakon ulaska u EU. Irska se pomerila za jednu poziciju ispred u odnosu na 2004. godinu. Sa druge strane, Grčka je usled problema u domenu javnih finansija, niskog BDP-a, dvostrukog deficita i visoke nezaposlenosti pala na poslednju poziciju. Odmah ispred Grčke nalazi se Velika Britanija, čiji su jedini povoljni pokazatelji domaća potrošnja i stopa nezaposlenosti od 5,4%. Imajući u vidu ovako negativnu situaciju, ne čudi ni odluka ove zemlje da istupi iz Unije. Takođe, Portugalija i Španija imaju značajno nepovoljne makroekonomske performanse u odnosu na ostale zemlje EU, naročito kada je reč o visini BDP-a, deficita tekućeg računa i budžeta, javnog duga i nezaposlenosti.

## 6. ZAKLJUČAK

Konvergenција predstavlja jedno od najznačajnijih pitanja za svaku integracionu celinu, pa tako i za Evropsku uniju. Da bi ekonomska integracija i stvaranje jedinstvenog tržišta ispunilo svoju svrhu, neophodno je postojanje sličnih ekonomskih struktura bez većih regionalnih dispariteta u realnim i monetarnim okvirima. Samo ravnomerni razvoj svih zemalja članica može omogućiti razvoj Unije kao celine. Pored toga, treba imati u vidu da se u uslovima sve veće povezanosti privreda na globalnom nivou, a naročito na nivou Unije, poremećaji i neravnoteže u jednoj privredi se vrlo brzo prenose na ostale privrede povećavajući sistemski rizik.

Imajući u vidu da postoji veliki broj kriterijuma nominalne i realne konvergenije analiza napretka zemalja članica u ispunjavanju tih kriterijuma zahteva primenu nekog od metoda multikriterijumske analize. Primena PROMETHEE metoda, kao jednog od najčešće korišćenih metoda multikriterijumske analize, omogućila je rangiranje zemalja članica EU na osnovu ispunjenosti kriterijuma konvergenije u trenutku najvećeg proširenja Evropske unije, 2004. godine, i 2015. godine, kao poslednje raspoloživih pokazatelja. Poređenjem dobijenih rezultata može se doći do zaključka o napretku zemalja članica u ispunjavanju izabranih kriterijuma u periodu 2004-2015. godine. Pri tom, definisanje odgovarajućih težinskih koeficijenata za rangiranje izvršeno je na bazi entropijske metode, koja određuje značaj određenog kriterijuma za rangiranje na osnovu disperzije podataka za dati kriterijum.

Osim što je omogućila određivanje težinskih koeficijenata, primena entropijske metode je ukazala na to da nema značajne disperzije podataka (a samim tim ni divergencije) na osnovu bilo kog od posmatranih kriterijuma, čak iako se isključe zemlje koje u tom trenutku nisu bile članice EU (Bugarska, Rumunija i Hrvatska). Takođe, interesantno je da su pomenute zemlje koje nisu bile članice u 2004. godini ostvarile bolji rang u poređenju sa nekim zemljama koje su pristupile Uniji 2004. godine (kao što su Poljska, Slovačka, Mađarska). To ukazuje da te zemlje nisu pristupile EU 2004. godine, kao što je to bilo planirano, pre zbog kvalitativnih razloga nego zbog kvantitativnih ekonomskih pokazatelja, koji se ogledaju u problemima sa korupcijom, nedovoljno efikasno sprovedenim strukturnim reformama itd. Pomenute tadašnje novoprimitljene zemlje članice su se nalazile, zajedno sa Maltom i Grčkom, među pet najlošije rangiranih zemalja 2004. godine. Sa druge strane, najbolje rangirane zemlje članice bile su Luksemburg, Finska, Estonija, Irska i Danska.

Rezultati entropijske metode za 2015. godinu ukazali su na to da nije došlo do promene u disperziji podataka o kriterijumima konvergenije, pa samim tim ni do pojave divergencije po bilo kom od kriterijuma. Najbolje rangirane zemlje su Luksemburg, Nemačka, Irska, Bugarska i Švedska, a najlošije rangirane su upravo zemlje koje je pogodila

dužnička kriza, kao to su Grčka, Italija, Portugalija, Španija. Pored toga, interesantno je to što je Velika Britanija date godine na pretposljednem, 27. mestu, što govori o značajnom pogoršanju ekonomskih situacije u ovoj zemlji, koji su verovatno imali značajan uticaj na njenu odluku o napuštanju Unije.

## REFERENCE

- [1] European Union (EU), Treaty on European Union, Luxembourg, (1992, consolidated version 6.10.2012), <https://www.math.uni-augsburg.de/emeriti/pukelsheim/bazi/OJ/2012C326p13.pdf>
- [2] Draskovic, M., Economic Development Of Montenegro And European Union From The Aspect Of Convergency Criterion, *Montenegrin Journal of Economics*, 4(7), (2008), 111-119.
- [3] Soukiazis, E., & Castro, V., How the Maastricht criteria and the Stability and Growth Pact affected real convergence in the European Union: A panel data analysis. *Journal of Policy Modeling*, 27(3), (2005), 385-399.
- [4] Sala-i-Martin, X. X., Regional cohesion: evidence and theories of regional growth and convergence. *European Economic Review*, 40 (6), (1996), 1325-1352.
- [5] Bilas, V., Konvergencija tranzicijskih zemalja prema Europskoj uniji, *Ekonomski pregled*, 56(3-4), (2005), 221-238.
- [6] Solow, R., A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), (1956), 65-94.
- [7] Mankiw, N. G., Romer, D., & Weil, D. N., A contribution to the empirics of economic growth, *The Quarterly Journal of Economics*, 107(2), (1992), 407-437.
- [8] Yin, L., Zestos, G., & Michelis, L., Economic Convergence in the European Union, *Journal of Economic Integration*, 18(1), (2003), 188-213
- [9] Ungureanu, D. M., Vilag, R. D., Ionescu, G. H., & Stoian, F. B., Romania's real convergence to the European Union. *Annales Universitatis Apulensis: Series Oeconomica*, 11 (2), (2009), 732-743.
- [10] Gáspár, A., Convergence analysis: a new approach, Published in: *Crisis Aftermath: Economic policy changes in the EU and its Member States*, Conference Proceedings, Szeged, University of Szeged, (2012), 382-390. [https://mpr.ub.uni-muenchen.de/40363/1/MPRA\\_paper\\_40363.pdf](https://mpr.ub.uni-muenchen.de/40363/1/MPRA_paper_40363.pdf)
- [11] Simionescu, M., Testing Sigma Convergence Across EU-28, *Economics & Sociology*, 7(1), (2014), 48-60.
- [12] Behzadian, M., Kazemzadeh, R. B., Albadvi, A. Aghadasi, M., PROMETHEE: A comprehensive literature review on methodologies and applications. *European Journal of Operational Research*, 200(1), (2010), 198-215.



- [13] Brans, J.P. Mareschal, B. Vincke, Ph., PROMETHEE: A new family of outranking methods in multi-criteria analysis, in Brans, J.P. (Ed.), Operational Research '84, North-Holland, Amsterdam, (1984), 447–490.
- [14] Brans, J.P., Vincke, Ph., A preference ranking organisation method: The PROMETHEE method for MCDM. Management Science, 3(6), (1985), 647-656.
- [15] Tomić-Plazibat, N., Aljinović, Z., Pivac, S., Risk Assessment of transitional Economies by multivariate and Multicriteria Approaches. Panoeconomicus, 57(3), (2010), 283-302.
- [16] Brans, J.P. Mareschal, B., Promethee methods. Chapter 5 in: Multiple Criteria Decision Analysis: State of the Art Surveys, Springer Science and Business Media, Boston, (2005), 170.
- [17] VP Solutions, Visual PROMETHEE, <http://www.promethee-gaia.net/files/VPManual.pdf>
- [18] Hwang, C. L., Yoon, K., Multiple Attribute Decision Making-Methods and Applications. A state-of-the-art survey. Springer-Verlag, New York, 1981.
- [19] Chen, T. Y., Li, C. H., Objective weights with intuitionistic fuzzy entropy measures and computational experiment analysis. Applied Soft Computing, 11(8), (2011), 5411-5423.
- [20] Zeleny, M., Multiple Criteria Decision Making. Graw-Hill, New York, 1982.
- [21] Zou, Z., Yun, Y., Sun, J., Entropy method for determination of weight of evaluating indicators in fuzzy synthetic evaluation for water quality assessment. Journal of Environmental Sciences, 18(5), (2006), 1020-1023.
- [22] Shannon, C. E., A Mathematical Theory of Communication. The Bell System Technical Journal, 27(3), (1984), 379–423.
- [23] Chuansheng, X., Dapeng, D., Shengping, H., Xin, X., Yingjie, C., Safety Evaluation of Smart Grid based on AHP-Entropy Method. Systems Engineering Procedia, 4, (2012), 203-209.
- [24] Ermatita, Hartati, S., Wardoyo, R., Harjoko, A., ELECTRE-Entropy method in Group Decision Support System Model to Gene Mutation Detection. International Journal of Advanced Research in Artificial Intelligence, 1(1), (2012), 58-63.
- [25] Li, X., Li, Y., Gu, Z., Yang, W., Competitive situation analysis of regional logistics development based on AHP and entropy weight. Journal of Southeast University, 34(3), (2004), 398-401.
- [26] Guo, C. Z., Study on the Evaluating Method of Entropy Coefficient for Stock Investment Value [J]. Nankai Economics Studies, 5, (2001), 65-67.
- [27] Meng, Q. S., Information Theory [M]. Xi'An: Xi'An Jiaotong University Press, (1989), 19-36.
- [28] Qiu, W. H., The entropy of decision and application of management [M]. Beijing: China Machine Press. (2002), 193-196.
- [29] <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00114&plugin=1>

[30] <http://data.worldbank.org/indicator/NE.CON.PETC.ZS>

[31] <https://www.imf.org/external/pubs/ft/weo/2016/02/weodata/index.aspx>

[32] <http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=32085>

[33]

<http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00118&plugin=1>

## WHAT BOOST THE OCCURANCE OF THE SHADOW ECONOMY IN EUROPEAN ECONOMIES IN POST-CRISIS PERIOD: THE RESULTS OF STRUCTURAL MODEL

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**Abstract:** The problem of the shadow economy is becoming more important. After the emergence of the global economic crisis solving this problem becomes even more necessary, given that widespread shadow economy reduces the amount of available budget funds necessary for the implementation of anti-crisis measures. In this sense, the aim of this study is to assess the role of wealth or living standards, market openness, political environment and tax system in the emergence and development of the shadow economy in 40 European economies during the period 2009-2014, using PLS-SEM model. The obtained model suggests that wealth and political environment have a negative and the openness of the market and the tax system a positive impact on the shadow economy in the observed economies. On the biases of conducted research authors suggest recommendations and guidelines that policymakers should include in their long-term strategy to fight the shadow economy.

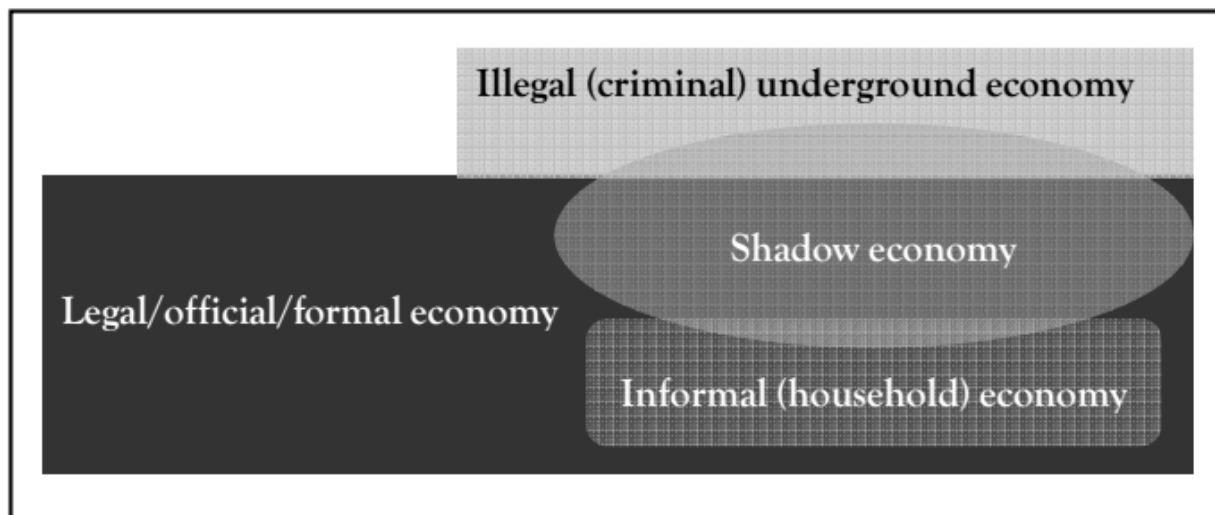
**Keywords:** shadow economy, EU countries, PLS-SEM model, global economic crisis, economic development.

### 1. UVOD

Interesovanje ekonomista i kreatora ekonomske politike za sivu ekonomiju ne jenjava. Naprotiv, sve veći broj njih nastoji da što preciznije definiše pojam sive ekonomije i utvrdi njen obim u privredi. Precizno definisanje pojma sive ekonomije jedan je od ključnih preduslova za kvalitetnu i sveobuhvatnu analizu faktora koji stvaranju povoljan ambijent za njenu pojavu i širenje u privredi.

Postoje brojne aktivnosti koje se smatraju sivom ekonomijom. Na jednoj strani su aktivnosti koje nisu legalne (kao što je reketiranje, prodaja droge i oružija i sl.), a na drugoj aktivnosti koje mogu biti legalne ili ilegalne u zavisnosti od rizika i benefita koje sa sobom nose njihovo neprijavlivanje [1]. Zbog toga, vrlo često autori koriste različite termine kao sinonime za sivu ekonomiju, poput „prikrivene (ilegalne) ekonomije“ i „neformalne ekonomije“. Međutim, treba imati u vidu da ovi pojmovi nisu sinonimi i da definisanje pojma sive ekonomije zahteva precizno razgraničenje aktivnosti koje ona obuhvata. Prikrivena ili ilegalna ekonomija obuhvata prihod koji je stvoren putem ekonomskih aktivnosti zasnovanih na povredi zakonskih propisa koji definišu spektar legalnih oblika trgovine. Učesnici ovom segmentu privrede se bave proizvodnjom i distribucijom zabranjenih roba [2]. Sa druge strane, neformalna ekonomija obuhvata pojedince koji se bave proizvodnjom dobara i usluga čiji je primarni cilj sticanje prihoda i zapošljavanje tih pojedinaca. Ove aktivnosti su legalne i obično pojedinci koji ih obavljaju nemaju svesnu nameru da izbegnu plaćanje poreza ili doprinosa za socijalno osiguranje ili da krše zakon o radu ili drugih zakonskih propisa [3]. Sa

Slike 1 se jasno vidi da siva ekonomija obuhvata deo ovih aktivnosti, ali da pomenuta tri pojma ne mogu biti sinonimi.



Slika 1. Legalna/zvanična/formalna, siva, ilegalna/prikrivena i neformalna ekonomija [4]

Možda najprecizniju definiciju sive ekonomije je dao [5] koji je istakao da siva ekonomija obuhvata celokupnu tržišno zasnovanu legalnu proizvodnju dobara i usluga, koja je namerno prikrivena od državnih organa iz sledećih razloga:

1. da se izbegne plaćanje poreza na prihod, PDV-a i ostalih poreza,
2. da se izbegne plaćanje doprinosa za socijalno osiguranje,
3. da se izbegne obaveza ispunjavanja određenih zakonom propisanih standarda za tržište rada, kao što su minimalne zarade, maksimalan broj radnih sati, standardi bezbednosti na radu, itd.
4. da se izbegne ispunjavanje određenih administrativnih obaveza, kao što je popunjavanje statističkih upitnika i drugih administrativnih obrazaca.

Uopšteno posmatrano, siva ekonomija obuhvata ekonomske transakcije i aktivnosti koje se ne odvijaju formalno, nisu evidentirane u zvaničnim dokumentima, nisu kontrolisane od strane državnih organa i uključene u obračun nacionalnih računa [6,7,8].

Nedovoljno efikasna borba protiv sive ekonomije ima brojne posledice na funkcionisanje formalnog sektora i, u krajnjoj instanci, na performanse nacionalne ekonomije. Visok nivo sive ekonomije u privredi može navesti kreatore ekonomske politike da donose odluke koje su zasnovane ne nerealnim informacijama. U takvim uslovima, tzv. „pozitivni indikatori“ (oni koje treba maksimizirati), kao što su npr. BDP i indeksi industrijske proizvodnje, su potcenjeni, dok su „negativni indikatori“ (oni koje treba minimizirati), kao što su inflacija i nezaposlenost, precenjeni. Iz tog razloga, kreatori ekonomske politike nastoje da u dugoročne strategije privrednog rasta i razvoja uvrste i mere usmerene na borbu protiv sive ekonomije, jer će smanjenjem njenog obima svoje odluke o merama ekonomske politike donositi na relevantnim činjenicama. Značaj borbe protiv sive ekonomije naročito dolazi do

izražaja u uslovima krize, jer ovaj vid aktivnosti smanjuje obim raspoloživih resursa koji su privredi neophodni za izlazak iz krize [9].

U tom smislu, cilj ovog rada jeste da se utvrde uzroci sive ekonomije u evropskim privredama u postkriznom periodu (2009-2014) i smer njihovog delovanja, da se istraže razlike između faktora koji podstiču sivu ekonomiju u 40 evropskih privreda i da se na bazi toga definišu preporuke i smernice za borbu protiv ove negativne pojave.

## **2. PREGLED LITERATURE**

Kako su posledice sive ekonomije u postkriznom periodu bile sve izraženije, a izlaz iz krize nedostižniji, sve veći broj autora nastojao je da što preciznije identifikuje pojam, determinante i obim sive ekonomije, primenjujući različite metode i modele. U zavisnosti od načina definisanja sive ekonomije i karakteristika područja na kome je vršeno istraživanje, autori su koristili različite indikatore sive ekonomije i uzroke njenog nastanka i širenja u privredi. U Tabeli 1 sistematizovane su determinante, indikatori i modeli korišćeni u nekima od najznačajnijih radova u ovoj oblasti.

Tabela 1. Pregled radova usmerenih na analizu determinanti i obima sive ekonomije

Autori	Determinante sive ekonomije	Indikatori sive ekonomije	Primenjivani metod
Bitzenis et al. (2016) [4]	Porez na prihod, Porez na zarade, Indirektni porezi, Sloboda poslovanja, Kvalitet državnih institucija, „Poreski moral“, Stopa nezaposlenosti i stopa rasta BDP-a.	Radnosposobno stanovništvo, BDP per capita i ponudu nacionalne valute per capita	MIMIC model
Mai i Schneider (2016) [10]	Poresko opterećenje, Regulatorno opterećenje, Stopa nezaposlenosti, Stopa samozapošljavanja, Indeks ekonomskih sloboda, Indeks slobode poslovanja	Rast BDP-a, Gotovina, Radnosposobno stanovništvo	MIMIC model
Dell'Anno (2007) [11]	Učešće javnog sektora u ukupnoj zaposlenosti, Poresko opterećenje, Subvencije, Socijalna davanja države, Stopa samozapošljavanja, Nezaposlenost.	Realna stopa rasta BDP-a, Učešće radnosposobnog stanovništva u ukupnom stanovništvu	MIMIC model
Ruge (2010) [12]	Sveukupno državno uređenje, Poreski sistem, Radno zakonodavstvo	Indeks percepcije korupcije, Ocena iz ankete o utaji poreza, Procena sive ekonomije na bazi ankete o svojoj ekonomiji, Racio gotovine (M0/M2)	SEM-PLS model
Quintano i Mazzocchi (2013) [13]	Bogatstvo i razvoj, Poreski sistem, Efikasnost regulative, Otvorenost tržišta	Indeks percepcije korupcije, Racio gotovina/M2, Stopa nezaposlenosti	SEM-PLS model
Goel i Nelson (2016) [14]	Pokretanje poslovanja (broj procedura, vreme i troškovi), Registracija vlasništva (broj procedura, vreme i troškovi), Plaćanje poreza (broj plaćanja, vreme za pripremu dokumentacije i ukupna poreska stopa), BDP per capita, indeks demokratije, deflator BDP-a, Finalna javna potrošnja	Siva ekonomija procenjena putem MIMIC metoda, Siva ekonomija procenjena putem metod tražnje za gotovinom, Broj neregistrovanih preduzetničkih radnji	Baseline model
Buehn et al. (2012) [15]	Porez na prihod, Porez na dobit, Stopa nezaposlenosti, Sloboda poslovanja, Poresko opterećenje, Samozapošljavanje, Stopa poreza na ekstra prihod, Broj upisanih u rednje škole, Članstvo u OECD-u.	Radnosposobno stanovništvo, Realna stopa rasta BDP-a,	MIMIC model

Na osnovu Tabele 1, može se uočiti da je najveći broj autora koristio tzv. MIMIC (Multiple Indicator and Multiple Cause) model za ispitivanje determinanti sive ekonomije i procenu njenog obima u privredi određene zemlje ili grupe zemalja. Međutim, često se u literaturi navode određeni nedostaci ovog modela [10,16]:

1. omogućava procenu sive ekonomije samo u relativnom, a ne u apsolutnom iznosu, pa je neophodno koristiti dodatno još neku proceduru kako bi se utvrdio obim sive ekonomije u apsolutnom obimu;

2. korišćenje određenih ad-hoc ekonometrijskih specifikacija što dovodi do pojave određenih greški u merenju sive ekonomije;
3. ne obezbeđuje donošenje odgovarajućih zaključaka na mikroekonomskom nivou;
4. zahteva veliki set podataka kako bi se ispunio uslov stacioniranosti i normalnosti,
5. subjektivni izbor varijabli, pri čemu pojedini pokazatelji (kao npr. stopa nezaposlenosti) mogu biti korišćeni i kao uzrok i kao indikator sive ekonomije.

Zbog svega toga, u ovom radu primenjen je PLS-SEM model za analizu determinatisive ekonomije u posmatranim evopskim privredama. Njegove ozbiljne prednosti jesu u tome da je vrlo pogodan u situacijama kada je uzorak veoma mali (manji od 100), kao što je to u ovom slučaju. Takođe, mnogi autori napominju da ga treba koristiti u situacijama kada potrebe rada prevazilaze mogućnosti standardnog SEM modela, posebno kad broj indikatora po latentnoj varijabli postane suviše veliki i to su glavni razlozi zbog čega su se autori opredelili upravo za ovaj metod.

### 3. DETERMINANTE SIVE EKONOMIJE

Determinante sive ekonomije su u ovom radu razvrstane u četiri grupe: bogatstvo, otvorenost tržišta, poreski sistem i političko okruženje. Svaka grupa se sastoji od nekoliko latentnih varijabli koje opisuju stanje u toj oblasti. Kao indikatori sive ekonomije korišćeni su: učešće potrošnje domaćinstava u BDP-u, poreski prihod kao %BDP-a i stopa nezaposlenosti.

**Bogatstvo** jedne zemlje, posmatrano kroz standard stanovništva i uopšte njihovo zadovoljstvo uslovima za život i rad, predstavlja jedan od vrlo bitnih faktora sive ekonomije. Bogatstvo zemlje u ovom radu predstavljeno je putem BDP-a per capita (kao pokazatelj standard stanovništva), Gini koeficijenta (kao pokazatelja jednakosti u raspodeli dohotka) i HDI indeksa (kao pokazatelja uslova za život i rad). Quintano i Mazzocchi su u svom istraživanju došli do zaključka da bogatstvo negativno utiče na sivu ekonomiju [13]. Zaključak da je veći nivo društvenog blagostanja u privredi povezan sa manjim nivoom sive ekonomije svakako da ima smisla, jer privreda i građani u takvim uslovima imaju malo razloga za delovanje u neformalnom sektoru.

**Otvorenost privrede** je još jedna od veoma bitnih determinanti sive ekonomije. Ova determinanta je prikazana odgovarajućim indeksima o ekonomskih sloboda (Index of Economic Freedom) u velikom broju zemalja koje svake godine objavljuje Heritage Foundation: sloboda poslovanja, sloboda investiranja, sloboda na tržištu rada, monetarna sloboda i sloboda trgovine. Analizirajući 69 nacionalnih ekonomija, Friedman [17] je sa svojim saradnicima došao do zaključka da previše regulisane privrede imaju veće učešće sive ekonomije u privredi. U otvorenim, brzorastućim privredama ljudi imaju mnogo šansi da ostvare dodatnu zaradu u formalnoj ekonomiji, pa nemaju interesa da se angažuju u neformalnom sektoru. Sa druge strane, u zatvorenoj, regulisanoj, autarhičnoj privredi koja se suočava sa recesijom ili usporenim rastom, ljudi nastoje da ostvare dodatnu zaradu u neformalnom sektoru. Prado [18] je otišao korak dalje i izračunao da smanjenje regulacije privrede u zemljama OECD-a obezbeđuje benefite za privredne subjekte koji se mere rastom dobiti blagostanja od 2,1% (izražene kroz rast potrošnje).

Nivo sive ekonomije i motivisanost građana i privrede da se angažuju u neformalnom sektoru direktno zavise od karakteristika *poreskog sistema* zemlje. Pri tom, treba uzeti u obzir ne samo nivo poreskog opterećenja, već i poresku administraciju, s obzirom da previše komplikovana procedura pripreme dokumentacije i plaćanja poreza stvara rizik od evazije poreza. Jedan od Američkih senatora Max Baucus isticao je da je „složenost poreskih procedura sama po sebi jedna vrsta poreza“ [19]. Imajući sve to u vidu, ova determinanta je opisana visinom poreza na dobit, poreza na zarade, poreza na dodatu vrednost i vremenom neophodnim za pripremu dokumentacije i plaćanje poreza. Često se dešava da kompanije na kraju godine prikazuju nerealne gubitke kako ne bi platile porez. Osim što je ovako nešto krivično delo, loše utiče na poslovanje ostalih kompanija koje posluju u skladu sa zakonom, jer se njihova konkurentnost na tržištu smanjuje u odnosu na kompanije koje su utajile porez [20]. Slični efekat ima evazija i ostalih vrsta poreza. Neplaćanje poreza na zarade smanjuje troškove poslovanja, što sa sobom povlači nižu cenu koštanja i prodajnu cenu u odnosu na konkurenciju, dok izbegavanje plaćanja PDV-a direktno utiče na prodajnu cenu. Ovakvo ponašanje zavisi od percepcije poreskog obveznika kakav je odnos između benefita ostvarenih neplaćanjem poreza i izdataka za kazne ukoliko poreska inspekcija utvrdi da su poslovali nelegalno. Ta percepcija je svako određena učestalošću kontrole, visinom kazni i, uopšte rečeno, efikasnošću zakonodavnog, regulatornog i institucionalnog okruženja definisanog poslednjom determinantom koja je uzeta u obzir u istraživanju.

Pojava sive ekonomije svakako da je povezana i sa državnim uređenjem, nivoom demokratije, kvalitetom regulative i, uopte posmatrano, sa *političkim i regulatornim okruženjem*. Političko okruženje je objašnjeno indikatorima Svetske banke Worldwide Governance Indicators (WGI) koji se odnose na efikasnost vlade, kvalitet regulative, vladavinu prava, politička stabilnost, vladavina prava i odgovornost i sloboda izražavanja. Teobaldelli i Schneider [21] su došli do zaključka da su demokratskim zemljama mere fiskalne politike formulisane tako da odražavaju stavove i preferencije građana, a samim tim je i nivo sive ekonomije u takvim privredama niži. Veće poverenje građana u državu i državne institucije, po istraživanju D’Hernoncourt i Méon [22], ima za rezultat smanjenje obima sive ekonomije u privredi. Međutim, nivo tog poverenja zavisi od kvaliteta javne vlasti. Jedan od vrlo bitnih aspekata kvaliteta javne vlasti koji direktno utiče na nivo sive ekonomije je efikasnost države u naplati poreza [23]. Najbolji primer za to su zemlje severne i zapadne Evrope gde je, i pored visokih poreskih stopa, siva ekonomija na relativno niskom nivou zbog stroge i efikasne kontrole naplate poreza. Na drugom kraju se nalaze zemlje istočne Evrope, među kojima prednjači Bugarska, koje se i pored relativno niskih poreskih stopa već godinama bore sa problemom sive ekonomije. To dalje povlači sa sobom problem povećanja budžetskog deficita i javnog duga, što dodatno podstiče rast sive ekonomije [9,20]. Naime, zbog pada kreditnog rejtinga zemlje i, s tim u vezi, pogoršanja makroekonomske situacije, položaj stanovništva i privrede se pogoršava (naročito, jer se u takvim uslovima, po pravilu, sprovode mere štednje), pa se oni sve više angažuju u aktivnostima u neformalnom sektoru.

#### 4. METODOLOGIJA

Poslednjih godina istraživači su koristili različite metodologije za merenje stepena sive ekonomije [24,25,26]. Trenutna studija koristi PLS-SEM proceduru. SEM\_PLS analiza je korišćena da bi se analizirala veza koja postoji između podataka koji predstavljaju faktore koji utiču na pojavu sive ekonomije u posmatranim zemljama i stepena sive ekonomije u toj



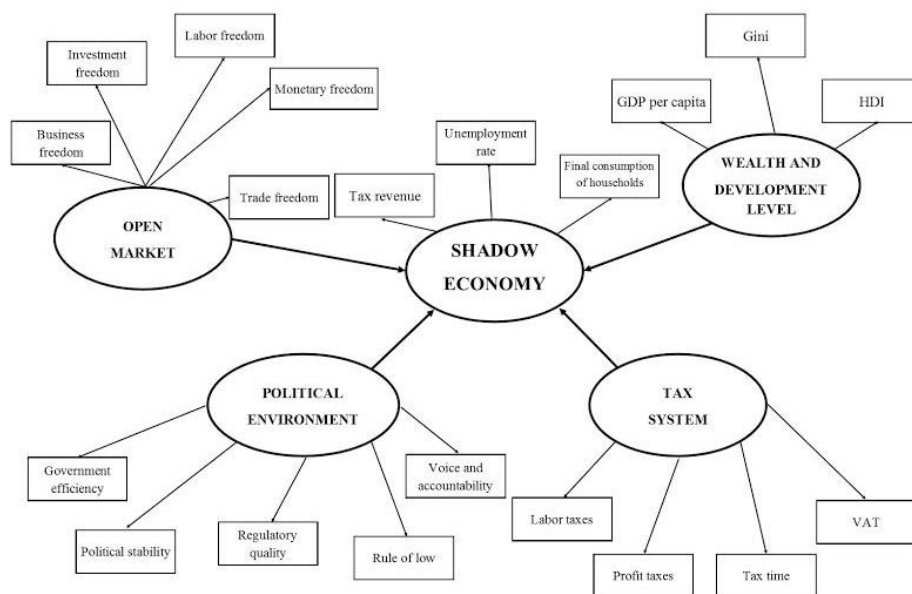
konkretnoj zemlji. Iako postoji ozbiljna debata o validnosti korišćenja SEM\_PLS analize nasuprot standardnoj SEM analizi, njegove ozbiljne prednosti jesu u tome da je vrlo pogodan u situacijama kada je uzorak veoma mali (manji od 100), kao što je to u ovom slučaju. Takođe, mnogi autori napominju da ga treba koristiti u situacijama kada potrebe rada prevazilaze mogućnosti standardnog SEM modela, posebno kad broj indikatora po latentnoj varijabli postane suviše veliki i to su glavni razlozi zbog čega su se autori opredelili upravo za ovaj metod.

U Evropi broj istraživača u oblasti menadžmenta koji koriste SEM-PLS metod sve više raste, jer su mnogi uspeli da prepoznaju prednosti ove metode, prvenstveno radu koji je objavio Hair [27]. Međutim, njegove ukupne mogućnosti nisu još uvek do kraja iskorišćene, pre svega zbog određenih ograničenja. Henseler sa svojim saradnicima [28] ukazuje da PLS metod predstavlja dobar kompromis između teorijski orijentisanih pristupa baziranih na kovarijansi, kao što je LISREL, i moći predviđanja koju imaju Veštačke Neuronske Mreže (ANNs). Tokom svojih istraživanja Reinartz [29] i njegovi saradnici su došli do zaključka da PLS nudi veću preciznost tokom procene u odnosu na LISREL, u slučajevima kada su uzorci manji od 250-500, što je vrlo česta pojava u ekonometriji [23].

PLS metod se fokusira na maksimizaciju varijanse zavisne varijable objašnjene od strane nezavisne varijable umesto na sastavljanje matrice kovarijanse. Kao i svaki SEM, PLS se sastoji od strukturnog dela, koji pokazuje vezu između latentnih varijabli, merne komponente, koja pokazuje kako su latentna varijabla i njeni indikatori povezani, i treće komponente, težinske veze, koje se koriste za procenu vrednosti latentnih varijabli [30].

## 5. REZULTATI I DISKUSIJA

Kako bi se ispitalo smer delovanja determinanti koji utiču na pojavu i širenje sive ekonomije u privredi, primenom PLS-SEM modela kreiran je strukturni model koji je prikazan na Slici 2.



Slika 2. Prikaz strukturnog modela

U analizi su korišćeni pokazatelji o determinantama i indikatorima sive ekonomije u periodu 2009-2014. godine za 40 evropskih ekonomija (Albanija, Austrija, Belgija, Belorusija, Bosna i Hercegovina, Bugarska, Crna Gora, Češka, Danska, Estonija, Finska, Francuska, Grčka, Holandija, Hrvatska, Irska, Island, Italija, Jermenija, Kipar, Letonija, Litvanija, Luksemburg, Mađarska, Makedonija, Nemačka, Norveška, Poljska, Portugalija, Rumunija, Rusija, Slovačka, Slovenija, Srbija, Švajcarska, Španija, Švedska, Turska, Ukrajina, Velika Britanija), kako bi se utvrdio stepen i smer delovanja latentnih varijabli na sivu ekonomiju kao zavisnu varijablu u postkriznom periodu. U Tabeli 2 su prikazani rezultati strukturnog modela.

Tabela 2. Rezultati strukturnog modela

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
<b>Bogatstvo -&gt; Siva ekonomija</b>	-0,383	-0,361	0,180	2,125	0,034
<b>Otvorenost trzista -&gt; Siva ekonomija</b>	0,076	0,021	0,083	0,914	0,361
<b>Politicko okruzenje -&gt; Siva ekonomija</b>	-0,113	-0,073	0,133	0,848	0,397
<b>Poreski sistem -&gt; Siva ekonomija</b>	0,102	0,065	0,127	0,800	0,424

Na osnovu prikazanih podataka može se uočiti da je jedino veza između bogatstva i sive ekonomije statistički značajna. Pri tom, ova determinanta ima najveći regresioni koeficijent koji iznosi -0,383 i pokazuje negativnu vezu između dostignutog stepena razvoja privrede i sive ekonomije. Veći standard stanovništva, jednakost u raspodeli dohodka i privredni razvoj svakako utiču na smanjenje nivoa sive ekonomije, jer u takvim uslovima privreda i stanovništvo nemaju dovoljno jak motiv da deluju u zoni sive ekonomije. Nešto niži, ali takođe negativni regresioni koeficijent (-0,113) je dobijen za političko okruženje ukazujući da kvalitetnije političko okruženje, koje podrazumeva veću vladavinu prava, kvalitetniju regulativu, efikasniju državnu upravu, veći nivo demokratije i političku stabilnost, ima za rezultat niži nivo sive ekonomije. Na drugoj strani, pozitivni regresioni koeficijenti ostvareni su za otvorenost tržišta (0,076) i poreski sistem (0,102). Iako je nakon svetske ekonomske krize pokrenuta debata o validnosti neoliberalnog koncepta razvoja, pri čemu je većina autora isticala negativnu stranu ovog koncepta, ovaj model dokazuje da visok stepen regulacije privrede stvara pogodno tle za razvoj sive ekonomije. To ne znači da je neophodno potpuno povlačenje države iz privrednog života, već jačanje njene uloge garanta delovanja tržišnih zakonitosti. Na kraju, pozitivni regresioni koeficijent u oblasti poreskog sistema, ukazuje na opšte prihvaćenu tezu da visoko poresko opterećenje i neefikasna poreska administracija predstavljaju glavne motive za razvoj sive ekonomije. Pri tom, treba istaći već pomenutu činjenicu da i najograničavajući poreski sistem neće imati za posledicu široko rasprostranjenu sivu ekonomiju ukoliko postoji efikasna, dosledna i rigorozna kontrola podnošenja dokumentacije, obračuna i naplate poreza.

## 6. ZAKLJUČAK

I danas siva ekonomija je globalni problem. Gotovo da nema zemlje koja se sa njom ne suočava u manjoj ili većoj meri. U nekim zemljama je dostigla zabrinjavajuće razmere.

Radi se o nelegalnom fenomenu gde pojedinci, privredni i drugi subjekti obavljajući svoje poslovne aktivnosti izbegavaju zakonske obaveze, te radeći protivno pozitivnim propisima nelegalno stiču korist za sebe, a na štetu države, privrede i građana. U pitanju su aktivnosti mimo kontrole države i institucionalnih procedura.

Inače, siva ekonomija nije samo ekonomski fenomen. Zbog svoje složenosti i kompleksnosti on ima sve atribute političkog, sociološkog, psihološkog, pravnog fenomena. Zato je i predmet multidisciplinarnog izučavanja, a time i preduzimanja različitih mera.

Posmatrano na globalnom nivou, siva ekonomija svoj „uzlet“ započinje šezdesetih godina prošlog veka, da bi naročito došla do izražaja 2008. godine, sa nastankom svetske ekonomske krize. Kod bivših socijalističkih zemalja tranzicioni procesi stvorili su prostor za njen nastanak. Posmatrano po zemljama njen udeo BDP je različit. Kod razvijenih zemalja se kreće oko 10% pa i niže, zemljama istočne Evrope 22-24%, a kod nekih zemalja u razvoju i do 70%. U Srbiji se procenjuje da je udeo sive ekonomije u BDP oko 30%, odnosno da se oko milijarda evra odlazi u nelegalne tokove.

Uzroci pojave sive ekonomije su brojni i različiti posmatrano po zemljama. Kao najvažniji ističu se: nepovoljni uslovi poslovanja, visoki porezi, izražena nezaposlenost, siromaštvo, komplikovane birokratske procedure itd.

Posledice toga su nepovoljne i ogledaju se u: bogaćenju na nelegalan način, socijalnom raslojavanju, smanjenju javnih prihoda, nelojalnoj konkurenciji i dr.

Na drugoj strani, ako se u opšte može reci nešto pozitivno kada je u pitanju siva ekonomija, to je da ona doprinosi smanjenju socijalnih tenzija, kroz izvesnog poboljšanja životnog standarda najsiromašnijih slojeva stanovništva, a sa ekonomskog aspekta sprečavanje pada profitne stope.

U radu je izložen model koji ukazuje na pojedine aspekte sive ekonomije. Naime, istraživanje je pokazalo da bogatstvo odnosno životni standard i političko okruženje imaju negativan odnos prema sivoj ekonomiji, tj. doprinose njenom smanjenju. S druge strane, otvorenost tržišta i poresko okruženje pozitivno utiču na sivu ekonomiju.

Svaka država u okviru svog delovanja preduzima čitav „arsenal“ mera i aktivnosti za smanjenje sive ekonomije i njeno svodjenje u prihvatljive granice, te stvaranje dugoročno održivog sistema borbe protiv ove pojave. U pitanju su sledeće aktivnosti:

- unapredjenje poslovnog ambijenta, koji će biti stimulativan za poslovanje i odvratanje subjekata privredjivanja od aktivnosti u neformalnoj ekonomiji,
- stvaranje uslova za poboljšanje tržišnog načina privredjivanja, veće samostalnosti tržišnih subjekata i manjeg uticaja države,
- uvođenje adekvatnog poreskog sistema koji će stimulisati obaveznike na društveno odgovorno ponašanje, odnosno na izmirenje obaveza prema državi (širi obuhvat, niža osnovica i stopa oporezivanja),
- savremeno organizovanje i funkcionisanje tržište rada,
- stvaranje uslova za ubrzano zapošljavanje, kroz razvoj preduzetništva, davanje određenih povlastica, posebno za osetljive kategorije stanovništva,
- afirmacija nekih oblika savremenog poslovanja koji su u funkciji smanjenja sive ekonomije – transparentnost, pravna sigurnost, zaštita imovine, bezgotovinsko

plaćanje, a posebno elektronsko poslovanje radi smanjenja birokratskih procedura te pojave mita i korupcije (crna ekonomija),

- edukovanje stanovništva o društveno odgovornom ponašanju, u smislu da obaveze prema državi nisu namet i kazna već patriotski čin za bolju budućnost i porast opšteg blagostanja stanovništva,
- odgovorni rad i puna primena zakona od strane nadležnih državnih institucija – inspekcijских službi, carine, policije, tužilaštva, sudova, a sve u cilju suzbijanja nelegalnog poslovanja.

S obzirom da se radi o složenom i delikatnom fenomenu, siva ekonomija treba da bude predmet stalnog praćenja, sagledavanja i analiziranja, kako bi sistem borbe protiv ove neželjene pojave bio dugoročno održiv.

## REFERENCES

1. Kireenko, A., Nevzorova, E., Impact of Shadow Economy on Quality of Life: Indicators and Model Selection, *Procedia Economics and Finance*, 25, (2015), 559 – 568.
2. Feige, E. L., Defining and Estimating Underground and Informal Economies: The New Institutional Economics Approach, *World Development*, 19 (7), (1990), 989-1002.
3. OECD, *Measuring the Non-Observed Economy: A Handbook*, OECD Publications Service, Paris, 2002.
4. Bitzenis, A.P., Vlachos, V. A., Schneider, F., An Exploration of the Greek Shadow Economy: Can Its Transfer into the Official Economy Provide Economic Relief Amid the Crisis? *Journal of Economic Issues*, 1 (1), (2016), 165-196.
5. Schneider, F., Estimating the Size of the Shadow Economy: Methods, Problems and Open Questions, *Turkish Economic Review*, 3 (2), (2016), 256-280.
6. Ozsoylu A.F. *Unregistered economy in Turkey*. Subject publications, İstanbul, (1996).
7. Schneider, F., Estimating the size of the Danish shadow economy using the currency demand approach: an attempt, *The Scandinavian Journal of Economics*, 88 (4), (1986), 643-668.
8. Feige, E.L. *The Underground Economies. Tax Evasion and Information Distortion*, Cambridge University Press, Cambridge, 1989.
9. González-Fernández, M., González-Velasco, C., Analysis of the shadow economy in the Spanish regions, *Journal of Policy Modeling*, 37(6), (2015), 1049–1064.

10. Mai, H., Schneider, F., Size and Development of the Shadow Economies of 157 Worldwide Countries: Updated and New Measures from 1999 to 2013, *Journal of Global Economics*, 4(3), (2016), doi: 10.4172/2375-4389.1000218.
11. Dell'Anno, R., The Shadow Economy in Portugal: An Analysis With The Mimic Approach, *Journal of Applied Economics*, 10 (2), (2007), 253-277.
12. Ruge, M., Determinants and Size of the Shadow Economy - A Structural Equation Model, *International Economic Journal*, 24 (4), (2010), 511-523.
13. Quintano, C., Mazzocchi, P., The shadow economy beyond European public governance, *Economic Systems*, 37 (4), (2013), 650–670.
14. Goel, R. K., Nelson, M. A., Shining a light on the shadows: Identifying robust determinants of the shadow economy, *Economic Modelling*, 58, (2016) 351–364.
15. Buehn, A., Dell'Anno, R., Schneider, F., Fiscal illusion and the shadow economy: Two sides of the same coin?, *MPRA Working Paper 42531*, (2012).
16. Elgin, C., Schneider, F., Shadow Economies in OECD Countries: DGE vs. MIMIC Approaches, *Boğaziçi Journal Review of Social, Economic and Administrative Studies*, 30 (1), (2016), 51-75.
17. Friedman, E., Johnson, S., Kaufmann, D., Zoido-Lobaton, P., Dodging the grabbing hand: the determinants of unofficial activity in 69 countries, *Journal of Public Economics*, 76 (3), (2000), 459–493.
18. Prado, M., Government policy in the formal and informal sectors, *European Economic Review*, 55 (8), (2011), 1120–1136.
19. Organization for Economic Co-operation and Development, *Progress in Policy Reforms to Improve the Investment Climate in South East Europe – Investment Reform Index 2006*. OECD Publishing, Paris, (2006).
20. Schneider, F., Raczkowski, K., Mróz, B., Shadow economy and tax evasion in the EU, *Journal of Money Laundering Control*, 18 (1), (2015), 34 – 51.
21. Teobaldelli, D., Schneider, F., The influence of direct democracy on the shadow economy, *Public Choice*, 157 (3), (2013) 157-543.
22. D'Hernoncourt, J., Méon, P., The not so dark side of trust: Does trust increase the size of the shadow economy?, *Journal of Economic Behavior & Organization*, 81 (1), (2012) 97–121.
23. Ruge, M., Public Governance and the Shadow Economy, available at: [http://www.culturaldiplomacy.org/academy/content/pdf/participant-papers/2012-03-biec/Public\\_Governance\\_and\\_the\\_Shadow\\_Economy\\_-\\_Narcus\\_Ruge.pdf](http://www.culturaldiplomacy.org/academy/content/pdf/participant-papers/2012-03-biec/Public_Governance_and_the_Shadow_Economy_-_Narcus_Ruge.pdf)
24. Dell'Anno, R., Schneider, F. Estimating the underground economy by using MIMIC models: A response to T. Breusch's critique. Working Paper No. 0607. Department of Economics, University of Linz, Austria, (2006).
25. Elgin, C., Oztunali, O., Shadow economies around the world: Model based estimates. Working Paper 2012/05. Department of Economics, Bogazici University, Bogazici (2012).

26. Orsi, R., Raggi, D., Turino, F. Estimating the size of the underground economy— A DSGE approach. Working Paper DSE 818, Dipartimento di Scienze Economiche, University of Bologna, Bologna, (2012).
27. Hair, J. F., Sarstedt, M., Pieper, T. M., Ringle, C. M., The use of partial least squares structural equation modeling in strategic management research: A review of past practices and recommendations for future applications. *Long Range Planning*, 45, (2012), 320-340.
28. Henseler, J., Ringle, C. M., Sinkovics, R., The use of Partial Least Squares at modeling in international marketing. *New Challenges to International Marketing, Advances in International Marketing*, 20, (2009), 277–319.
29. Reinartz, W.J., Haenlein, M., Henseler, J. An Empirical Comparison of the Efficacy of Covariance-Based and Variance-Based SEM. INSEAD Working Paper No. 44, (2009), available at: <http://ssrn.com/abstract=1462666>.
30. Haenlein, M. A Beginner's Guide to Partial Least Squares Analysis, *Understanding Statistics*, 3(4), (2004), 283–297.

## **COST MANAGEMENT USING ABC METHODOLOGY**

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**Abstract:** This paper presents our approach to model product cost using the Activity Based Costing (ABC) methodology. We address the support of information sharing and activity synchronization within a team and between teams. An original software for product cost modelling is presented in this paper. The developed system has the capability of selecting an activity, as well as machining processes and parameters based on a set of design and production parameters and of estimating the product cost throughout the entire product development cycle.

**Keywords:** Cost management, activity, cost driver, ABC methodology

### **INTRODUCTION**

Cost estimates during the early stages of product development are crucial. They influence the go, no go decision concerning a new development. If an estimate is too high it could mean the loss of business to a competitor. If the estimate is too low it could mean the company is unable to produce the product and make a reasonable profit.

Cost estimating helps companies with decision making, cost management, and budgeting with respect to product development. It is a methodology used for predicting/forecasting the cost of a work activity or output. It is the start of the cost management process [1].

Many authors agree that 70-80% of a product cost is committed during the concept phase. Making a wrong decision at this stage is extremely costly further down the development process. Product modifications and process alterations are more expensive the later they occur in the development cycle. Thus, cost estimators need to approximate the true cost of producing a product, based on empirical data, with the purpose of satisfying both the customer and company.

ABC can be defined as a method for accumulating product cost by determining all costs associated with the activities required to produce the output. An ABC system can help designers to become aware of design parameters that create demands on indirect and support resources. New concepts such as design for quality, design for production, and design for distribution utilize the ABC model to remove non-value-adding activities. The main advantage of ABC is that indirect costs are more accurately reflected in costs of the different products. Its main disadvantage is the effort required in obtaining accurate information regarding resources consumed at each activity and their cost-driver.

## **1. LITERATURE REVIEW ON COST MANAGEMENT AND COST REDUCTION**

### **1.1. DESIGN TO COST**

The objective with design to cost (DTC) is to make the design converge to an acceptable cost, rather than to let the cost converge to design. DTC activities, during the conceptual and early design stages, are one of determining the trade-offs between cost and performance for each of the concept alternatives. DTC can produce massive savings on product cost before production begins [2].

The general approach is to set a cost goal, then allocate the goal to the elements of the product. Designers must then confine their approaches to that set of alternatives that satisfy the cost constraint [4]. However, this is only possible once cost engineers have developed a tool set that designers can use to determine the impact of their decisions as they make them.

It is the cost engineers who are responsible for bringing back, to the early stages of product development, enough information on cost that will enable the designer to use it for decision-making.

Both VA/VE and DTC help to manage the risk of failing to meet the required cost targets; however, they are not focused on risk as a main project objective. Therefore, the next section discusses risk management and its role within today's estimating community.

### **1.2. TARGET COSTING**

Target costing (TC) is a cost management concept that is well suited for use within a concurrent engineering environment. It has mostly been used within the automotive industry as a means of strategically managing cost. TC provides a framework that places cost management issues into the forefront from the early phases of product development and can be used throughout all phases of a product life cycle. However, it is mostly practiced during the design and development stages where most of the decisions that impact life cycle cost are made. TC is a framework in which estimating becomes an integrated element. It combines the concepts from existing cost management and cost estimating/engineering tools e.g. VA/VE, DTC, risk management, and bases its philosophy on the logic and benefits of activity based costing.

### **1.3. EXPECTED COST AS A MEASURE OF RISK**

Risk contains two basic elements: chance and consequences. Probability is a universal measure of chance, and cost is an accepted measure of consequences. For a given failure scenario, risk calculated as expected cost: the product of probability and failure cost [5, 6]. Expected cost is used extensively in the fields of Risk Analysis, Economics, Insurance, Decision Theory, etc. Both probability and cost are ratio scales, for which multiplication is an admissible operation.



#### 1.4. ACTIVITY BASED COSTING

ABC can be defined as a method for accumulating product cost by determining all costs associated with the activities required to produce the output. An ABC system can help designers to become aware of design parameters that create demands on indirect and support resources. New concepts such as design for quality, design for production, and design for distribution utilize the ABC model to remove non-value-adding activities. The main advantage of ABC is that indirect costs are more accurately reflected in costs of the different products. Its main disadvantage is the effort required in obtaining accurate information regarding resources consumed at each activity and their cost-driver rates.

The modern investigating methods of costs allow the integration of the costs analysis inside the strategically approach of the organization, in creating a lasting competing advantage, contributing to the fixing of both the decisions regarding the portfolio of products and services offered by an organization and of a system of micro-decisions that progressively lead to changing the company strategy.

#### 2. MODELLING AN INFORMATIONAL SYSTEM FOR THE ANALYSIS AND FIXING OF THE ACTIVITY THROUGH COSTS

Modelling an informational system for determining the costs supposes the analysis and planning of the methods and techniques of collecting, processing and efficient evaluation of the information that compete to the obtaining of the total cost of product offered by an organisation [7].

The pattern model of the informational system aims at some aspects related to the design and the development of the products.

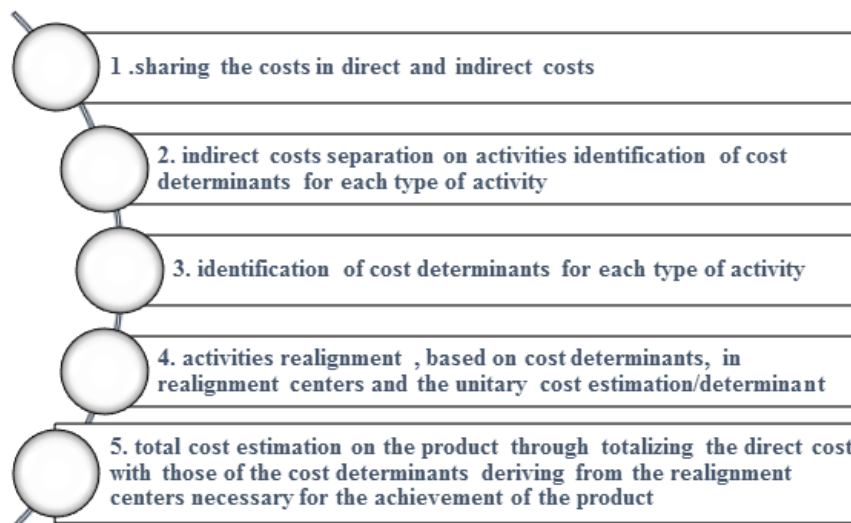


Figure 1. Stages covered the cost estimation according ABC method

The cost estimation according ABC method assumes covering the main following stages (Figure 1).

Modelling an informational system for determining the costs supposes the analysis and planning of the methods and techniques of collecting, processing and efficient evaluation of the information that compete to the obtaining of the total cost of product offered by an organisation [7].

Our research indicates that there are tools by which we can effectively and efficiently design for reduced cost while satisfying, and possibly even exceeding, customer desires. The primary deterrents to designing for cost include a "who cares" attitude toward cost, a lack of cost understanding within the product delivery community, and a lack of knowledge within the product delivery community of tools that can be used to design for cost.

The key to understanding cost, and hence to reducing cost, is the ability to accurately measure cost and to appropriately allocate it to products [9, 10, 11]. Only then can intelligent cost-related decisions be made. Activity-based Costing is an effective attempt to move in that direction.

In conformity with the carried out survey upon the costs situation on activities, we made the cost model shown in the following formula:

$$C = F + \sum_i b_i * x_i + \sum_{ij} D_{ij} * B_{ij} \quad (1)$$

where:

$C$  - product cost;

$b_i$  - direct costs on the product unit (including human resource costs, direct costs with materials, etc);

$x_i$  - number of type  $i$  of cost drivers;

$D_{ij}$  - cost driver rate of  $i$  activity;

$B_{ij}$  - number of cost drivers on  $i$  activity used by  $j$  resource.

The equation 1 will be:

$$C = F + VD + AD \quad (2)$$

where:

$VD$  - total direct variable cost;

$AD$  - total indirect activity cost.

The previous model can be shown as a matrix in equation 2, so:

$$VD = [b_1x_1 \quad b_2x_2 \quad b_3x_3 \quad \dots \quad \dots \quad b_mx_m]^T \quad (3)$$

where:

$b_i$  - direct costs on the product unit (including human resource costs, direct costs with materials);

$x_i$  – number of type  $i$  of cost drivers.

The total indirect cost of activities will be presented in equations 4:

$$AD = \left[ A_{ij} / \sum_{i=1}^m A_{ij} \right]_{m \times n} \cdot \left[ R_{jk} / \sum_{j=1}^n R_{jk} \right]_{n \times s} \cdot P_k \quad (4)$$

where:

$A_{ij}$  - number of activity  $j$  consumed of product;

$R_{jk}$  - resources consumed by  $j$  activity;

$p_k$  - price of type  $k$ .

Adding the parameter time  $t$  to this formula leads to the determination of the costs drivers. By combining the basic concepts specific to the entity-association model (entity, attribute, association, cardinality, integrating restrictions) with Codd's normalizing rules, the data, dictionaries, associations between them, cardinalities, structural and integrating restrictions were defined. It was also performed the matrix of the functional dependencies among attributes, like an extra element for the validation of the conceptual, relational (logical) and physical models of the system under study. It starts from the central premise according to which the goods (the organisation outputs) consume some activities and the activities consume some resources.

WinDesignABC is a tool that facilitates fast track cost estimation, knowledge capture and delivery. It helps user to easily identify the significant cost elements in a domain and the attributes that drive their costs. It helps to capture rules that encode experts' experience in how costs are realized. It facilitates the visually organizing the knowledge bases within a product or work breakdown structure (WBS).

Figure 2 presents the user interface of the WinDesignABC original software, realised in Microsoft Access, like a relational model.



Figure 2. User interface

It is easy to dynamically pivot to view the knowledge in different ways in WinDesignABC. It is flexible enough to allow creating reusable knowledge modules of an entire knowledge base or just pieces of the knowledge base. It also allows assembling composite knowledge bases from these reusable components. It supports generating multi-level cost models, supporting estimation summaries, and drill up/down to details.

### 3. CONCLUSION

The paper has presented an analysis and research of cost accounting and charging strategy by ABC in the mechanical industry. It also confirms different charging strategies according to the different customers, and then provides scientific reference for enterprise or department.

Once identified, corrective action can be taken. Combining the modelling tools and the ABC activity a method of identifying the areas that will have the largest impact in the future can be developed.

This WinDesignABC original software can be an assisting system of the decision, the principle of the costs optimization being the decisional one.

### REFERENCES

1. Behncke F., Maisenbacher S., Maurera M., Extended Model for Integrated Value Engineering, *Procedia Computer Science*, 28, 2014.
2. Bock S., Pütz M., Implementing Value Engineering based on a multidimensional quality-oriented control calculus with in a Target Costing and Target Pricing approach, *International Journal of Production Economics*, 183, 2017.
3. Chandrakumar T., Parthasarathy S., An approach to estimate the size of ERP package using package points, *Computer Standards & Interfaces*, 47, 2016.
4. Cooper R., Slagmulder R., Target costing for new-product development: component-level target costing, *Journal of Cost Management*, 16(5), 2002.
5. Horngren, C.T., Datar G., Rajan M., *Cost Accounting: A Managerial Emphasis*. 15th Edition, Pearson Prentice Hall, London, 2015.
6. Lee J., Chen S., Shivpuriya V., Mohan R., Service cost estimation for packaged business application-based business transformation, *Service Operations and Logistics, and Informatics, IEEE/SOLI 2008, IEEE International Conference*, 2008.
7. Roy R., Colmer S., Griggs T., Estimating the Cost of a New Technology Intensive Automotive Product: A Case Study Approach. *International Journal of Production Economics*, 2005.
8. R. Setchi et al. (eds.), *Sustainable Design and Manufacturing, Smart Innovation, Systems and Technologies*, 52, Springer International Publishing Switzerland, 2016.

9. Taylor, I.M., Cost engineering –a feature based approach, 85th Meeting of the AGARD Structures and Material Panel, Aalborg, Denmark, 14, 1997.
10. Zengin Y., Ada E., Cost management through product design: Target Costing approach. International Journal on Production Resources, 48(19), 2010.
11. Zmuk B., Business Sample Survey Measurement on Statistical Thinking and Methods Adoption: the Case of Croatian Small Enterprises. Interdisciplinary Description of Complex Systems 13, 2015.

## **STAFF MANAGEMENT MECHANISM BASED ON THE ASSESSMENT OF ECONOMIC LOSSES DUE TO STAFF TURNOVER**

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**Abstract:** Approaches to the staffing in the context of the diverse labor market conditions (of labor excess and deficit) are analyzed. The mechanism for regulating staff turnover is algorithmized. The purpose of the work is to develop a mechanism of managing staff turnover based on the economic assessment of the negative impact of excessive staff mobility. There are given some arguments concerning the insufficiency of existing instruments to determine the normative values of the staff turnover in the enterprise. The necessity to introduce the principles of preventive management of staffing parameters is also supported.

An algorithm for evaluating and correcting the staffing dynamics is proposed. The appointment of the staff balance in the staff turnover management is characterized. The impact and the significance of factors influencing the staff mobility is determined. The regulatory effects for preventing and minimizing the excessive staffing are justified. The proposed staff management mechanism comprises new tools based on the assessment of economic losses in the enterprise as a result of staff turnover. The structure of economic losses includes the cost items: loss of productivity; direct and indirect payments for dismissal on various grounds; expenses to search, attract and hire new employees, and the investment losses while forming cohesive workforce.

As a result, a set of sufficient significant factors determining staff turnover of the enterprise has been justified; a methodology for estimating economic losses due to excessive staff mobility has been proposed, a mechanism for regulating staff turnover to business-acceptable values has also been tested. The knowledge gained will provide a justification for the necessity to enter into preventive measures in the technology of the enterprise's staffing.

**Keywords:** staff turnover, labor market conditions, turnover predictors, turnover, types, staff balance, impact instruments, economic effect, payback

### **1. THE STATEMENT OF THE PROBLEM**

Labor market conditions dictate staff movement and influence the staffing strategy. Market conditions of labor excess enable employers to adopt selective recruitment and hiring policies, as well as to generate a broader request for a set of matching opportunities for applicants and organizations. For many jobs and occupations in the industrial fields, the market conditions of labor excess (Gimpelson V.E., Kapeljushnikov R.I., Sharunina A.V., 2016) are recorded and the structural imbalances in the supply and demand parameters are identified.

This situation limits the employer's selectivity in the staffing: there appear other requirements for organizing the search and recruitment of applicants; the set of requirements and the relevance of the criteria for diagnosing professional suitability are being modified;

more resources for inducting, adapting and training new staff have been forced. Thus, the market conditions of labor excess limit the choice of applicants whose professional qualifications are in line with the enterprise's target request and also affect the change in the composition of the work and the functional content of the HR manager. In general, such labor market conditions increase the cost of staffing, as well as the premature departure of professionals (to the level of return on investment) may increase the negative impact of staff turnover.

The company management system is interested in monitoring the payback of resources spent on staffing, as the results are based on adjusting the Strategy and evaluating the performance of the HR Department (factors are included in the set of performance indicators for HR managers: "staff turnover", "retention of new specialists", "performance of the recruitment budget" (Baskina T.V., 2016; Vetluzhskih E., 2016). An analysis of approaches to the development of the performance metrics for staffing (Vasilyev S., 2017; Performance indicators, 2017) has revealed significant differences in the choice of indicators, the rationale for their impact on the sustainability of staffing, and the feasibility of achieving for implementers. In theory and practice, there is no universal approach to "digitizing", to rationing of the impact of HR management. The basic premise of this development is the adequacy of the staffing for the purposes of the company. The rationale for the development of the staffing efforts (work) is based on the ratio of the costs and benefits from the implemented work. Therefore, we believe that the methodology for estimating economic losses due to staff turnover is in demand. The aim of the work is to algorithmize activities for diagnosing the socio-economic impact on HR development.

## **2.THEORETICAL AND METHODOLOGICAL GROUNDS**

The phenomenon of staff turnover has been actively developed by researchers over the years. The main view is the research by J. March and X Simon (1959), who developed the staff turnover model (the balance of satisfying the realization of the employee's values and the prevailing labor market conditions works as an incentive. The complex causal relationship of this phenomenon compels the realization of multifaceted studies. The strength of the influence of the various predictors on the level of staff turnover is studied (Antosenkov E.G., Kupriyanova Z.V., 1977; The movement of..., 1985; Karimova E.F., Kozlova O.A.,2016). The accumulated data allow us to track changes in the influence of the staff turnover predictors in different business conditions; to assess differences in the impact of factors on staff differentiated by the criteria (e.g. age, category, training, post, work experience for the company). Knowing the determinants of the phenomenon in theory allows introducing preventive management, but the multidimensional impact of the predictors complicates its practical implementation. Therefore, in the development of a theoretical and applied approach to staff turnover management, a focus on the process impact is being diagnosed.

The basis for the decision of "voluntary resignation" (as a key reason for staff turnover) is the accumulated dissatisfaction with various aspects of work in the enterprise. The accumulation of negative assessments occurs gradually during the implementation of the recruitment and retention processes. The representatives of this approach (Belov D.S., 2016; Ozernikova T.G., 2016) prove the direct impact of organizational processes of staff management on satisfaction and, as a result, a more intense mobility of staff. Therefore, recommendations for leveling the negative effects of staff turnover are based on adjusting

current processes of staff management, in particular the improvement of the system of motivation and pay, adaptation programs, and the introduction of career orienting trajectories.

A systemic view of the causality of turnover is concentrated in the work aimed at justifying the resultant impact of the staff turnover management processes. The result is traditionally expressed: focus and distribution of labor (Shipovalov A.G., 2014), stability (sustainability) of the staff (Tihonova E., 2012), labor productivity (Selezneva T.O., 2015). In this direction, the impact of rehabilitative effects on the prevention of excessive staff turnover and the leveling of its negative effects are monitored in the major processes describing staffing.

The traditional methodological means of diagnosing the causal constraints are the sociological tools, including surveys (questionnaires and interviews), included observations, focus groups, content analyses. The tools for receiving and processing data have been repeatedly tested, recognized by the scientific community and often used in practice to interpret social and labor relations among the staff, to characterize the social and psychological climate and to assess the involvement, loyalty and commitment of the staff. These data are a necessary but not sufficient condition for the justification of factors influencing the staff mobility. The customer of this information - the owner (employer) has a fair interest into interpreting the "social" assessments received into the economic language. The management system operates applies cost categories and requires a cost-efficiency assessment of the management process, as well as a rationale for the return on the invested resources. This target request has been taken into account by the HR managers and a further direction of staff turnover is being actively pursued (Mitrofanova A.E., 2015; Theoretical and methodological ...2009), that is based on the rationale for the socio-economic impact of coping effects. The methodological tools for this area is being developed, tested and make it possible to expand the existing methodologies for regulating staff turnover.

Thus, three theoretical and applied areas are focused on creating coping effects on the staff turnover in the company that differ in the selection of input and output variables for modeling staff movement, as well as the demand for analytical processing and the presentation of final data to the target customer.

### **3. A MECHANISM FOR REGULATING STAFF TURNOVER IN THE COST DIRECTION**

The sequence of stages aimed at regulating staff turnover, which eventually provides a rationale for the cost-effectiveness of the management impact, is presented in Table 1.



Table 1. Structure and design of actions to manage excessive staff turnover in the company

Stage Name	Stage target
Analysis of staff movement balance for the period under review	Scoping the problem and the sources of its localization
Analysis of the structure and magnitude of the economic and social damage to the company due to staff turnover	Estimating the magnitude and structure of losses and identifying key parameters to be influenced to reduce staff turnover
Diagnose the potential and actual turnover of human resources in the company	Justification for changes in staff turnover
Rationale for the action plan to level the negative effects of turnover and prevent its further growth	Calculation of the payback of resources invested in the management and staff turnover prevention in the company

Source: prepared by the author

The analysis of the staffing balance is based on an assessment of the dynamics of a number of staffing indicators (e.g. turnover rates for reception and departure, stability and turnover of staff, as well as actual, potential turnover and their intensity measures). By diagnosing the pace and magnitude of changes in the professional qualification levels and/or structures, it is possible to record the problem presence or absence of excessive staff turnover, assess its negative impact and identify the source of its localization.

The assessment of the impact of the staff movement balance is based on comparison with the normative values of the actual and potential turnover rates. The comparison is complicated by the lack of representative data on the systematic monitoring of staff mobility in sectoral statistics. The nature of the activity, the size of the company, the stage of its life cycle and the level of financial sustainability, the seasonality factor and even the official position, all have a significant impact on the normative values of the turnover coefficient. Therefore, it is not sufficient to focus on the 7-15% (Kibanov A., 2016) Guideline for the recommended range in the literature. Other business-acceptable values are recorded in practice (Table 2).

Table 2. Turnover factor in the context of determinants

Factor	Value, %	Factor	Value, %
<i>Industry specific activities:</i> IT - technologies	8-10	<i>Management level управления:</i> top management	2
production	10-15	Middle management	10
insurance	30	Line Specialists	20
Trade	30 -50	Unqualified staff	50
Hospitality	50-80		
Catering (fast food)	80		

Source: prepared by the author

The diagnosis of the normative values of the turnover coefficient is based on the regular statistics of the staff movement balance accumulated in the company. The data on mobility are related to the measure of the staffing sustainability and the cumulative cost of

updating the staffing. Cost comparisons are the basis for a decision on the need to enter the turnover management activities to the regulatory values of the company's sustainability. For example, It might be more beneficial for a company (in value terms) to pursue a policy of savings in the staff payroll on a probation period, then the higher turnover rates in this category would be acceptable to the company, even if the normative values were significantly exceeded in 10-15%.

Thus, the conduct and analysis of the staff movement balance allows establishing normative values of the turnover coefficient acceptable to the company.

The negative effects of excessive staff turnover are subject to economic valuation. The assessment is carried out through an analysis of the structure and magnitude of the economic and social damage to the company. While the importance of the results of the analysis is undeniable, the reliability and validity of the obtained data are, unfortunately, dependent on the ability of the HR manager to overcome a number of organizational problems. The data collection for the analysis of economic losses generally requires involving and harmonizing information from different departments, developing and conducting resource intensive events - photographs of the working day, development and regulation of labor standards. At the same time, in companies with high leveled HR management, many of the mentioned operations are developed and built into the management process. Labor rationing and coherence of information flows are key processes that characterize the HR management system, including a policy to prevent staff turnover.

The economic losses of the company as a result of staff turnover may include some factors and types of costs presented in Table 3. The inclusion of cost data in the damage structure depends on the organization of HR Management and the social and economic security measures employed in the company. For example, according to a number of collective agreements, the amounts paid on different grounds of dismissal may significantly increase the financial burden on the staff replacement.

Table 3. Business cost factors and items staff turnover

<b>Factors</b>	<b>Types of costs</b>
Staff dismissal on their own volition and violation of work discipline	Severance pays
	Legal costs, due to illegal dismissal, subsequent reinstatement and involuntary truancy
	Losses due to the designation of the dismissal procedure
Staff productivity	Losses due to inoperative employees
	Losses of employee productivity before dismissal
	Losses of employee productivity during in-service training
	Staff productivity losses during the adaptation period
Recruitment and new employment employees	Costs for analyzing work content and developing job models
	Costs for developing diagnostic tools to define professional suitability of applicants
	Costs for informing market; Human Resources Agency fees
	Interview costs and other diagnostic activities
	Costs for employees under recruitment
Introducing and adapting new staff	Costs for on-the-job training and mentoring
	Costs (direct and indirect) for on-the-job training

Source: prepared by the author

The volume of payments for labor disputes (including reinstatement in the workplace due to illegal dismissal) has a growth trend. The number of appeals to law courts and the Labor Commission is increasing every year (Podzherob M.,2017): the 18% growth is recorded in Novosibirsk in 2016 [Statistics on the...,2017]. There are at least two circumstances contributing to the increase in the number of hits on the staff member: some increase in the legal literacy of the population and a stronger measure of security for the staff member in the regulations of labor legislation. According to the experts assessments the procedure for the dismissal (Sapfirova A. A., Volkova V.V., 2015) is tightly regulated and built into the HR management system through causal relationships involving a close link between all HR procedures and operations.

Costs for escorting the separating staff member may also vary considerably as a result of different ideologies of the employer's brand of management at the period of dismissal. For example, dismissal under the scheme of outplacement significantly increases the workload of the specialists and, therefore, the financial burden.

In the structure of damage, the share of losses due to productivity trends is significant. But the traditional practice of estimating the economic impact of staff turnover in terms of the complexity of data collection is limited in format. In general, this situation distorts the assessment of the economic impact of investment in HR management. With regard to the specific conditions of the business, we have presented a scheme for calculating the decline in productivity during the adaptive period for a new employee and during work, accompanied by an increase in the staff member's dissatisfaction (Borisova A.A.,2010).

The cost recruiting and employing is largely determined by the organizational processes and the use of tools with a high level of forecasting capabilities to diagnose the professional suitability of applicants. The total cost of a series of qualifying procedures relates to the number of closed jobs. Therefore, the choice of diagnostic tools, the channels of recruitment and the content of the selection actions makes it possible to differentiate the cost of staff replacement (Table 3).

Table 3. Comparative analysis of staff selection costs

Categories of expenses	Sources of recruiting applicants		
	Source 1	Source 2	Source 3
The cost of accessing the source, rubles.	15000	10000	0
Number of responses (summary), unit.	145	820	7
Cost of response processing, rubles (based on data 0.1 hour per 1 response; value of man-hour-100 rubles)	1450	820	70
Number of recruiting interviews, unit	25	19	6
Interview costs, rubles (based on data of 0.5 hours per 1 interview; value of man-hour - 100 rubles)	1250	950	300
Number of interviews with the head of the structural unit, Unit	13	10	3
Interview costs, rubles (based on data of 0.75 hours per 1 interview; value of man-hour - 500 rubles)	4875	3750	1125
Number of recruited staff	5	3	2
The cost of finding and selecting the applicant, rubles	1515	1840	747.5

Source: compiled by the author on the basis of empirical evidence (Osovickay H., 2015).

Thus, the structure of economic losses as a result of staff turnover includes the cost of staffing and the prevention of losses associated with the loss of professional productivity in the course of the staff mobility. The amount of damage is determined by the established practice of HR management. The total amount of economic losses is a guide in the design and justification of the budget for the draft regulatory measures of impact.

#### 4. CONCLUSION

The dominant type of labor market conditions determines the approach to organizing and implementing staffing. A management decision on the feasibility of adopting preventive and/or corrective actions can be based on an analysis of the staff movements, an estimate of the acceptable values of the actual and potential turnover rates. The rationale for the budget is to compare the required resources with economic losses due to staff turnover. Exceeding the projected value over current expenditures specifies the need to find ways for reducing the resource correctional impact.

#### REFERENCES

- Gimpelson V.E., Kapeljushnikov R.I., Sharunina A.V. (2016). Roads we choose: internal and external labor market movements // Economic Journal of the High School of Economics. № 20. 2. P. 201-242.

- Vetluzhskih E. (2016). How to develop an effective wage system: Examples from Russian companies/E. Vetluzhskih, A. Larina, T. Petrenko. – M.: Alpina Publisher – 201 p.
- Baskina T.V. (2016). Technology of successful recruitment/T. V. Baskina. – M: Alpina Publisher – 288 p.
- Vasilyev S. (2017) Measuring the performance of the Human Resources Service [electronic resource] URL: <http://www.obs.ru/article/178/>, free access (access date: 20.03.2017).
- Performance indicators for HR services [Electronic] <http://dzensales.ru/personal/pokazateli-effektivnosti-raboty-kadrovyyx-sluzhb>, free access (access date: 20.03.2017).
- Antosenkov E.G., Kupriyanova Z.V. (1977) Trends in workforce turnover. Dynamic aspect. Novosibirsk: Science. – 256 p.
- The movement of personnel in the Siberian city (in the Novosibirsk Industry yield study) (1985). Monograph / L.A.Shishkina, L.S.Korovin, V.P. Mikhailovskaya. Novosibirsk: Science, 1985. – 272 P.
- Karimova E.F., Kozlova O.A. (2016). Staff turnover // Eurasian scientific journal. № 5. P. 114-115.
- Belov D.S. (2016).The motivation of the staff and its impact on the turnover of the enterprise's staff//scientific Almanac. № 4-1 (18). P. 24-27.
- Ozernikova T.G. (2016.) Systems of motivation and stimulation of work. / T.G. Ozernikova. Textbook-Irkutsk: BSU. –183 p.
- Shipovalov A.G. (2014). Approaches to estimating labour resources in the Siberian regions//economy and governance in the 20th century. № 16. P. 97-101.
12. Tihonova E. (2012). Stability of the Labor collective// Kadrovik. 2012. №6. P. 98-101.
- Selezneva T.O. (2015). Problems of productivity improvement // Economic and entrepreneurship. № 5-1. P. 896-899.
- Mitrofanova A.E. (2015). Management of staff turnover in the Organization // Management of personnel and intellectual resources in Russia. 2015.
- Theoretical and methodological foundations for the development of a human resources management system: Monograph. T.G. Ozernikova, N.G. Solodova, A.V. Skavitin. – Irkutsk, BSU, 2009. – 228 P.
- Kibanov A.Y. (2016). Personnel Management. – M.: Inform-M. – 459 P.
- Podzherob M. (2017). Russian courts are increasingly on the side of the employer // Vedomosti. [Electronic resource] URL: <http://www.vedomosti.ru/management/articles/2016/02/17/629931-rossiiskie-sudivse-chasche-vstayut-storonu-rabotodatelya>, (access date: 25.03.2017).
- Statistics on the jurisprudence of the Courts of general jurisdiction Novosibirsk) [Electronic resource] URL: [http://sudact.ru/regular/stats/?geo\\_area=ZfZ6Llw78PJh&suit\\_category=IBTUDc2jRo6T&workflow\\_stage=a2UdzpWquCJj](http://sudact.ru/regular/stats/?geo_area=ZfZ6Llw78PJh&suit_category=IBTUDc2jRo6T&workflow_stage=a2UdzpWquCJj). (access date: 25.03.2017).

- Kolobova S.V. (2016). Legality and validity of labor judgments // Modern law. №1. P. 86-92.
- Sapfirova A. A., Volkova V.V. (2015). Labor disputes in Russia. – M.: UNLT-Dana. – 88 p.
- Borisova A.A. (2010). A mechanism for establishing employment relations in an enterprises. Novosibirsk: NSTU . – 206 p.
- Osovickay H. (2015). HR-branding. How to become the best employer of Russia. - St. Petersburg: Peter. – 348 p.

## COMPARATIVE ANALYSIS OF THE FACTORS INFLUENCING SME FAILURE IN SERBIA AND ALBANIA

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**Abstract:** This manuscript is presenting a comparative analysis of the factors which are influencing the failure of small and medium-sized enterprises (SMEs) in Serbia and Albania. The aim of comparative analysis is to indicate similarities and dissimilarities between influence of these factors in both countries. To achieve this aim, a questionnaire was used to collect the opinions on influence of particular factors from entrepreneurs/owners who suffered the failure of their previous businesses. For identifying the difference between the influence of certain factors Mann-Whitney U test was used. Results of the study indicate that certain factors have different effects on SME failure in Serbia and Albania.

**Keywords:** SME, SME failure, Mann-Whitney U test

### 1. INTRODUCTION

Although in previous years has been paid great attention on importance of SMEs for economy of a country, only few researches conducted with aim to discover factors that threaten operation of SME in Serbia as well as in region. According to Report on small and medium-sized enterprises and entrepreneurship for 2012, compared to 2005, there is decline of business activity in this sector by 15% and number of employees by 3.6% [1]. Therefore, authors of this paper, conducted research in order to point out main problems faced by SMEs in Serbia and compared them with problems that emerge in Albania.

In this paper, is paid attention to the factors that threaten the operations of SMEs and they can lead to failure of them. In the previous research of the authors of this paper [2, 3, 4], scientific papers were analyzed with the aim to discover all potential factors that influence on the failure of SMEs. Authors grouped these factors into two main sets of factors: (1) individual and (2) non-individual. The non-individual factors likewise, separated into two sets of factors: (2.1) internal and (2.2) external factors. Individual factors refer to the abilities and characteristics of the entrepreneur/owner of SMEs. Internal non-individual factors beside the characteristics of the SMEs also include decisions made within the SMEs and other factors originated within the SMEs. On the other hand, external non-individual factors refer to the impacts who emerge from the environment on which SMEs do not have a significant influence.

The purpose of this paper is to explore the similarities and differences between the impact of certain factors on the business failure of SMEs in Serbia and Albania, as well as to fill the research gap in the literature since there is no similar research.

## 2. METHODOLOGY

The aim of this study is to present results of comparative analysis of the factors influencing SME failure in Serbia and Albania. In this way, we will pointed out differences between influences of certain factors.

For data collection about impact of factors that can cause the failure of SME, was used a questionnaire as research tool. Target group of respondents were entrepreneurs/owners of SMEs who experienced failure of their SME or at least, had changed the business activity of their SME. The questionnaire was developed according to other questionnaires that were applied in similar studies [5, 6, 7, 8]. Development of the questionnaire used in this research presented in [2]. The questionnaire consisted of two groups of questions. The first group contained 18 questions refers to demographic characteristics of respondents and of SMEs. The second group included 36 questions describing the influencing factors for SMEs failure. This group of questions consisted of six subgroups of factors: (1) Private time activities; (2) Personal characteristics of entrepreneurs/owners of SMEs; (3) Start-up motivation; (4) PESTEL analysis; (5) Infrastructural issues; (6) Internal non-individual issues.

The first three subgroups refer to individual factors, while subgroups four and five refers to non-individual external factor. Subgroup six refers to non-individual internal factors.

The strengths of impact of certain factor were measured using five-point Likert scale. A mean score for each item, it was calculated with a higher mean score indicating greater impact. The research conducted in Republic of Serbia and Republic of Albania during 2016 and 2017. The method of filling out the questionnaire was a “face to face” meeting with the entrepreneurs/owners of SMEs. In all, 64 Albanian entrepreneurs/owners of SMEs participate in the survey, while 138 Serbian entrepreneurs/owners of SMEs have agreed to be interview. The replies obtained entered in a single database and then we performed the statistical processing of the data. We analyzed the sample through two steps: first, authors made and presented descriptive statistics of the sample; second, sample was analyzed with Mann-Whitney U test in order to discover differences between factors influencing the failure of SMEs in Serbia and Albania. Through the SPSS program for statistical analysis, version 18, it was made data analysis.

## 3. RESULTS AND DISCUSSION

For identifying the difference between the influences of certain factors, was used the Mann-Whitney U test. A two-sample t-test would not be appropriate because the data are ordinal and non-normally distributed. Mann-Whitney U test is non-parametric alternative to the independent t-test. Different from the independent t-test where mean scores of the two group are compared, in Mann-Whitney U test medians of two groups are compared. The values obtained converted into the ranks for both groups and then calculates whether the ranks of these groups are significantly different. Since the results converted into the ranks, the actual distribution of the results is not important. Level of statistically significant used in this research is 0.05 [9, 10, 11, 12].

Table 1 shows the results of descriptive statistics for characteristics of SMEs. Both samples are predominated by service businesses: 76.09 percent of the Serbian sample and 64.06 percent of the Albanian sample categorized as providing a service. The Albanian sample has more small manufactures while the Serbian group has a higher percentage of agriculture businesses.



Different from Albanian SMEs where SMEs failed in the first three years and in stage of establishment, Serbian SMEs failed after five years of operations and in stage of stagnation.

Those entrepreneurs/owners of SMEs from Albania who decided to start up a new SME after failure, in most of the cases decided to start up new SME in sector of service. On the other hand, entrepreneurs/owners of SMEs from Serbia who decided to start up new SMEs after failure of their previous SME; in the most of cases, they moved their business from sector of service to sector of manufacturing and in sector of agriculture.

Table 1. Characteristics of Albanian and Serbian SMEs

	<b>Serbia</b>	<b>Albania</b>
	Percent	Percent
<i>Previous business sector</i>		
Manufacturing	19,56	34,38
Service	76,09	64,06
Agriculture	4,35	1,56
<i>Business age at the time of failure</i>		
< 3	24,64	62,5
3 – 5	22,46	26,56
> 5	52,9	10,94
<i>Business life cycle at the time of failure</i>		
Establishment	9,42	71,88
Growth	12,32	12,5
Stagnation	42,03	12,5
Decline	36,23	3,12
<i>Number of employees in the SMEs that suffered from failure</i>		
< 10	79,17	60,94
10 – 50	14,58	28,12
50 – 100	0,69	1,56
100 – 250	3,47	4,69
>250	2,08	4,69
<i>The sector of the current SME business</i>		
Manufacturing	26,97	25
Service	61,8	75
Agriculture	11,23	0
<i>Number of employees in the current SMEs</i>		
< 10	71,91	59,38
10 – 50	21,35	21,87
50 – 100	3,37	9,38
100 – 250	2,25	6,25
>250	1,12	3,12

Table 2 presents the results of descriptive statistics of respondents. As shown in Table 2, both samples are dominated by male respondents, age between 30 and 40 and married marital status. Albanian entrepreneurs/owners of SMEs in the sample had attained a higher level of education comparing to their Serbian counterparts. In Table 2, we see that 34.37 percent of the

Albanian respondents have bachelor degree and 39.06 percent have master degree, while 23.19 percent of Serbian respondents have bachelor degree and only 1.45 percent have master degree.

Table 2. Characteristics of Albanian and Serbian entrepreneurs/owners

	<b>Serbia</b>	<b>Albania</b>
	Percent	Percent
<i>Age</i>		
< 30	18,84	18,75
30 – 45	52,17	42,19
45 – 55	26,09	34,37
> 55	2,90	4,69
<i>Gender</i>		
Male	75,36	62,5
Female	24,64	37,5
<i>Level of education</i>		
High school diploma and under	65,94	20,32
B. Sc.	23,19	34,37
M. Sc.	1,45	39,06
Ph. D.	1,45	0
Other	7,97	6,25
<i>Marital status</i>		
Single	22,46	17,19
Married	66,67	78,12
Divorced	10,87	4,69

In Table 3, we present mean values for responses to question: “If you had more time for private activities, what would you like to do?” Data shown in Table 3 indicate that both Serbian and Albanian respondents ranked time spend with family as the most important activity. Since there is statistically significant difference, which is marked with asterisk, between answers of Serbian and Albanian respondents, we concluded that Albanian entrepreneurs/owners of SMEs would spend more time that is private with family than their Serbian counterparts. However, Serbian entrepreneurs/owners of SMEs would spend private time going on vacation, or doing socially responsible work and other activities not mention in questionnaire compared to Albanian entrepreneurs/owners of SMEs.

Table 3. Private time activities

<b>Activities</b>	<b>Serbia</b>	<b>Albania</b>	<b>Sig.*</b>
Spend time with family	4.30	4.78	0.000*
Spend time with friends	3.77	3.52	0.084
Hobby	3.32	3.28	0.670
Vacation	3.81	3.28	0.003*
Voluntary work	2.37	1.94	0.086
Socially responsible work	2.26	2.22	0.047*
Other activities	2.95	1.22	0.000*

Table 4 presents how respondents ranked importance of certain personal characteristics for success of SME. Albanian entrepreneurs/owners of SMEs view self-confidence as the most important factor contributing to business success, whereas Serbian entrepreneurs/owners of SMEs consider that this is education. There were significant differences between Serbian and Albanian entrepreneurs/owners of SMEs according to all characteristics except to risk taking. Namely, Albanian respondents view self-confidence and need for achievement as the most important characteristics. On the other hand, Serbian respondents rate creativity, internal locus of control, independence and education more highly than their Albanian counterparts do.

Table 4. Personal characteristics

<b>Personal characteristics</b>	<b>Serbia</b>	<b>Albania</b>	<b>Sig.*</b>
Self-confidence	3.92	4.30	0.011*
The need of achievement	3.01	3.84	0.000*
Risk taking	3.62	3.78	0.526
Creativity	3.91	2.94	0.000*
Internal locus of control	3.86	3.17	0.001*
Independence	3.81	2.78	0.000*
Education	3.96	3.05	0.000*

Respondents asked to rate reasons for deciding to start up a SME on a five-point Likert scale with five being “extremely important” and one being “unimportant”. Mean scores are shown in Table 5. The results suggest that entrepreneurs/owners of SMEs in both Serbia and Albania indicated that the top motivation was financial gain. This is understandable because both counties have the low level of incomes. Although, there was no significant difference between Serbian and Albanian entrepreneurs/owners of SMEs on this motivation, there were significant differences among following motivation: self-fulfillment, employment creation and access to additional financial resources. While Serbian entrepreneurs/owners of SMEs were more motivated by the desire to create new jobs and to gain more self-fulfillment. On the other hand, Albanian entrepreneurs/owners of SMEs motivated by possibility to access to additional financial resources.

Table 5. Motivational factors

<b>Motivational factors</b>	<b>Serbia</b>	<b>Albania</b>	<b>Sig.*</b>
Desire to be independent	3.91	4.09	0.690
Financial motives	4.16	4.31	0.834
Job satisfaction	3.80	3.42	0.052
Self-fulfillment	3.78	3.23	0.001*
Good business connections	3.10	2.66	0.069
Employment creation	3.79	2.20	0.000*
Access to additional financial resources	2.56	3.31	0.000*

Table 6 presents mean scores for influence of external factors on failure of SMEs. From Table 6, it can be concluded that respondents in the both countries indicated that the highest influence failure of SMEs have economic issues, while ecological issues have the lowest impact. Statistically significant differences were found between two factors: political and economic issues. Since Serbian respondents rated political issues higher than Albanian respondents did, the

political issues have higher impact on failure of Serbian SMEs. On the other hand, economic issues were rated higher by Albanian respondents, so it is easy to conclude that the impact of economic issues are significantly higher in Albania.

Table 6. External factors

<b>Factors</b>	<b>Serbia</b>	<b>Albania</b>	<b>Sig.*</b>
Political issues	3.34	2.42	0.000*
Economic issues	3.96	4.58	0.000*
Social issues	2.98	3.17	0.359
Technological issues	2.95	2.97	0.965
Ecological issues	2.28	2.13	0.337
Legislative issues	3.39	3.25	0.708

The results shown in Table 7 indicate that main internal problem in operation of SMEs in both countries is management of receivables/payables. There were significant differences among four internal factors: difficulties in obtaining new technologies, inability to find new potential shareholders/partners, the level of clearing/barter transaction, which were higher rated by Serbian respondents, as well as drop in motivation that was higher rated by Albanian respondents.

Table 7. Internal factors

<b>Factors</b>	<b>Serbia</b>	<b>Albania</b>	<b>Sig.*</b>
Management of receivables/payables	3.26	3.34	0.764
Delays in loan repayments	2.66	2.86	0.353
Drop in motivation	2.91	3.42	0.014*
Delegation of responsibilities,	3.16	3.03	0.644
Difficulties in obtaining new technologies	3.10	2.64	0.030*
Inability to find new potential shareholders/partners	2.78	2.25	0.006*
The level of unencumbered fixed assets	2.02	1.97	0.947
The level of clearing/barter transaction	2.27	1.77	0.002*

Results of Mann-Whitney U test shown in Table 8, pointed that there were statistically significant differences between two infrastructural factors. Namely, entrepreneurs/owners of SMEs from Albania view possibility of increasing capacity as the most important impact on SMEs success compared to entrepreneurs/owners of SMEs from Serbia who view existence of markets for products/services as the most importance infrastructural factor.

Table 8. Infrastructural factors

<b>Factors</b>	<b>Serbia</b>	<b>Albania</b>	<b>Sig.*</b>
Transportation system	3.23	2.84	0.136
The supply of electricity	3.46	3.81	0.054
Possibility of increasing capacity	2.99	3.52	0.009*
Existence of markets for products/services	3.50	3.00	0.007*
Availability of suppliers for the necessary production materials	2.70	2.78	0.835
Enough qualified work force	3.12	2.77	0.090

We asked the respondents to rate achieved level of financial recovery after failure of their previous SME on a five-point Likert scale with five being “completely” and one “not at all”. As shown in Table 9, entrepreneurs/owners of SMEs from Albania have achieved higher level of recovery after financial distress compared to their Serbian counterparts. Moreover, differences in achieved level of recovery between two samples have statistically significant.

Table 9. Achieved level of recovery

	<b>Serbia</b>	<b>Albania</b>	<b>Sig.*</b>
Level of recovery	2.44	3.53	0.000*

### 3. CONCLUSIONS

Despite a great numbers of reports on importance of SMEs for developing countries and poor performance of Serbian and Albanian SMEs, there are not great numbers of studies regarding problems of developing the SMEs sector in Serbia and Albania. In order to reduce research gap that exist in literature, authors have conducted research with an aim to identified potential factors influencing failure of SMEs in Serbia and Albania, as well as comparative analysis of those factors. Identified factors are grouped in six subgroups and for each subgroup is carried out Mann-Whitney U test in order to determine the difference between the influence of certain factors in Serbia and Albania. Results of Mann-Whitney U test for subgroup “Private time activities” shows that there is significant difference for following activities: time spend with family, vacation, socially responsible work and other activities not mention in questionnaire. Obtained results for subgroup “Personal characteristics” shows that there is no statistically significant difference just for one characteristic: risk taking. Albanian entrepreneurs/owners of SMEs appear to be more motivated to start up SMEs by possibility to access to additional financial resources than Serbian entrepreneurs/owners of SMEs. On the other hand, Serbian respondents are more motivated by self-fulfillment and employment creation. For two external factors, political issues and economic issues, we discovered that have different impact in Serbia and Albania. Namely, in Serbia political issues have higher impact than in Albania, while in Albania economic issues have higher impact. Statistically significant differences among internal non-individual factors appear for following factors: drop in motivation, difficulties in obtaining new technologies, inability to find new potential shareholders/partners and the level of clearing/barter transaction. As for infrastructural factors, statistically significant differences discovered between two factors: possibility of increasing capacity - higher rated by Albanian respondents and existence of markets for products/services - higher rated by Serbian respondents. In addition, Albanian respondents that suffered from failure have higher level of recovery after failure of their previous SME and according to results taken from Mann-Whitney U test this difference is statistically significant.

These conclusions are speculative because small numbers of respondents limits this study and representativeness of the sample is questionable. In further research, authors will try to interview more entrepreneurs/owners of SMEs from this region in order to get more representative sample.

## REFERENCES

1. Ministry of Economy, Ministry of Regional Development and Local Self-Government, National Agency for Regional Development, Report on small and medium-sized enterprises and entrepreneurship 2012, Belgrade, 2013.
2. Nikolić N., Dharmo Zh., Schulte P., Mihajlović I., Kume V., An analysis of factors affecting failure of SMEs, Proceedings of XI International Symposium of Strategic Management IMKSM15, 29–31 May 2015, Bor, Serbia, 2015, 174–192.
3. Mihajlović I., Nikolić N., Dharmo Zh., Schult P., Kume V., The Reasons for SME's Failure, Comparative Analysis and Research, Proceedings of FIKUSZ 2015, 13. November 2015, Budapest, Hungary, 2015, 7-22.
4. Nikolić N., Nikolić I., Impact of cross-cultural marketing on the failure of SMEs, Proceedings of IX International Student Scientific and Practical Conference, Marketing in industries: Multinational Business experience, 22 April 2016, Moscow, Russia. 2016, 123-127.
5. Arasti Z., An empirical study on the causes of business failure in Iranian context, African Journal of Business Management, 5(17), (2011), 7488-7498.
6. Chittithaworn C., Islam A., Keawchana T., Yusuf D. H. M., Factors affecting business success of small & medium enterprises (SMEs) in Thailand, Asian Social Science, 7(5), (2011), 180-190.
7. Franco M., Haase H., Failure factors in small and medium-sized enterprises: qualitative study from an attributional perspective, International Entrepreneurship and Management Journal, 6, (2010), 503–521.
8. Scherger V., Vigierb H. P., Barberà-Marinéc M. G., Finding business failure reasons through a fuzzy model of diagnosis, Fuzzy economic review 19 (1), (2014), 45-62.
9. Mann, H. B., Whitney D. R., On a test of whether one of two random variables is stochastically larger than the other, The Annals of Mathematical Statistics, 18 (1), (1947), 50–60.
10. Wilcoxon F. Individual comparisons by ranking methods. Biometrics Bulletin, 1, (1945), 80–83.
11. Nachar N., The Mann-Whitney U: A test for assessing whether two independent samples come from the same distribution, Tutorials in Quantitative Methods for Psychology, 4(1), (2008), 13-20.
12. Chu H. M., Benzing C., McGee C., Ghanaian and Kenyan entrepreneurs: A comparative analysis of their motivations, success characteristics and problems, Journal of Developmental Entrepreneurship, 12 (3), (2007), 295-322.

# **APPLICABILITY OF ALGORITHMS FOR PRODUCTION PLANNING OF VIRTUAL CELLULAR MANUFACTURING SYSTEMS IN INDUSTRIAL ENTERPRISES IN CONDITIONS OF MASS CUSTOMISATION**

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**Abstract:** The paper analyses the possibilities of applying, in conditions of mass customisation, existing production planning algorithms for virtual cellular manufacturing systems in industrial enterprises. On the basis of the analysis, which was carried out, we have defined alterations and additions to be made to the algorithm for scheduling the start and finish of batch machining in virtual cellular manufacturing systems and to the algorithm for scheduling batch machining in Analysis systems so that they can be applied in conditions of mass customisation. The alterations in production planning we are proposing will contribute to cover the manufacturing of the customised batches (lots) of component parts for the respective orders (batches of end items), and not only to the customised unit and general assembly in industrial enterprises.

**Keywords:** Mass customisation, industrial enterprise, virtual cellular manufacturing systems for mechanical machining, algorithms for production planning, schedules for the start and finish of batch machining, schedules for batch machining.

## **1. INTRODUCTION**

The choice of suitable production systems and the way their work is interconnected is essential for the successful implementation of mass customisation in industrial enterprises. On the basis of the analysis the authors performed (Dakov and Genchev (2015), it was proven that virtual cellular manufacturing systems (VCMS) are most appropriate to use in conditions of mass customisation, especially mechanical machining. What plays a significant role for their effective use in conditions of mass customisation are both the interlocking of their activities with those of the other production units in the industrial enterprise and the planning of the batch machining in each of them. Thus, an in-depth critical analysis of the possibilities to use the existing algorithms in the conditions of mass customisation, is needed.

## **2. PRESENTATION**

### **2.1. ANALYSIS OF THE ALGORITHMS FOR PRODUCTION MANAGEMENT OF VCMS BY FOREIGN AUTHORS**

Scientific literature describes several algorithms for production management of virtual cellular manufacturing systems for mechanical machining (VCMSMM) the opportunistic strategy of Drolet (1989) and Drolet, Moodie and Montreuil (1989), the algorithm for

reconfiguring the automated technological modules (work stations) of Abedzadeh (1997) and the genetic algorithm of Mak and Wang (2002). In these algorithms, production management comprises four phases – determining the priority of the batches to be machined, allocation of the resources, formation of a virtual cell and dispatching. These algorithms are aimed at the formation of a virtual cell from nearby automated technological modules (ATM) (work stations) and provision of the shortest way of movement of the component parts. The algorithm of Drolet, Moodie and Montreuil (1989) is not computerised and working with it takes longer. The model of Abedzadeh (1997), unlike the other two algorithms, looks into the possibility for moving the ATMs (work stations) during the phase of forming the virtual cell, which is impossible in mechanical machining. The genetic algorithm of Mak and Wang (2002) does not make use of priority rules for choosing the batches – they are arranged in a line format. Out of those three approaches, only the genetic algorithm of Mak and Wang (2002) has been computerised and produces the best results as far as the work load, in percentage, as far as the ATMs (work stations) and the highest productivity are concerned.

Those algorithms do not set specific times for the start and the end of the machining of production batches, but only time periods over which it takes place, which is a major drawback in conditions of mass customisation.

The production programme of VCMS and the way it is drawn up are not studied by Drolet, Moodie and Montreuil (1989) or Abedzadeh (1997). The authors do not consider the possibility of interconnecting the VCMSMM with the other production units in the enterprise, i.e. there is no suggestion for integrating the VCMS as an intermediate unit in the enterprise or for drawing up schedules for the machining of the batches in them, which makes the algorithms, inapplicable for the conditions of mass customisation (Genchev (2016)).

## 2.2. ANALYSIS OF THE ALGORITHMS FOR PRODUCTION PLANNING OF VCMS BY BULGARIAN AUTHORS

Bulgarian authors Dakov and Petkova (2005), Petkova and Dakov (2005), Dakov and Petkova (2008), Dakov, Lefterova and Petkova (2010) and Dakov and Naydenov (2011) have also studied the volumes related to the production planning of VCMSMM. Two algorithms presenting the logical sequence of the methodological approach for production planning of VCMSMM have been developed by Dakov and Petkova (2008) – an algorithm for designing schedules for the start and finish of the mechanical machining of the batches in the VCMSMM and an algorithm drawing up schedules for the batch machining in the VCMSMM. These algorithms need to be analysed in depth in order to find out whether it is possible to apply them in the conditions of mass customisation (Genchev (2016)).

### 2.2.1. Analysis of the algorithm for designing schedules for the start and end of the mechanical machining of the batches in the VCMSMM

The algorithm for designing schedules for the start and end of the mechanical machining of the batches in the VCMSMM of Dakov and Petkova (2008) is shown in Figure 1. In it the design of the schedules for the start and end of the mechanical machining of the batches in the VCMSMM makes use of this “piece-by-piece” method of “batch lead time” (Dakov 1990a), which has been adapted to the specificity of VCMS (Dakov and Petkova (2005)).



For conditions of mass customisation the use of this piece-by-piece method of coordinating the work of VCMSMM (intermediate unit) with the other production units in the industrial enterprise is quite suitable as it makes it possible to plan the production of the customized batches, needed for assembling the respective batches of end items (orders).

The schedules for machining of the batches in VCPS are designed using the method of “batch lead time “ moving – at the end of every plan period for a plan horizon of between three and six time periods in the plan horizon. Depending on the predominant duration of the machining of the batches in the VCMS and the duration of the working week the time period can be from one twenty-four-hour period (one working day) to five or six twenty-four-hour periods (working week).

In conditions of mass customisation it is recommended that the time periods in the plan horizon are of minimal duration so that the designed schedules are operational to the maximum and the deadlines negotiated with the clients can be kept.

The sequence of work in designing the schedules for the start and the end of batch machining in VCMS has been described in the following blocks:

Block 1. Introduction of the times of the start of the assembly.

The time for starting the assembly of the respective batch depends on the deadline fixed with the client for manufacturing the batches of end items (the order).

In conditions of mass customisation for each batch processed in the VCMS there will be a separate time for the start of its assembly.

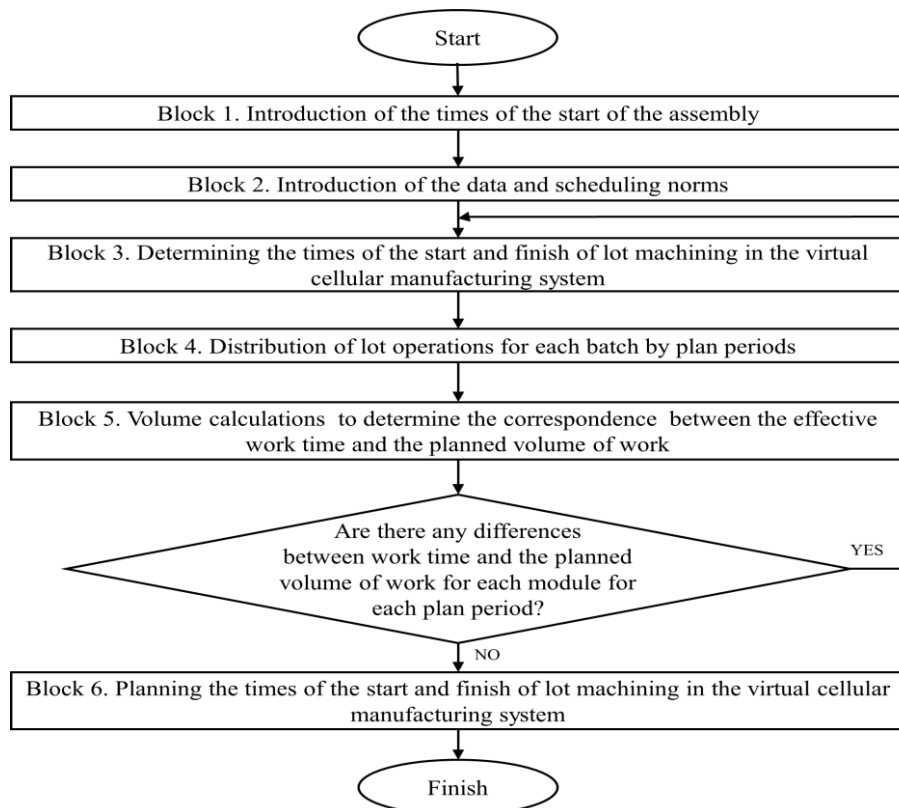


Figure 1. Algorithm for designing schedules for the start and end of the machining of the batches in the VCMSMM (Đakov and Petkova (2008))

## Block 2. Introduction of the data and scheduling norms.

The data about each processed batch in the VCMS, include:

- size of the batch processed in the VCMS;
- operating times of the operations in the partial process taking place in the VCMS;
- set-up times of the operations;
- cycle time of the partial process taking place in the VCMS;
- time-safety buffer for the end and the start of batch machining in VCMS when batch in the VCMS related to the time for the start of its assembly.

In conditions of mass customisation the processed batches of a certain type are of different sizes and times for the start of their assembly because they are to be used in different end item batch sizes (orders). That is why it is practically impossible to work with pre-calculated cycles of the partial processes taking place in the VCMS because of the varied quantitative and time characteristics of batches with one and the same type of component parts. Calculating the cycles in advance and using them as a scheduling norm is possible only with batches of periodically changing sizes and the resulting lead times of the start and the end of their machining in VCMS.

That is why in conditions of mass customisation the calculation of the cycles of the partial processes taking place in the VCMS, and of the lead times of the end and the start of batch machining should be carried out in differentiated blocks in consecutive blocks of algorithms.

## Block 3. Determining the times for the start and the end of batch machining in VCMS.

The times of the start and the end of the machining of each batch in the VCMS are determined by means of the the lead time of the end of machining of each batch as compared to the start of its assembly and the cycle of the partial process taking place in the VCMS.

In conditions of mass customisation it is advisable that this block is divided into three different blocks in order to determine the time of the end of the machining of each batch in the VCMS, the cycle of the partial process taking place in the VCMS and the time of the start of the machining in each batch in the VCMS. In the first block we need to determine the time of the end of the machining of each block in the VCMS (on the basis of the additional calculation of the lead time of the end of the machining of each block in the VCMS as compared to the time for the start of its assembly) by using the time for its machining in other production units after VCMS and the safety time-buffer before the start of its assembly. In the second block we need to calculate the cycle of the partial process taking place in each batch in the VCMS. In determining it we need to take into consideration the fact that in conditions of mass customisation the parallel-consequential sequencing of the technological operations of the partial process will be performed for the longest operations of several automated technological modules (ATM) of a certain type (Dakov and Genchev (2016)). That will help to shorten the cycle and to reduce the differences in the throughput of the ATMs, from the groups of interchangeable ATMs, in carrying out the sequential operations of the respective partial process without carrying out expensive synchronizing operations. In the third block we need to determine the start of machining of each block in the VCMS on the basis of the

calculated time for the end of machining of each block in the VCMS and the calculated cycle of the partial process taking place in VCMS.

**Block 4. Distribution of the batch operations for each batch by time periods.**

The allocation of the batch operations for each batch by time periods is performed according to the planned times for its machining in the VCMS. Through it we can determine the weighted relative shares of machining in each batch in VCMS according to the time periods. In this way we can determine the applicability and the feasibility of the designed schedules for batch machining in the VCMS and their timely preparation for assembly.

In conditions of mass customisation, the allocation of the batch operations for each batch by time periods, depending on the differentiated times for the start (continuation) and the end of their machining in the VCMS, should ensure that the planned times for the start of the assembly of each type of the component parts are kept.

**Block 5. Volume calculations to determine the correspondence between effective work time and the volume of work planned.**

Volume calculations are made for each type of ATM for each time period and show the planned volume of work of batch machining. The actual check of the correspondence between the effective work time and the planned volume of work for each type of ATM within each time period is done after this block, which necessitates precision of the name of this block.

Before Block 6 there is check of the correspondence between the effective work time and the volume of work in each type of ATM for each time period. The acceptable deviation is  $\pm 5\%$ . If the deviation exceeds the admissible value for each type of ATM the schedules for the start of the batch machining need to be rearranged and to have a new allocation of the batch operations and to make new volume calculations. In such a situation we need to go back to Block 3. If no corrections are needed we proceed to Block 6.

In conditions of mass customisation it is advisable that the admissible deviation is reduced in order to maximally ensure the supply to the assembly of each order with the respective bathes of component parts and to improve the extent to which production resources are used.

**Block 6. Planning the times of the start and the end of batch machining in VCMS.**

When there is a correspondence between effective work time and the volume of work in each type of ATM for each time period within admissible boundaries, the times of the start and the end of batch machining in VCMS, determined in Block 3, are accepted as the final ones.

In conditions of mass customisation no alterations are needed in carrying out the activities in this Block.

In conditions of mass customisation, as a drawback of this algorithm, we can consider the lack of a block to determine the time of the end of producing the batches of blanks, which is to be calculated on the basis of the planned time of the start of the machining of each batch in VCMS and the lead time at the end of producing the blanks. In this way, the work of the

respective preparatory unit will be linked up to the VCMSMM, i.e. to all production units along the technology chain - preparatory, processing and assembly units.

### 2.2.2. Analysis на algorithms for drawing up schedules for batch machining in VCMSMM

The algorithm for drawing up schedules for batch machining in VCMSMM of Dakov and Petkova (2008) is shown in Figure 2.

The design of a schedule for batch processing in VCMSMM makes it clear which modules are to be included in the respective virtual cells and in which moment in time each technological operation of the partial process of the processed batch should start, that is the formation and the work of the virtual cells in the system.

For each batch, data is provided about the extent to which it is ready to be processed and about the current state of the modules, which are needed to form the cell. In order to design a schedule we need not only the times of the start of the batch machining, but also the volume of each batch, the technological process, the operational and set-up times, as well as the time of washing the components from a transport unit, the control, transport and other operations.

The design of the schedule is based on the use of the following priority rule: some safety time–buffer for performing the batch machining (Dakov (1990b)) in relation to the moment of forming the virtual cell, which shows what is the safety time -buffer for a unit of time of the minimal cycle of the partial process that is taking place in the VCMS (Petkova and Dakov (2005)). This method of drawing up schedules for the work of VCMS is particularly suitable for conditions of mass customisation; it makes it possible to prevent lagging behind with batch machining and timely supplies to the assembly of the respective order.

The planning horizon in designing a schedule for the work of VCMSMM is equal to the duration of two consecutive time periods, and the restriction is that they are at least two working days (two twenty-four-hour periods long). When there are considerable deviations in the course of the work a new schedule needs to be prepared.

The sequence of the activities in drawing up the schedules for batch machining in VCMS is described using the following blocks:

Block 1. Entering the times set out in the schedules of the start of the batch mechanical machining by the time periods and the data about the current state of all modules.

To enter the time of the start of batch machining in the virtual cellular manufacturing system by the time periods we have used the schedules prepared by using the first algorithm. On their basis are prepared the schedules for the work of the virtual cellular manufacturing system with a planning horizon of at least two working days (two twenty-four-hour periods).

In conditions of mass customisation, due to the great variety of the machined batches it is advisable that the time period in designing the schedules is brought down to one shift (working day). It is also advisable to introduce times for the start of machining in VCMS only for batches with available component parts, tools and devices and to single this activity out in a separate block.

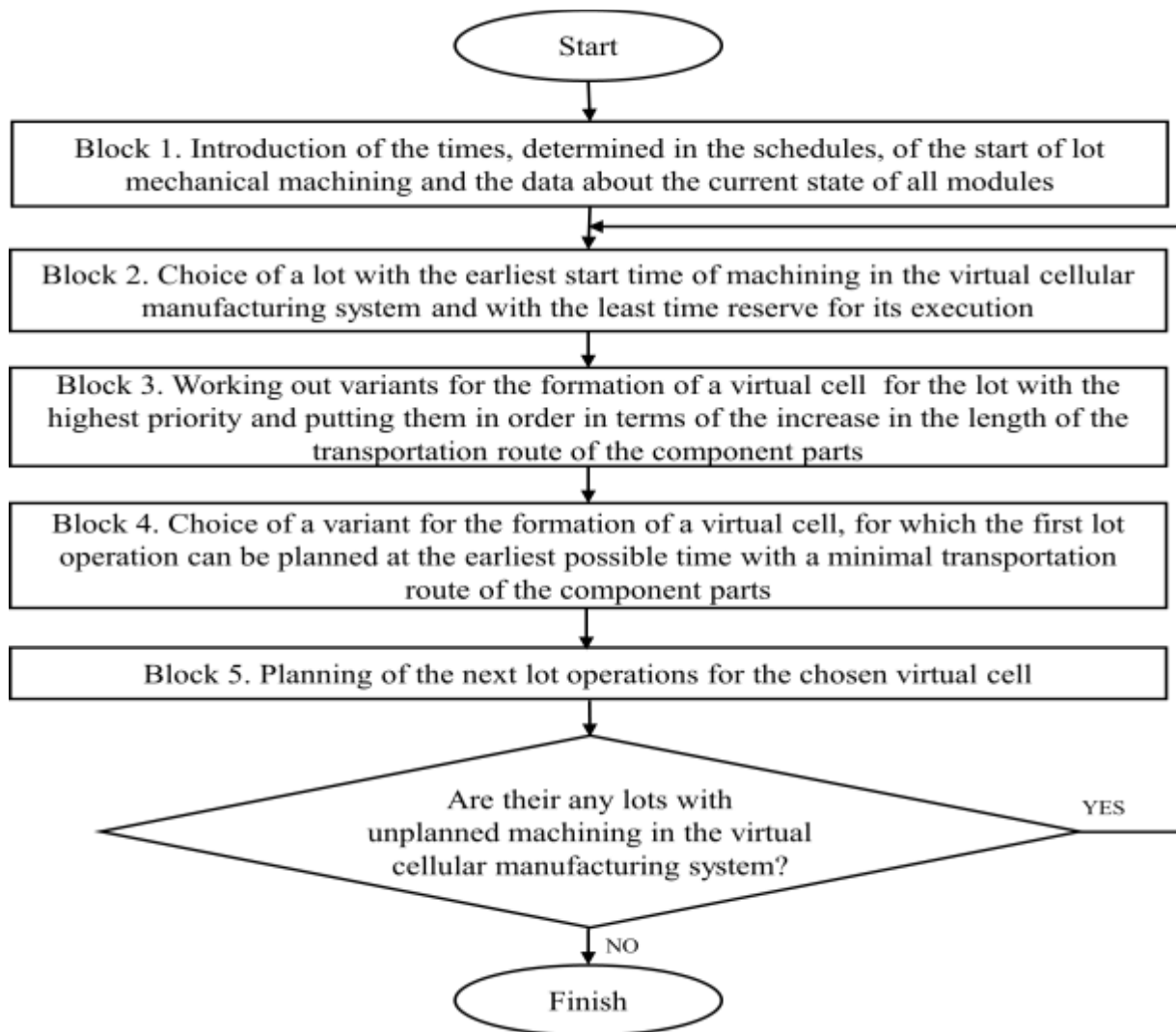


Figure 2. Algorithm for drawing up schedules for batch machining in VCMSMM (Dakov and Petkova (2008))

Current state of the modules in the VCMSMM can be:

- working – when an operation is conducted in the ATM;
- is being set up;
- is being repaired;
- stays idle, when there is no planned work and the ATM is considered to be a cell as a time-buffer.

The current state of the ATM is identified in every regular design (at the end of each shift or working day) or in emergency design (in the case of a failure or other exceptional circumstances) of a schedule; that is why it is advisable that this activity is separated in a different block. In addition, it is necessary to include in that block additional activities related to:

- identifying batches with a delayed time of the start (continuation) of their machining in VCMS related to the time of designing the schedule;

- the current extent of batch machining in VCMS (the execution of the subsequent batch operation and its expected end) and the planned execution of the following batch operations in the respective virtual cell;
- the planned execution of the next batch operations in the respective virtual cell.

Block 2. Choice of a batch with the earliest time of the start of machining in VCMS and with a relatively the smallest time -buffer for executing it.

The batch with the most risky (lagging behind) machining in VCMS is the one with the earliest (missed or planned) time of the start of its machining in VCMS and with the lowest relative time -buffer to conduct the machining. In order to perform the machining we need to form a virtual cell in VCMS. That is why the batches waiting to be machined (late, lagging and planned) need to be arranged in terms of how the time of the start of their machining (continued after an outsourced operation) increases in the VCMS. Then for each of them, we need to calculate the relative time-buffer for carrying out the batch machining in the VCMS. Finally, the batches are arranged in a priority list according to the growing relative time-buffer.

In our opinion, in conditions of mass customisation, the use of the priority rule “the shortest relative time-buffer for performing the batch machining in VCMS“ will contribute to giving priority to the most risky (lagging behind) batches and avoiding failures to meet the finish times of their machining.

Block 3. Working out variants for the formation of the virtual cell of the highest priority batch and their arrangement in terms of the increase in the length of the transportation route of the component parts.

All possible variants for the formation of the virtual cell of the highest priority batch (the first in the list) are developed and the length of the transportation route of the semi-finished items are calculated for each variant. All variants are arranged in terms of the increasing length of the route and thus the priority list for the choice of a variant for the formation of the virtual cell is made.

In conditions of mass customisation it is necessary to provide for the possibility to use several ATMs in the formation of the virtual cells for the longest technological operations (Dakov and Genchev (2016)) of the batches with a negative relative time-buffer so that the time for machining them is shortened.

Block 4. Choice of a variant for the formation of the virtual cell for which the first batch-operation can be planned at the earliest possible time and with a minimal route of transportation of the component parts.

The variant for the formation of a virtual cell, which is first in the priority list, is chosen. In order to plan the first batch operation with the first variant for the formation of the virtual cell it is necessary to find a free ATM to conduct the operation. If there is no such variant we need to check the possibilities for planning it in the following variants for the formation of the virtual cell. If for all the following variants of the formation of the virtual cell

there is no free ATM, we need to determine when an ATM will be free at the earliest so that we can plan the execution of the first batch operation.

In conditions of mass customisation it is necessary to add to the algorithms a “yes/no” check after Block 4, which (in case it is impossible to plan the first batch operation under the first variant of forming a virtual cell) will make it possible to plan its execution under one of the following variants on the priority list for virtual cell formation for the chosen batch.

Block 5. Planning of the following batch operations in the chosen virtual cell.

The name of this block needs to be corrected because there is subsequent planning of the execution of the following batch operations of the chosen batch from the priority list.

Then, in conditions of parallel-consecutive conjunction, the second (next) batch operation is planned in conditions of parallel-consecutive conjunction. Here, as with the previous Block, we first determine the possibility of planning the execution of the second (next) batch operation of the specific module according to the chosen variant for virtual cell formation. If the ATM is not free, we determine the possibility of planning the execution of the second (next) batch operation for the next variants of virtual cell formation on the priority list. If for all the following variants of virtual cell formation on the priority list there is no free module, it is necessary to determine when a module will be free at the earliest possible time so that the next batch operation is planned.

In conditions of mass customisation it is necessary not only to make the formulation of the block name precise but to add to a “yes/no” check algorithms in case it is not possible to plan the next batch operation for the chosen variant of virtual cell formation, the possibilities for its execution can be checked for some of the next variants of virtual cell formation on the priority list.

After the execution of all batch operations on the highest priority batch have been planned, the next priority batch is chosen and in this iterative manner the machining of all the batches waiting to be machined in the virtual-cellular production system is planned.

In conditions of mass customisation, it is necessary to add to the algorithm, after the first “yes/no” check, a second check after Block 5 through which (after planning the last batch operation on the chosen batch) we can proceed with the planning of the execution of the operations on the next priority batch from the list of batches waiting to be machined in the VCPS.

After that check, it is advisable to add a new Block for fixing the planned initial and final times of batch machining in the VCPS and for the execution of all batch operations in each module for the next plan period.

The analysed algorithms for production planning in VCPSMM and the above presented innovative ideas for their adaptation and further development in conditions of mass customisation have considerable potential for meeting the system requirements for its practical implementation.

### 3. CONCLUSION

The above presented alterations in production planning of the industrial enterprise, in conditions of mass customisation, will contribute to cover the production of the customized

batches of component parts for the respective batch of end items (orders), and not only the execution of the customized unit and general assembly.

## REFERENCES

1. Drolet, J. (1989). Scheduling Framework of Virtual Cellular Manufacturing, *Journal of Manufacturing System Design*, 4, (1), p. 351 – 365.
2. Drolet, J., Moodie C., Montreuil B. (1989). Scheduling Factories of the Future, *Journal of Mechanical Working Technology*, 20:183-194.
3. Dakov, I. (1990a). Researching and Elaboration of the Operative Management of the Production in the Flexible Manufacturing Systems, Ph. D. Dissertation (на Bulgarian), Technical University of Sofia, Bulgaria.
4. Dakov, I. (1990b). Heuristic Method for Schedules Preparation for Work of the Flexible Manufacturing System for Mechanical Machining (на Bulgarian), *Proceedings of VMEI – Sofia*, Vol. 45, B. 2, 1990, Sofia, Bulgaria.
5. Abedzadeh, M. (1997). Development of the Virtual Cell Concept in a Reconfigurable Manufacturing Environment, Ph. D. Dissertation, UK.
6. Mak, K., Wang X. (2002). Production Scheduling and cell formation for VCMS, *International Journal of Advanced Manufacturing Technology*, 20(2):144-152.
7. Petkova, A., Dakov, I. (2005). Scheduling of the Virtual Cellular Manufacturing System for Mechanical Processing. *Selected Papers of 2-nd International conference CADAM*, 28.09-01.10.2004, Shibenik, Croatia. Rijeka, Croatia, Zigo, pp. 107-111. ISBN 953-7142-09-4.
8. Dakov, I., Petkova, A. (2005). An Adapted Partial Method for Schedule Preparation for the Start and Finish of the Mechanical Machining of Batches in a Virtual Cellular Manufacturing System. *Proceedings of 5<sup>th</sup> International conference „Technology and Automation” (ICTA’05)*, Thessaloniki, Greece, 15-16.10.2005, pp. 242-245.
9. Dakov, I., Petkova, A. (2008). Methodical approach for scheduling of the production in the virtual cellular manufacturing system for Mechanical Machining – *Advanced Management*, 2 (2008) Rijeka, Croatia, Zigo, ISSN 1846-5900.
10. Dakov, I., Lefterova, T., Petkova, A. (2010). Layout and Production Planning of Virtual Cellular Manufacturing Systems for Mechanical Machining - *Economic Asymmetries*, Vol 7, № 1, 06.2010. Toronto, Ontario, Canada, pp. 43-67. ISSN 1703-4949.
11. Dakov, I. and Naydenov, P. (2011). Dynamic evaluation of the possibilities of practical application in virtual cellular manufacturing systems of mechanical machining (in Bulgarian). *Scientific proceedings of NTU of Mechanical Engineering of the IXth International Scientific Conference: "Management and Engineering'11"*, Sozopol, Bulgaria, 19 - 22.06.2011, volume XIX, issue 2 (122). Publishing House of NTU in Mechanical Engineering, Sofia, pp. 192 -201. ISSN 1313-7123, 2011.



12. Dakov, I. and M. Genchev (2015). Choosing an approach and form of organisation of production for implementing mass customisation in the production activities of industrial enterprises (in Bulgarian). - *Industrial Management*, , volume XII, issue 2, 35-44, Publishing House of TU - Sofia , ISSN 1312-3793.
13. Dakov, I. and M. Genchev (2016). Method of formation of virtual cells with several modules of a type (in Bulgarian). *Scientific Proceedings of NTU in Mechanical Engineering of the XIVth International Scientific Conference: "Management and Engineering '16"*, Sozopol, Bulgaria, 19 - 23.06.2016, volume XIV, issue 13 (199). Publishing House of NTU in Mechanical Engineering, Sofia, pp. 1065 - 1073. ISSN 1310-3946, ISSN 1314-6327.
14. Genchev, M. (2016). *Theoretical and Methodological Study of the Application of Virtual Cellular Manufacturing Systems in Conditions of Mass Customisation* (in Bulgarian). Ph. D. Dissertation, Technical University of Sofia, Bulgaria.

# ADAPTATION AND DEVELOPMENT OF THE ALGORITHMS FOR PRODUCTION PLANNING OF VIRTUAL CELLULAR MANUFACTURING SYSTEMS IN INDUSTRIAL ENTERPRISES IN CONDITIONS OF MASS CUSTOMISATION

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**Abstract:** The paper aims to provide evidence in support of the need for making alterations in the activities performed within the algorithm blocks, for decomposing some of the blocks and for including additional blocks and checks. It does so on the basis of defined alterations and additions to the algorithm for scheduling the start and finish of batch machining in virtual cellular manufacturing systems and to the algorithm for scheduling batch machining in these systems, which are the result of the specific requirements of mass customisation. Using those adapted and further developed algorithms so that they suit the conditions of mass customisation will contribute to the design of schedules and plans that allow to bind together the work of all production units of the industrial enterprise - the preparatory, processing and assembly ones, and simultaneously produce the customized batches (lots) of component parts for the respective orders (batches of end items).

**Keywords:** Mass customisation, industrial enterprise, virtual cellular manufacturing systems for mechanical machining, algorithms for production planning, schedules for the start and finish of batch machining, schedules for batch machining.

## 1. INTRODUCTION

On the basis of the analysis of Dakov and Genchev (2017) on the applicability of production planning of virtual cellular production systems for mechanical machining (VCMSMM) in conditions of mass customisation we have defined the necessary alterations and additions, which need to be made to the existing algorithm (Dakov and Petkova (2008)) for designing schedules for the start and end of the machining of the batches in VCMSMM (the first algorithm (Figure 1)) and to the existing algorithm of (Dakov and Petkova (2008)) for designing schedules for batch machining in VCMSMM (the second algorithm (Figure 2)). On the basis of the conclusions drawn from that analysis it is necessary to develop suggestions for adapting and further developing the algorithms of production planning in VCMSMM so that they can be applied in conditions of mass customisation (Genchev (2016)).

## 2. PRESENTATION

### 2.1. ADAPTATION AND DEVELOPMENT OF THE ALGORITHM FOR DESIGNING OF SCHEDULES FOR THE START AND END OF BATCH MACHINING IN VCMSMM IN CONDITIONS OF MASS CUSTOMISATION.

In the first algorithm in conditions of mass customisation we are suggesting the following alterations:

1. Block 1 “Introduction of the times for the start of the assembly“ and Block 2 “Introduction of the data and the scheduling norms“ from the existing first algorithm (Figure 1) are combined in Block “Introduction of the data about machined batches in the virtual-cellular production system” (Block 1 in the altered first algorithm (Figure 3).

The data about each machined batch in VCMS in conditions of mass customisation are:

- volume (size) of the machined batch;
- operational times of the operations of the partial process carried out;
- set up times of the operations;
- start time of the assembly of batches;
- time of batch machining in other production units after VCMSMM;
- safety time buffer before assembly of the batches.

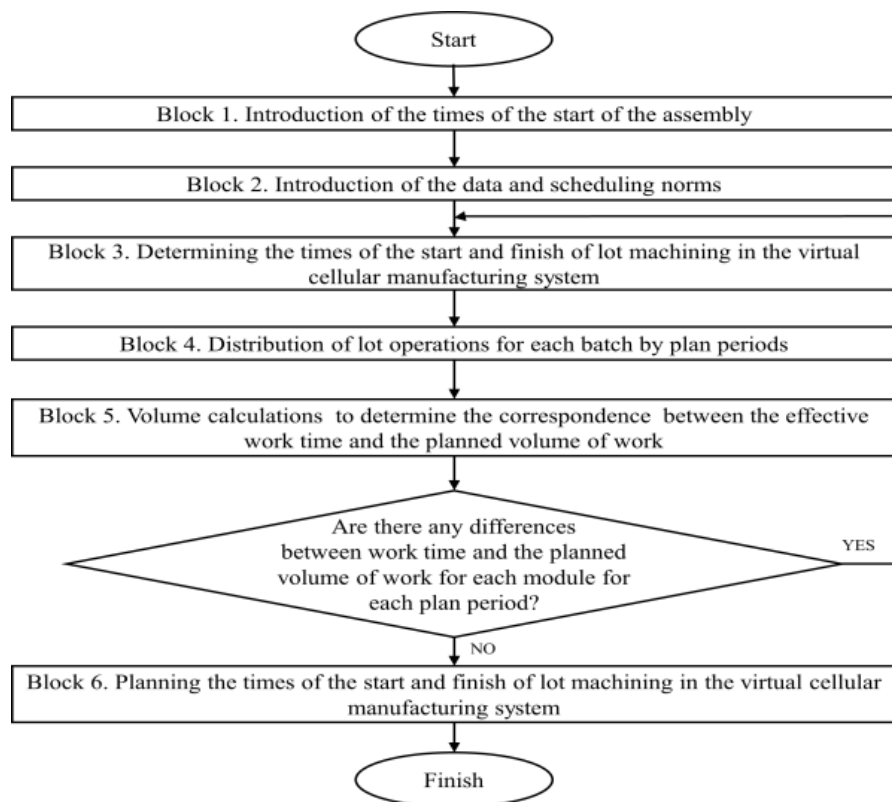


Figure 1. Algorithm for designing schedules for the start and end of the machining of the batches in the VCMSMM (Dakov and Petkova (2008))

In the VCMS, in the case of mass customisation, the size of each processed batch is determined by the necessary component parts for the assembly of the respective order (batches of end items). Due to the wide variety of orders and individual customer requirements, the component parts of each individual order must be considered as a stand-alone batch.

The operating and set-up times of the operations of the partial process, carried out in VCMS, are technological data.

The time of the start of the assembly of the batches is the result of the negotiated time for the end of the assembly of the respective order and the lead time of the start of the assembly of the batches, i.e. a differentiated time for the start of its assembly is determined.

The time of batch machining in other production units after VCMS shows the time of thermal, galvanised or other type of additional machining.

If there are simultaneous incoming VCMS batches with equal times for starting the assembly (which is quite unlikely), it is permissible to consolidate them.

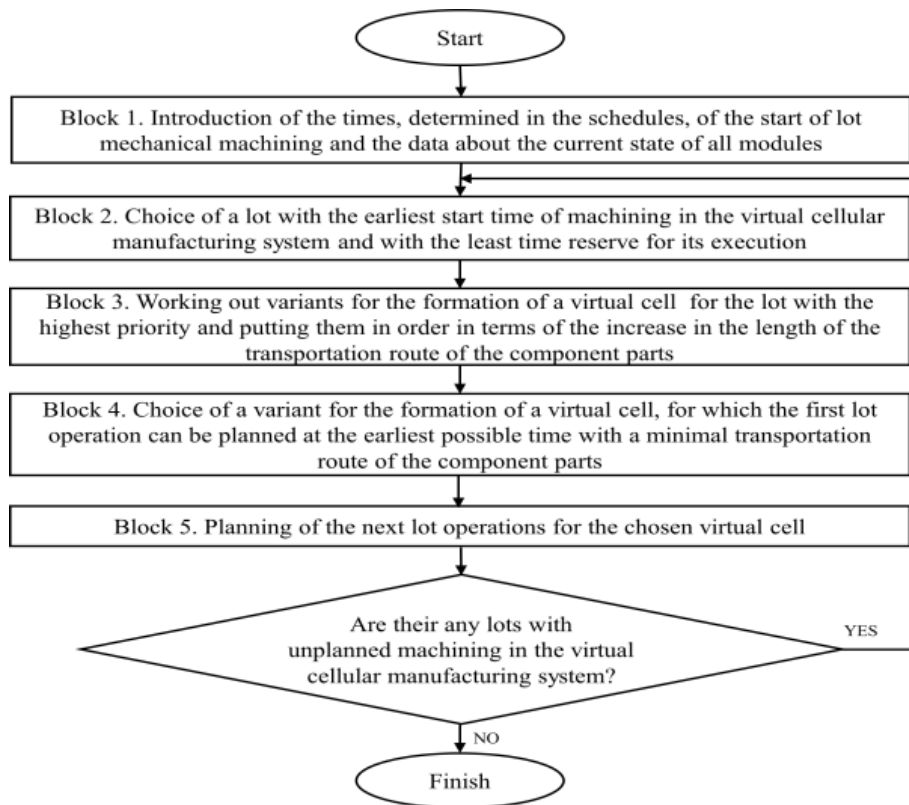


Figure 2. Algorithm for designing schedules of batch machining in VCMSMM (Dakov and Petkova (2008))

2. Block 3 "Determining the times of the start and finish of batch machining in the virtual-cellular manufacturing system", on the basis of the existing first algorithm (Figure 1), is divided into three separate Blocks.

The start and finish machining times of each of the batches in VCMS are determined using the sub-batch method of "batch lead time" (Dakov and Petkova (2005)), adapted to the specificities of VCMS. For the conditions of mass customisation, the schedules are designed

by calculating, for each batch, the corresponding lead times and the partial process cycle performed in VCMS. Lead times and the partial process cycle can not be unified (pre-calculated as scheduling-planning norms) because of the different sizes and times for the start of batch assembly for one and the same type of batches. That is why three separate Blocks are formed.

The first new Block is "Determining the times of finish of batch machining in the virtual-cellular manufacturing system" (Block 2 in the revised first algorithm (Figure 3)). The time for machining of each batch in VCMS is determined on the basis of the additionally included lead time calculation of finishing the processing in VCMS relative to the start time of the assembly by means of its processing time in other production units after the VCMS and the safety time-buffer before the start of its assembly, if any has been planned.

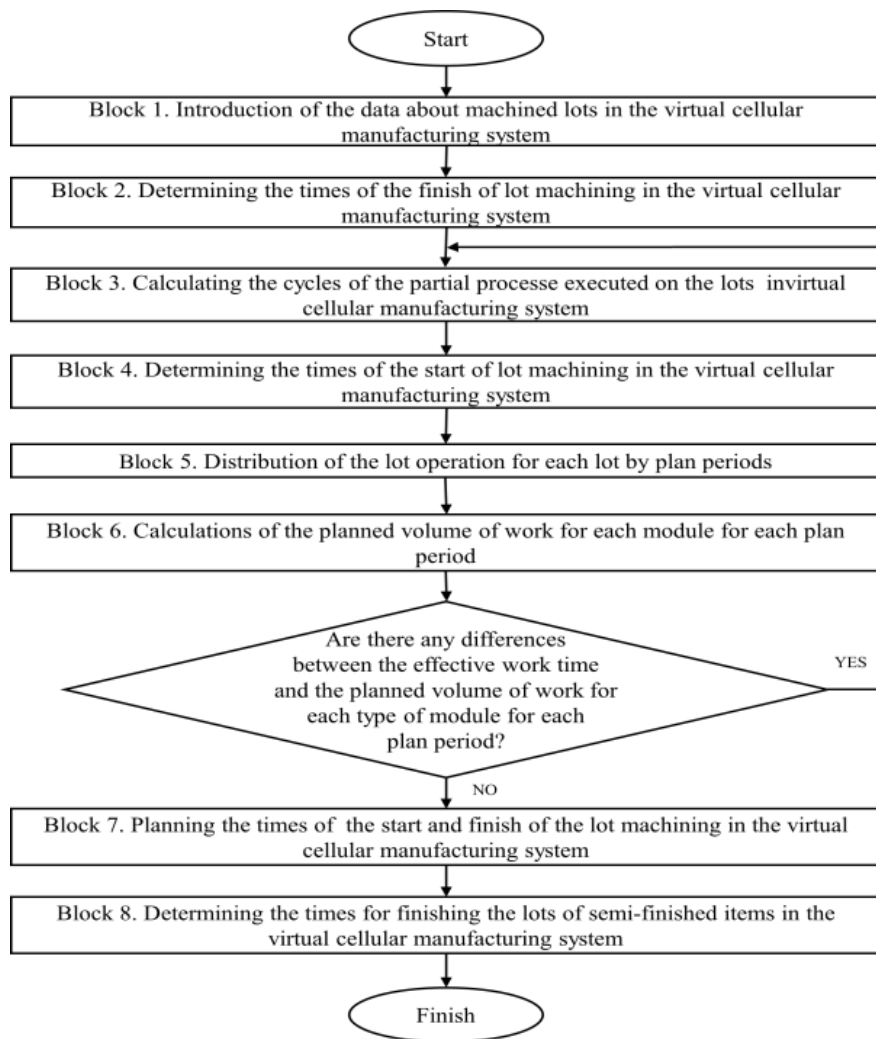


Figure 3. Adapted and further developed algorithm for the conditions of mass customisation for designing schedules for the start and finish of batch machining in VCMSMM

The second new block is "Calculating the cycles of the partial process executed on the batches in the virtual-cellular manufacturing system" (Block 3 in the revised first algorithm (Figure 3)). When determining the cycle for each machined batch, it should be borne in mind that for the longest operations in the conditions of mass customization, the parallel-consequential combination of the partial process operations will be performed in several

respective modules (Dakov and Genchev (2016)). This will achieve shortening of the cycle and reduction of temporary-revolving stock by eliminating the significant differences in the throughput of the used automated technology modules (ATMs) from the interchangeable ATMs groups when performing the corresponding operations.

The third new block is "Determining the times of the start of batch machining in the virtualcellular manufacturing system" (Block 4 in the revised first algorithm (Figure 3)).

The time to complete the machining of each batch in VCMS is determined by calculations in the previous Block about the partial process performed in VCMS.

3. Block 4 "Distribution of batch operations for each batch by plan periods" of the existing first algorithm (Figure 1) does not change regarding the activity performed (Block 5 in the revised first algorithm (Figure 3)).

The distribution of batch operations for each batch, according to the time periods in the plan horizon, is carried out in terms of the times planned in the previous Blocks for its machining in VCMS. Through it we can determine the relative shares of each batch machining in VCMS by the time periods in order to meet the planned time for completing it.

4. Block 5 " Volume calculations to determine the correspondence between effective work time and planned volume of work" in the existing first algorithm (Figure 1) is renamed "Performing volume calculations of the planned work volume for each type of ATM for each time period "(Block 6 in the revised first algorithm (Figure 3)).

Volumetric calculations are performed for each type of ATM and for each time period and show the planned volume of work for batch processing, and in order to identify the correspondence with the effective work time another check is performed after this block.

5. Checking for differences between the effective work time and the planned volume of work for each type of ATM for each planning period does not change with respect to the activity performed (after block 6 in the revised first algorithm (Figure 3)), but the admissible deviations in the ratio are eliminated .

In order to ensure to the full the assembly of each order with the corresponding batches of component parts, it is advisable, in conditions of mass customisation, to reduce the admissible deviation from  $\pm 5\%$  to  $\pm 3\%$ . In cases where the deviation of this ratio exceeds the admissible value, for the type of modules, the schedules for the start of batch processing in the VCMS are adjusted and a new distribution of the batch operations and new volumetric calculations are made.

6. Block 6 "Planning the times of the start and finish of batch machining in the virtual cellular manufacturing system" from the existing first algorithm (Figure 1) is unchanged with respect to the performed activity (block 7 in the revised first algorithm (Figure 3)).

If there is a correspondence between the safety time-buffer and the volume of work of each type of ATM for each time period within the admissible limits ( $\pm 3\%$ ), the start and finish time for completing batch processing in the VCMS are considered to be the final ones.

7. Addition of a new block "Determining the times finishing the batches of semi-finished items for the virtual cellular manufacturing system" (block 8 in the revised first algorithm (figure 3)).

The determination of the finish time for completing the batches of blanks is based on the planned times for the start of the processing in the VCMS and the lead time for the

completion of the production of the blanks. Thus the work of the respective preparatory unit is also linked with the VCMSMM.

Figure 3 presents the adapted and further developed for conditions of mass customisation algorithm for compiling schedules for starting and completing the batch processing in the VCMSMM.

## 2.2. ADAPTATION AND DEVELOPMENT OF ALGORITHM FOR DESIGNING SCHEDULES FOR BATCH PROCESSING IN VCMSMM IN CONDITIONS OF MASS CUSTOMISATION

In the second algorithm in the context of mass customisation, the following changes are proposed:

1. Block 1 "Introduction the start times for mechanical machining of batches, according to the schedules and the data about the current state of all modules" of the existing second algorithm (Figure 2) in conditions of a mass customisation is divided into two Blocks, with no changes being made in the execution of this activity.

The first new Block " Introduction of the determining in schedules times of the start of batch machining by time periods" (Block 1 in the Revised Second Algorithm (Figure 4)) contains data about available work in progress, tools, devices and management programs for the batches planned for processing and further establishes the presence of delayed batching for machining for the same reasons. Data on the current state of the batch processing VCMSMM and the expected assembly in VCMSMM is also included.

The second new Block is "Determining the current state of the modules" (Block 2 in the revised second algorithm (Figure 4)) and includes the second part of Block 1 from the existing second algorithm (Figure 2)). The current state of the modules is determined before designing the consecutive schedule at the end of each shift (working day) or in an emergency (in cases of failure or other unexpected circumstances).

2. Block 2 "Choosing of a batch with the earliest time to begin machining in a virtual-cellular manufacturing system and with the least relative time reserve for executing" from the existing second algorithm (Figure 2) in conditions of mass customisation does not change with respect to the activity being performed (Block 3) in the revised second algorithm (Figure 4).

In VCMS, in conditions of mass customisation, a batch with the most risky (lagging behind) machining is the one with the earliest start time of machining and with the lowest safety time-buffer to execute it - the first one on the priority list. In the list, the batches with a negative safety time-buffer are arranged according to the way it decreases, then come the batches with zero safety time-buffer and finally the batches with positive safety time-buffer in the order of its increase. For the first batch in the priority list, a virtual cell in VCMS must be formed first.

In the context of mass customisation, using the priority rule, "the smallest relative safety time-buffer for batch processing in the HC VF" (Petkova and Dakov (2005)) will help to prioritize the risky (lagging) batches and to prevent failure to meet the times for completing their processing.

3. Block 3 "Working out variants for forming of a virtual cell for the top-priority batch and arranging the batches according to the increase in the length of the transportation route of the component parts" from the existing second algorithm (Figure 2), in the context of mass customisation, is changed in terms of expanding the scope of the activity being carried out, since it is advisable to use several ATMs of a type to perform the longest technological operations (Dakov and Genchev (2016)). That is why the block name is changed to "Drawing up variants for forming a virtual cell for the selected batch using multiple module types to perform the most prolonged technological operations, and stacking them by the increase in the length of the transportation route in the virtual cell "(block 4 in the revised second algorithm (Figure 4)).

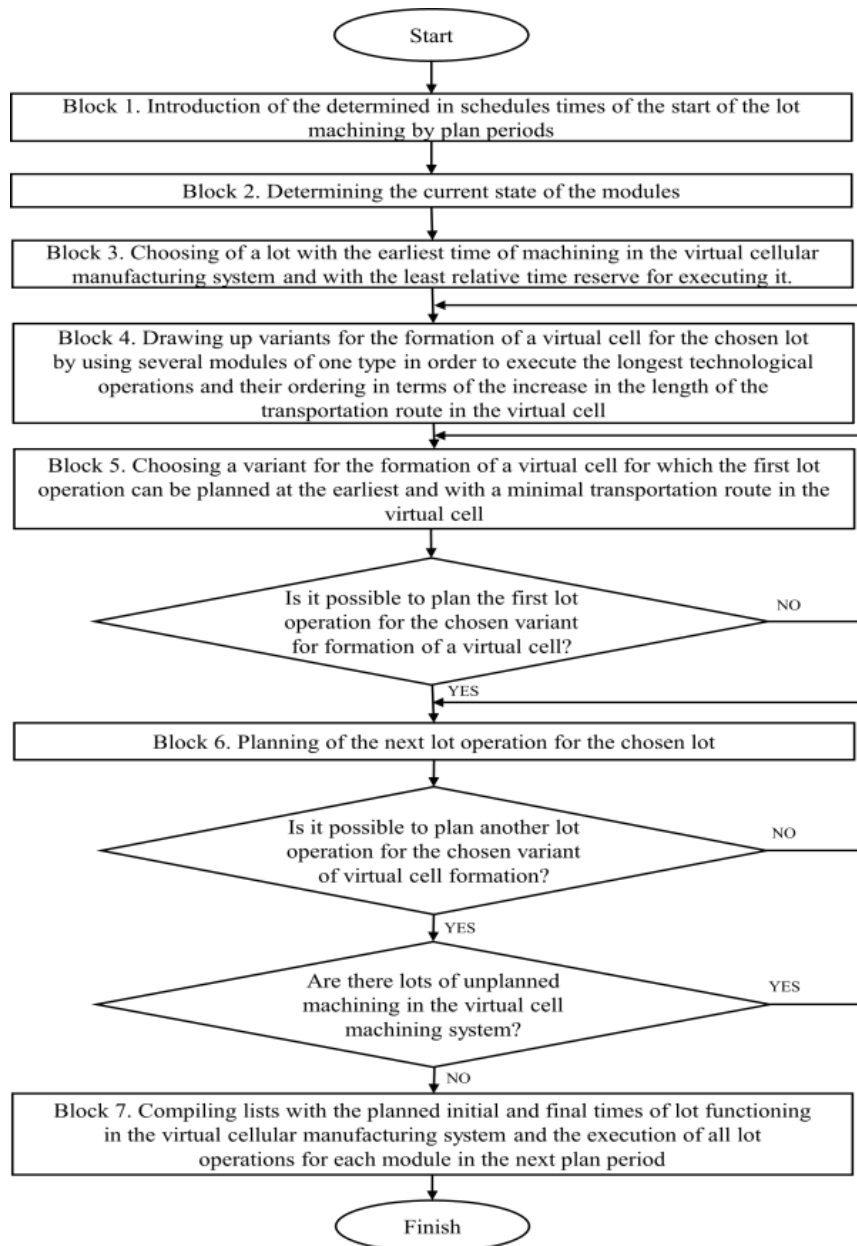


Figure 4. Adapted and further developed for the conditions of mass customisation algorithm for designing schedules for batch processing in VCMSMM



In virtual cellular manufacturing systems, in conditions of mass customisation, for the risk batches (lagging and delayed - with a negative relative safety time-buffer), all possible variants for forming a virtual cell are developed using several modules of a type to perform the longest technological operations in order to shorten the time for their production. The variants are arranged in terms of the increasing length of the route that the component parts must pass through the virtual cell, and thus the priority list for selecting a virtual cell variant for the selected batch is drawn.

4. Block 4 "Choosing a variant for forming a virtual cell for which the first batch operation can be planned at the earliest and with the minimum transportation route of the component parts" from the existing second algorithm (figure 2) under conditions of mass customisation does not change with respect to the performed activity (Block 5 in the revised second algorithm (Figure 4)), but according to the findings of the analysis, we also need to determine the expected early freeing of the ATM in order to plan the execution of the first batch operation, if for all variants of forming a virtual cell from the priority list there is no free module.

In the context of mass customisation, the variant that is chosen, is first in the priority list (with the earliest time to begin processing and the shortest route to transport the semi-finished items). For the selected batch, the planning of the first batch operation (availability of one free or more than one free ATMs, if several modules have been planned for its execution) is checked. If there is no free ATM for the first batch operation to carry out the first variant of virtual cell formation, a second (next) variation of the virtual cell priority list is checked for the selected batch. If for all variants on the priority list for forming a virtual cell for the chosen batch there is no free ATM (free ATMs), it is necessary to determine the expected earliest release of the ATM in order to plan its execution.

5. Include additional check "Is it possible to schedule a first batch operation for the selected variant of virtual cell formation?" (After block 5 in the revised second algorithm (Figure 4)).

In conditions of mass customization through this check we can establish, in consecutive order, the possibilities of planning of a first batch operation over the selected batch for the next variants of virtual cell formation out of the priority list for the selected batch.

6. Block 5 "Planning of the next batch operations for the chosen virtual cell" from the existing second algorithm (Figure 2) in the context of mass customisation does not change with respect to the performed activity but according to the conclusions drawn in the analysis it is necessary to make its name more precise to "Planning of next batch operation for the chosen batch"(block 6 in the revised second algorithm (Figure 2) as the variant of forming a virtual cell for its processing is possible to change in planning each following batch operation and it is relate to the processing of the selected batch.

In the context of mass customisation, we first establish whether it is possible to schedule the next batch operation of the specified ATM according to the variant chosen for the formation of the virtual cell. If the ATM is not free, we need to identify the possibility for planning the execution of the next batch operation for the next priority variants of virtual cell formation. If there is no free ATM for all the other variants on the priority list, it is necessary to determine the expected earliest release of a planning module for the next batch operation.

7. Include additional check "Is it possible to schedule a next batch operation for the selected virtual cell variant?" (After block 6 in the revised second algorithm (Figure 4)).

In the context of mass customisation, through this check, we can identify in a sequence the possibilities for planning a subsequent batch operation over the selected batch for the subsequent variants of forming a virtual cell from the priority list of the selected batch.

8. Correcting the name of the last check "Are there batches of unplanned processing in the virtual cellular system?" from the existing second algorithm (Figure 2), by using "batch" instead of "batches".

In the context of mass customisation, this check identifies the possibilities for planning the batch operations of each subsequent batch of the priority list to be processed in the VCMS.

9. Include an additional block "Compiling lists with the planned start and finish times of batch processing in the virtual cellular manufacturing system and of performing all batch operations of each module over the next time period" (block 7 in the revised second algorithm (Figure 4)).

In the context of mass customisation through the information from these lists it is established to what extent the schedule that has been developed ensures meeting the times set out for the the start and finish of batch processing in the VCMSMM.

Figure 4 illustrates the algorithm for scheduling batch processing in VCMSMM which has been adapted and developed further to suit the conditions of mass customisation.

From the changes we have made, it can be concluded that the adapted and further developed algorithm scheduling batch processing in the VCMSMM fully meets the requirements of mass customisation.

### 3. CONCLUSION

In conclusion, it can be said that the adapted and further developed algorithms for drawing up schedules for the start and finish of batch processing in the VCMSMM and for batch processing schedules in the VCMSMM fully meet the requirements of mass customisation and will contribute to its successful implementation in practice.

### REFERENCES

1. Dakov, I., Petkova, A. (2005). An Adapted Partial Method for Schedule Preparation for the Start and Finish of the Mechanical Machining of Batches in a Virtual Cellular Manufacturing System. Proceedings of 5<sup>th</sup> International conference „Technology and Automation” (ICTA’05), Thessaloniki, Greece, 15-16.10.2005, pp. 242-245.
2. Petkova, A., Dakov, I. (2005). Scheduling of the Virtual Cellular Manufacturing System for Mechanical Processing. Selected Papers of 2-nd International conference CADAM, 28.09-01.10.2004, Shibenik, Croatia. Rijeka, Croatia, Zigo, pp. 107-111. ISBN 953-7142-09-4.
3. Dakov, I. and M. Genchev (2016). Method of formation of virtual cells with several modules of a type (in Bulgarian). Scientific Proceedings of NTU in Mechanical

Engineering of the XIVth International Scientific Conference: "Management and Engineering '16", Sozopol, Bulgaria, 19 - 23.06.2016, volume XIV, issue 13 (199). Publishing House of NTU in Mechanical Engineering, Sofia, pp. 1065 - 1073. ISSN 1310-3946, ISSN 1314-6327.

4. Genchev, M. (2016). Theoretical and Methodological Study of the Application of Virtual Cellular Manufacturing Systems in Conditions of Mass Customisation (in Bulgarian). Ph. D. Dissertation, Technical University of Sofia, Bulgaria.
5. Dakov, I., Genchev, M. (2017). Applicability of Algorithms for Production Planning of Virtual Cellular Manufacturing Systems in Industrial Enterprises in Conditions of Mass Customisation. Proceedings of International May Conference on Strategic Management 2017 (IMCSM'17), 19-21.05.2017, Bor, Serbia (in printing).

## PILOT PROJECT OF ECOLOGICAL HOUSE

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**Abstract:** Implementation of environmentally friendly materials in construction in the EU and beyond, and the selection of good practices in order to optimize the recovery of old buildings as a result, reduce the amount of carbon dioxide and energy-efficient buildings, as well as the positive impact on the environment in accordance with the standards of the national and European level (pack ISO 14001 - systems environmental management).

Application of selected materials in order to raise the quality of stay and motivation for the realization of the set goals, both in terms themselves of natural materials and their combinations and energy parameters, in terms of sustainable development.

Measuring compliance with requirements of energy efficiency of the building is done by making the study of electricity. Creating a climate and initiatives for sustainable construction with respect to environmental, economic and energy parameters.

[http://www.ingkomora.org.rs/strucniispiti/download/ee/PRAVILNIK\\_O\\_EEZ\\_za%20obuku.pdf](http://www.ingkomora.org.rs/strucniispiti/download/ee/PRAVILNIK_O_EEZ_za%20obuku.pdf)  
Measuring indicators of progress that has been achieved through the selection of the optimal position, measuring the number of sunny days per year, the number of days per year with wind, the possibility of using renewable energy sources, measurements of environmental parameters, the concentration of the components in soil, water and air, and defining the zero state, to monitor the impact of the facility on the environment, as well as promoting a particular project when it comes to sustainability in terms of energy, economy and ecology.

Define the criteria of economic and technical capabilities, the plan of reconstruction and financing in accordance with the flow of funding from the European Commission. Attention was given to the selection of partners in the country and abroad, all in accordance with the needs and sustainability of the project and its implementation.

Special attention was paid to the choice of organic materials and their use, both in terms of energy, economic and environmental parameters. Used experiences in neighboring countries and beyond, as well as our traditional. The resulting design is optimal which gives a nice facility designed to remain with a positive impact on health, as well as the editing environment in which one lives.

**Keywords:** organic materials, zero state, environmental parameters, sustainable construction

### 1.UVOD

Da bi se dao doprinos poboljšanju kvaliteta životne sredine kreiraće se model gradnje, rekonstrukcije starog objekta uz poštovanje potrebnih standarda i ekoloških parametara sa ciljem šireg uključivanja mladih ljudi, kompetentnih za različite poslove, kao i poštovanje podizanja nivoa kvaliteta života u ambijentima prirodnih resursa.

Da bi se ostvario ovaj cilj neophodno je ovladati metodologijom izrade projekta, pilot rešenja koje će poslužiti kao baza za bržu i efikasniju ekološku gradnju u skladu sa tehnikama i

tehnologijama 21. veka, uz poštovanje prirodnih zakona i potpuno očuvanje ambijenta životne sredine.

Odabran je model za pilot projekat jedne planinske kuće.

<https://www.youtube.com/watch?v=Iv1-OmVzR1g>

<https://www.pinterest.com/salliebecker/stone-mountain-house/>

Ekološka gradnja omogućava stvaranje, ne samo boljeg spoljašnjeg okruženja, nego i pomaže gradnju u zdravijem unutrašnjem prostoru. Konvencionalni materijali i metode za građenje povezani su sa nizom zdravstvenih problema. Hemijski zagađivači iz boja, rastvarača, plastike i kompozitnih greda, zajedno sa biološkim zagađivačima, kao što su plesni i grinje, izazivaju simptome astme, glavobolje, depresije, ekcema, problem lupanja srca i hroničnog umora. Zelena gradnja eliminiše ove probleme kroz dobar sistem ventilacije, zidove koji dišu, netoksične proizvode i materijale.

Postoji mnogo razloga zašto treba koristiti metode i materijale ekološke gradnje. To može unaprediti zdravlje naše planete, kao i zdravlje ljudi. Podržava lokalno poslovanje i pomaže jačanju ekonomije na lokalnom nivou, a zauzvrat dobija pomoć u izgradnji naše zajednice u prosperitetna i poželjna mesta za život.

Tabela 1. Tradicionalni I ekološki sistem gradnje [1]

	<b>Ekološki konstruktivni sistem</b>	<b>Konvencionalni konstruktivni sistem</b>
Arhitektura	prizemlje(5.5 x 4.0 m) prvi sprat (3.0 x 4.0 m) čista spratna visina je 2 m	prizemlje(5.5 x 4.0 m) prvi sprat (3.0 x 4.0 m) čista spratna visina je 2 m
Funduranje	PC trakasta osnova	RC izolovana osnova
Stubovi	Opeka	Beton
Ploče/grede	Montažni sistem, kamena vuna	Beton
Stepenice	Montažni sistem	Beton
Zidovi	Pirinač slama trska	Opeka
Završna obrada zidova	Žičana mreža-cement za malterisanje	Cement za malterisanje

[http://www.arpnjournals.com/jeas/research\\_papers/rp\\_2015/jeas\\_0215\\_1524.pdf](http://www.arpnjournals.com/jeas/research_papers/rp_2015/jeas_0215_1524.pdf)

Primena odabranih materijala u cilju podizanja nivoa kvaliteta boravka i motivacije za realizaciju postavljenih ciljeva, kako sa aspekta samih prirodnih materijala i njihove kombinacije tako i energetske parametara, u smislu održivog razvoja.

Merenje ispunjenosti uslova energetske efikasnosti zgrade vrši se izradom elaborata EE. Stvaranje klime i inicijative za održivu gradnju uz poštovanje ekoloških, ekonomskih i energetske.

Građenje sa malim utroškom energije i optimalnim korišćenjem prirodnih materijala su budućnost 21. veka., a u strukturi materijala treba voditi računa, zato što od strukture zavise osobine a samim tim i mogućnost ispunjenja standarda i zahteva energetske efikasnosti, ekonomskih i ekoloških parametara.

Dopremanje i ugradnja odabranih materijala treba da ima modele, usklađene sa potrebama i mogućnostima, misli se na postizanje optimalne fleksibilnosti u cilju primene odabranih modela.

## 2.OPIS PROJEKTA

Pre svega, neophodno je snimiti postojeće informacije na terenu i potrebnim institucijama vezano za odabrano mesto, lokaciju građenja i ažuriranje, ne samo dostupnih informacija, nego i svih relevantnih, potrebnih za kontinualan proces ostvarenja definisanih aktivnosti, a sve u skladu sa zahtevima i ciljevima projekta.

Cilj prikupljanja potrebnih dokumenata je dobijanje građevinske dozvole.

Najpre je potrebno reći da se građevinska dozvola može dobiti samo na parceli koja ispunjava uslove da bude građevinska parcela (a ne na parceli koja se vodi kao poljoprivreno zemljište) i na kojoj je uknjiženo vlasništvo investitora (vlasništvo "1/1").

Dobijanju građevinske dozvole prethodi niz dokumenta: kopija plana za katastarsku parcelu i list nepokretnosti, lokacijska dozvola. Nakon dobijanja Lokacijske dozvole, može se pristupiti izradi Glavnog projekta. Prethodno je potrebno izraditi situacioni plan i protokl regulacije.

Ta dva priloga i svu do tada prikupljenu dokumentaciju (originale), treba dostaviti arhitekti i, u dogovoru sa njim, početi izradu najpre **Idejnog projekta**, na kojem se radi sve dok projekat ne postane prihvatljiv za Investitora, a nakon toga arhitekta pristupa izradi **Glavnog projekta**.

Kada arhitekta završi izradu Glavnog projekta, predaje ga investitoru da ga potpiše u 3 primerka, s tim da su u prvom primerku upakovani svi originali koje je investitor predao arhitekti.

Investitor sva 3 primerka predaje Opštini. Kada je projekat pregledan od strane Opštine, investitor će biti obavešten da može da preuzme jedan primerak projekta i odnese ga u **Direkciju za građevinske poslove** radi zaključivanja ugovora i plaćanja naknade za korišćenje građevinskog zemljišta ili radi dobijanja **Građevinske dozvole**.

Nakon par dana Opština će obavestiti investitora da dođe da preuzme **građevinsku dozvolu i dva overena projekta**, od kojih jedan projekat sadrži originalnu dokumentaciju.

15 dana kasnije u Opštini se može dobiti građevinska dozvola overena pečatom pravosnažnosti, što znači da se niko nije žalio.

**Građevinska dozvola prestaje da važi ako se radovi ne započnu u roku od 2 godine.**

Potreba projekta jeste kompetenti ljudi iz oblasti materijala, zaštite životne sredine, informacionih tehnologija, građevinski inženjeri, arhitekta i geometri, dizajneri enterijera, firma za izvođenje grubih i završnih radova.

Izrada modela gradnje, pilot projekat rezultiraće na bazi iskustava, kako sa aspekta teorijski tako i praktične primenljivosti odabranih materijala i modela.

Osnovno pitanje svake rekonstrukcije je da troškovi obnavljanja ne budu veći od koristi, proizvoda, vrednosti u eksploataciji, dobijenog obnovljenog objekta.

**Odgovor mora biti stručan, validan na osnovu merljivih parametara, a uloženo treba da se vrati u što kraćem vremenskom periodu.** Praksa je pokazala da ulaganje u obnovljive izvore vraća se u kratkom periodu, tako da je to ulaganje održivo, a efikasnost

zavisi od raspoloživih prirodnih resursa i nivoa tehničko tehnoloških znanja i opreme koja može da se implementira.

[http://www2.schneider-electric.com/documents/buildings/recommissioning\\_your\\_building\\_to\\_deliver\\_peak\\_performance.pdf](http://www2.schneider-electric.com/documents/buildings/recommissioning_your_building_to_deliver_peak_performance.pdf)

Jedan od osnovnih ciljeva ovog rada je ubrzanje modernizacije gradnje u Srbiji, u skladu sa tendencijama 21. veka, izbor optimalnih materijala sa aspekta energije, ekonomije i ekologije (3E), održivost, bezbednost i lep ambijent, što daje refleksiju povećanja nivoa kvaliteta stanovanja, primena inovativnih ključeva i zapošljavanje ljudi kroz multidisciplinarni rad, promocija visokog kvaliteta gradnje, pokretljivost s obzirom na primenu inovativnih ideja i njihovu implementaciju.

Razumevanje potreba za ekološkim materijalima i promocija ekološke gradnje, primena znanja i veština korišćenja ekoloških materijala u građevinarstvu i arhitekturi, u skladu sa energetsom efikasnošću i potrebnim standardima.

Iskustva se baziraju:

- poznavanju i razumevanju strukture materijala, jer od nje zavise osobine, to bi bio fokus;
- implementacija materijala na osnovu održivog izbora;
- prirodni materijali;
- ekološki principi;
- ekološka efikasnost;
- ohrabrivanje mladih ljudi za razvoj „green“ veština i veština profesionalnog razvoja;
- povećanje kapaciteta u oblasti zaštite životne sredine (misli se na zapošljavanje);
- primena znanja i veština neophodnih za harmoniju sa prirodom i kreiranje uslova za ostvarenje ciljeva;
- Evropski centar za ekologiju može da podrži ideju ovakvog projekta (Green talents for building).

Zaštitom životne sredine i primenom tradicionalnih materijala u građevinarstvu sigurno da se štedi energija. Prisutan je čitav spektar različitih materijala koji se koriste u ovoj oblasti kao što je: drvo, čerpič, trska, seno, trava, džakovi peska, ilovača, kompozitni materijali, mešavina cementa i kompozitnih materijala, biorazgradljivi materijali, kontrolisani reciklirani materijali, biomasa, eco friendly linoleum, materijali u kojima nisu prisutne isparljive organske komponente i drugo.

Jedan od osnovnih ciljeva ovakvog mehanizma jeste bezbedna gradnja, minimizacija uticaja na životnu sredinu, s tim što treba dati prioritet materijala u smislu obnovljivih izvora energije i harmonije sa prirodom, kao i definisanje jasnih kriterijuma i implementacije. Prisutan je veliki broj prototipova kuća sa velikom energetsom efikasnošću. [4]

Treba se fokusirati na netoksične materijale, materijale iz obnovljivih izvora, sa visokom izdržljivošću, čiste materijale, koji smanjuju zagađenje vazduha, funkcionalni, sa optimalnom izolacijom na bazi kompozitnih materijala, a planiranja moraju biti sistematska, ekološka rekonstrukcija povezana sa ekonomskim razvojem, ohrabrivanje za ekološke akcije, zabrana nelegalne gradnje, uz prisustvo 3E. [3]

<http://newatlas.com/gizmag-top-10-sustainable-innovative-green-houses/34712/#gallery>

### 3. ZAKLJUČAK

Osnovni koncept rada je:

- korišćenje netokdičnih materijala u građevinarstvu;
- merenje nultog stanja parametara kvaliteta zemlje, vode i vazduha;
- poboljšanje kvalliteta životne sredine;
- štednja energije;
- minimizacija održavanja;
- kreiranje “green space”;
- rešavanje problema otpada;
- izgradnja soba za vežbanje;
- korišćenje boja, tekstura i dizajna koji povoljno deluju na zdravlje, smanjuju strefs, formiraju lep ambijent, koji motiviše na rad i ugodan život;
- smanjenje CO<sub>2</sub>, kako lokalno tako i globalno
- primena obnovljivih izvora energije, u skladu sa ambijentom u kome se živi i parametrima održivosti.

U životnu sredinu uvek su inkorporirane socijalne, ekonomske i političke dimenzije. U 21. veku neophodno je poznavanje strukture materijala jer od nje zavise osobine, koristan je multidisciplinarni rad, stručnjaci za materijale, građevinci, arhitekta, informatičari, mašinci, elektro inženjeri i dr, što je optimalan put gradnje.

Radi implementacije projekta i njegove održivosti kreirana je logistička matrica, data kroz sledeći tabelarni prikaz.



Tabela 2. Logistička matrica

	Preventivne mere	Pokazatelji napretka	Kako će se meriti ovi pokazatelji	Pretpostavke i rizici
Opšti cilj Doprinos poboljšanju kvaliteta životne sredine	- Izučavanje potrebnih zakona iz oblasti Zaštite životne sredine; - Definisane nultog stanja; - Odabir kompetentnog osoblja;	- Merenje uticaja komponenta u zemlji, vodi i vazduhu, pre početka gradnje i nakon godinu dana.  - Doprinos harmoniji životne sredine zbog prijatnog izgleda objekta i njegove funkcionalnosti	Koristiće se aparati za merenje koncentracije komponenta u zemlji, vodi i vazduhu, a u skladu sa zakonskim propisima.	
Specifični cilj Gradnja ekološke kuće, kao pilot projekta	Saradnja sa potrebnim institucijama i praćenje i primena neophodnih zakona	Primena odabranih materijala u cilju podizanja nivoa kvaliteta boravka i motivisanost za realizaciju postavljenih ciljeva, kako sa aspekta samih prirodnih materijala i njihove kombinacije tako i energetskih parametara, u smislu održivog razvoja	- Broj sunčanih dana u godini - Broj dana sa vetrom - Mogućnost korišćenja obnovljivih izvora energije i njihova održivost - Merenje ekoloških parametara ensuring quality residence - Broj novoizgrađenih kuća	- Specifični ciljevi plana obnove - Dijapazon mogućih postupaka rekonstrukcije i obnavljanja, koji treba razviti i analizirati - Snimak i analiza nultog stanja, period kada nisu preduzete akcije - Definisane kriterijuma ekonomskih i tehničkih mogućnosti alternativa - Definisane mogućnosti za finansiranje plana obnove - Izbor optimalnog rešenja plana obnove sa aspekta ekološke i energetske efikasnosti, kao i ekonomskih parametara.  - Nalaženje partnera i investitora
Rezultati projekta: - Izlazi (opipljivi rezultati) i Ishodi (neopipljivi rezultati) - Primena ekoloških materijala u oplemenjivanju postojećeg objekta - Održivost oplemenjivanja i primenljivost	Kontrola svih materijala koji se koriste za izgradnju ekološke kuće	Korišćenjem obnovljivih izvora energije i ekološki svesnoj izgradnji objekata, koristeći se adekvatnim materijalima i sistemima izgradnje leži mogućnost zaustavljanja daljnjih degenerativnih procesa koje smo proizveli u prirodi, kao i otvaranja mogućnosti ka stvaranju kvalitetnije budućnosti.	Definisane održivog modela gradjenja uz postovanje ekoloskih , energetskih i ekonomskih parametara	- Nerešeni imovinsko pravni odnosi - Neusaglašenost predloženog projekta sa lokalnim i regionalnim urbanističkim projektom - Validnost postojećih informacija vezano za nulto stanje kvaliteta vode, zemlje i vazduha.
Aktivnosti: - Prikupljanje potrebnih informacija na lokalnom, nacionalnom i globalnom nivou - Pribavljanje potrebnih dokumenata - Analiza i ključevi za kreiranje željenog proizvoda - Formiranje tima za realizaciju projekta - Definisane potrebnih parametara	- Obezbeđenje potrebnih sredstava za investiciju - Kontrola kompletne dokumentacije i njihova validacija.	Sredstva: Intelektualna znanja i veštine u oblasti ekoloških materijala , primene informacionih tehnologija za sposobnost kreativnog, praktičnog rada oživljavanja starih objekata u svrhu boravka, kao i inoviranja starih objekata u cilju zaštite spomenika i kulturnih dobara na lokalnom i nacionalnom	Troškovi: 10000 €	Blagovremeno obezbeđenje sredstava za svaku pojedinačnu aktivnost,

## REFERENCE

1. Bakhom E. S., Garas G. L., Allam M. E. Sustainability analysis of conventional and eco-friendly materials: a step towards green building, ARPN Journal of Engineering and Applied Sciences, vol.10, no.2 (2015), ISSN 1819-6608, 788-796
2. McManus B., Building Optimization: Recommissioning Your Building to Deliver Peak Performance, White papers (2009.)
3. [http://www.cif.org/noms/2003/27 - Insulating Concrete Forms.pdf](http://www.cif.org/noms/2003/27_-_Insulating_Concrete_Forms.pdf) 10.05.2017. 16h
4. <http://www.multipod-studio.com/popup-house-passive-house/> 10.05.2017. 17h
5. [http://www.eco-innovation.eu/index.php?option=com\\_content&view=article&id=541%3Aecological-prefab-houses&catid=59%3AGermany&Itemid=59](http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=541%3Aecological-prefab-houses&catid=59%3AGermany&Itemid=59) 11.05.2017. 15 h

## KEYWORDS IN MARKETING: SOME LINGUISTIC CONSIDERATIONS

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**Abstract:** There are several points of view about what is understood by ‘keyword’ in marketing. However, our focus here will be mainly on what determines the choice of lexical items that are used for trademark naming. These terms have some type of meaning that can produce some concrete effect on potential customers, and this depends not only on their denotative and connotative meaning but also on their phonosemantic characteristics.

We revise a taxonomy for brand names that has been presented elsewhere [1]: *eponymous names* (“John Deere”, “Gucci”, “Giorgio Armani”, “Christian Dior”), *descriptive names* (“General Electric”, “Telefonica”), *acronyms* (“AT&T”, “IBM”), *figurative and evocative names* (“Dove”, “Sunlight”, “Dash”), *real-world names* (“Apple”), *portmanteaus* (“Microsoft”), *coined words* (meaningless like “Kodak”, descriptive, figurative, emotional like “Excite”, personal like “My Yahoo!”). In our research we have examined some concrete additional examples, especially from the Spanish market, and we have looked into the implications brought about by the usage of terms that were coined in a given language for a given market in other markets with other languages.

**Keywords:** trademark naming, marketing, branding, lexicology, cultural keywords

### 1. INTRODUCTION

We present here some work which stems from our previous research on lexical meaning and categorization [2] and on its implications for the right choice of keywords in trademark naming and marketing. First, let us clarify what we understand by ‘keyword’ in the present discussion. There are several points of view. For instance, we can talk about important terms that are used in the discipline of marketing. This is a terminological approach, which can be useful for specialized language learning, teaching, translation, etc. There are many lists available that can be used with these purposes in mind. We can also choose to examine keywords as a marketing tool in webpage optimization, internet marketing, etc. There is also another perspective in which we can examine what are called ‘action words’ or ‘power words’ which are used by job seekers, marketing professionals, etc. to call your attention or to create certain desired psychological effects. However, our focus here will be mainly on lexical items which are used for trademark naming. Since the field can be very broad, we will restrict ourselves here to lexical items which are used in trademark naming, as a part of a more general marketing strategy.

These terms are chosen by big companies because they have some type of meaning that can produce some concrete effect on potential customers. In general terms, we can say that words have two kinds of meaning that can have an influence on its desired image and associated effects on consumers: denotative and connotative.

## 2. MEANING IN TRADEMARK NAMES: DENOTATIVE AND CONNOTATIVE MEANING OF LEXICAL ITEMS.

Denotative meaning has been usually discussed in terms of (discrete) features or similar categories. However, after all the criticism that came from psycholinguistic empirical evidence [3] it became clear that meaning *does not* consist of discrete features which are sufficient and necessary [4]. Rather, denotative meaning has an internal structure that relies on the distinction between prototypical and peripheral categories as well as between different levels of schematicity and specificity. In addition, we must acknowledge that in the centre of any lexical meaning configuration there is always one (or, in some cases several) sense(s) to which all the others relate. In cognitive linguistics, the concept of a ‘core meaning’ from which different meaning extensions originate has clarified the issue: conceptual categories have a radial structure [5]. All members of a category are networked around a single core member. Radial structures have not been universally accepted, though. It has been pointed out that certain meaning structures do pose problems when conceived of as networks [6]. Furthermore, we must acknowledge the importance of encyclopaedic information [7-8]. This is real ‘world knowledge’; it is part of the communicative context and it is there, inside our minds, in the form of semantic memory. Its role in language can be seen not only in inference processes, such as presuppositions, implicatures, etc., but also in the understanding of idiomatic expressions and creative metaphors. It is also necessary for the interpretation and use of isolated words.

Meaning should also be seen as something that has been acquired through experience, with a double perspective: Meaning as a product and also meaning as a process (dynamic perspective). It is always in continual construction within different contexts of use [9] and it is also assumed that there are different types of knowledge [10] and cultural key words [11].

Another aspect of meaning is what has been referred to as the ‘connotations’ of lexical items. In a pioneering work in this area, Osgood [12] presented a large number of subjects with a vocabulary sample to which they had to assign different values on several bipolar scales consisting of qualifying adjectives. A factorial analysis of the data revealed three main dimensions (*evaluation*, *potency* and *activity*). In addition, other types of meaning have been identified from a psycholinguistic perspective. For instance, using features like ‘familiarity,’ ‘concreteness’ or ‘imagery,’ obtained through extensive sampling among speakers [13]. There are also other types of connotation. One of them is *sound meaning*. According to Magnus [14], there are three types of sound meaning: *Onomatopoeia* (when there is imitation of a certain sound by means of a combination of consonants and vowels in a word), *clustering* (when a certain speech sound used very often in a context is used productively for new words), and *iconism* (when a certain sound acquires a certain meaning, independent from the reference of the word). An example of sound iconism is, for instance, the fact that initial ‘s’ before a consonant is linked to meanings of smoothness and gliding (‘slip’, ‘slide’, ‘slick’) or constriction (‘squeeze’, ‘smash’).

And there is also cultural connotation, when concepts connote according to certain values, attitudes, historical usage, etc. An example would be what happens with words denoting concepts of ‘nation’, ‘friendship’, ‘freedom’, etc. in different cultures, different countries and different historical moments [15].

Bearing in mind all that multi-dimensionality of meaning, we have examined different lexical possibilities in trademark naming.

### 3. TRADEMARK NAMING. DIFFERENT KINDS OF STRATEGIES.

There are different strategies for brand names. We can distinguish the following [16]:

**Eponymous names:** This is the case with brand or company names like “John Deere”, “Gucci”, “Georgio Armani”, “Christian Dior”, etc., in which a full name or a family name is used. This is normally the name of the owner or the founder of the company.

**Descriptive names:** These are names which are linked to some descriptive traits of the company. Normally these names are linked to a given language, which can create problems for markets in which the descriptive terms are not recognizable. It is better if they are made up of internationally-acknowledged terms: “General Electric”, “Telefonica”.

**Acronyms:** They are often abbreviations of descriptive names. Here we only remember certain combinations of letters, without predetermined connotations. Some examples are “AT&T”, “IBM”

**Real-world names:** These are words which denote something in a given language, normally English. They are linked to our understanding of this language. If they are short and phonetically simple they can be used in other markets with other languages: “Apple”.

**Figurative and evocative names:** Again, these are words which denote something in a given language, but in this case we use the metaphorical meaning. They are also linked to our understanding of the language. If they are short and phonetically simple they can be used in other markets with other languages: “Dove”, “Sunlight”, “Dash”.

**Emotional names:** These are also words or expressions in a given language, normally English, which use our emotions or our personal involvement. We have names like “Excite”, “My Yahoo!”

**Portmanteaus:** These are artificial words which cover more than one meaning. They can still be linked to a given language. An example is “Microsoft”.

**Coined words:** We can create new words, but they may also be similar phonetically to terms in a given language.

**Meaningless words:** New words, apparently without a predetermined meaning and without a link to a given language. They tend to be simple phonetically, so that they can be pronounced without any problem in any language. An example is “Kodak”.

The fact that most of these words are based on a given language may create unexpected problems. This is for instance the case with homophones and homographs which have different meanings in different languages. We have known examples from the car industry. “Renault Megane” is not a good name for a car model in Japan, since in Japanese “megane” means ‘glasses’. “Nissan Pajero” would not sell well in Spain (as opposed to the name “Nissan Montero”), because in this country “pajero” is a taboo word. “Nissan Nova” is a good model for jokes in Spanish-speaking countries, because in Spanish “no va” means “it does not go”. Another problem is the phonetic suitability of some words in different languages. E.g.: “Schwarzkopf” is impossible to pronounce in Spanish, Italian or Japanese, where combinations of consonants are limited. This is specially relevant in languages with not very sophisticated phonetic systems, like Japanese, where there are only C + V combinations and the only consonant that can be final in a syllable is “n”. In general terms, brand names with C + V syllables are acceptable in all languages. Words with that syllabic structure and with open vowels have a better connotation from a phonosemantics point of view (e.g. “Lada”, “Nova”, “Vega”). However, there are more factors involved (written language can be read differently, and there may be non-phonetic connotation involved).

Eponymous names can also have meanings in other languages. Surnames can create problems even in the original language (e.g. if your surname is “Calvo”, ‘bald’ in Spanish, don’t use it for your Spanish firm if you sell anything related to health or hair care). Words with the same meaning sound differently in different languages, with evocations linked to important persons with those surnames (e.g. “Zapatero”, Spain’s former President of Government, means the same as “Schumacher”, famous F1 driver, seven times world champion. Although the meaning in English is in both cases the word ‘shoemaker’, the connotations of these words as surnames are different in Spanish and German).

Descriptive names (e.g. “General Electric”) are not descriptive in other languages if the words cannot be understood. Acronyms may be dictionary words in some languages, with unexpected connotations. However if that is not the case, they are preferable to their full descriptive expression (e.g. “IBM” is better than “International Business Machines”, as it can be pronounced in any language with their own alphabet, and it is connotation-free).

As for figurative and evocative names, they can only be evocative if they are understood. In other linguistic environments the evocation disappears.

Real-world names is another matter. An example of a real-world name is “Apple” (computers). The real-world name ‘apple’ has some associated meanings: perfect fruit, high nutritional content, it comes in a nice package, it doesn’t damage easily, etc. Parallely, the trademark Apple has similar associated meanings: perfect computer, high value content, it comes in a nice package, it doesn’t damage easily. Immediately, other similar names followed: e.g. “Apricot Computers”. However, real-world names can lose their original connotations and also have different denotative and connotative meanings in other languages.

Coined words are (normally) complex expressions created artificially. They may not have any meaning in the language of origin. But they may also have some kind of denotative or connotative meaning. There are different possible types: Meaningless (“Kodak”), descriptive (“ContentGuard”, “Real Simple Magazine”), figurative (“Oxygen Television”), irreverent (“Pete’s Wicked Ale”), emotional (“Excite”), personal (“My Yahoo!”), etc. [17].

However, coined words without meaning in the original language may have meaning in another language. Other kinds of coined words (e.g. figurative coined words) depend on intelligibility of meaning and cultural adequacy of the image used.

Meaningless coined words can be created because of their special phonetics (“Kodak”) or because they evoke something foreign (“Häagen-Dazs” is not a Scandinavian brand, but it looks Scandinavian to American eyes). Many coined words rely on Latin-based affixes or word structure because their creators think they can have more international potential (e.g. Philip Morris’s choice of the name “Altria”).

Let us look at a concrete case. The case of Telefonica. This is a Spanish telecommunications corporation, whose original name was “Compañía Telefónica de España”. Initially it was state-owned, but it was privatized when Spain entered the EU (then European Common Market). Later, it went global and now has presence in many countries worldwide. It changed its name to “Telefónica”, which is simpler. Later on there was a small change to “Telefonica”, without the graphical stress mark, because it didn’t make sense in an international brand name. The word “telefónica” (‘telephonic’) is a dictionary word in Spanish. However, as a global trademark name it looks like a coined name with a Latinized form.

As for emotional (“Excite”) and personal (“My Yahoo”) names, they depend on phonetic suitability and correct meaning understanding. Irreverent coined names, like “Pete’s

Wicked Ale”, only make sense in their own language. Even in that case, they are only acceptable for certain kinds of products (alcoholic drinks or tobacco products, for instance).

#### 4. CONCLUSION: THE COMPONENTS OF TRADEMARK NAMING

If we want to delimit in which way lexical meaning is used in all these types of trademark naming we can see that all meaning distinctions are relevant for this classification. Trade names are normally based on real-language words, and the first type of meaning that then comes to mind is its denotation. It can be a concrete, determined, subject or set of subjects, as in family names (eponymous names). It can be a thing from the real world (concrete, real-world names). It can be an explanation of something (descriptive and acronym names). Additionally, trademarks may also make use of connotation through emotion or evocation (evocative, figurative and emotional names) or through sound (‘meaningless’ names) (see Table 1). In all cases, the language in which the word is used may create meaning connections which can support the original idea or, if we made a bad choice of words, spoil it. In this respect, not only the choice of language, but also issues related to culture can play a role.

Table 1. Types of meaning involved in different trademark names

Type	Refers to	Primary type of meaning involved in the reception process (Other types may also be present, but secondarily)
Eponymous names	Full person name	Denotation: Concrete person
	Family name	Denotation: Set of persons
Real-world names	Thing from the real world	Denotation: Real-world thing
Descriptive names	Description of something	Denotation: What is being described
Acronym names	Abbreviation of description	Connotation: Phonosemantics of acronym
Evocative names	Name of something that can be perceived or felt	Connotation: Perception and feelings
Figurative names	Name of a concrete object that can suggest something that can be perceived or felt	Connotation: Perception and feelings
Emotional names	Name of something that can arouse emotions	Connotation: Emotions
Meaningless coined words	Without meaning in the primary language	Connotation: Phonosemantics of word

In any case, there are always some components of trademark naming which can easily be identified:

- A new name must be able to appeal to a certain target audience.
- It must also be easily associated with certain product features and benefits.
- It must also be easily associated with certain communication attributes of the firm involved.
- It must be easily associated with the main positioning statement of the firm.
- The new name must be able to denote and connote in such a way that all the preceding facts are taken into account...

...and if it wants to go global, that name has to be compatible with naming strategies in other cultural and linguistic environments. At least, it must not denote or connote undesirable things in those environments, and the most desirable goal is to produce a similar effect in all markets.

## REFERENCES

1. Perry A., Wisnom D., *Before the brand: Creating the unique DNA of an enduring brand identity*, McGraw-Hill, New York, 2003.
2. Inchaurrealde C., Ibarretxe-Antuñano I., Sánchez García J., Hornero A., Luzón M. J., Ruiz Moneva M. A., in *Language, Mind and the Lexicon* (Ibarretxe-Antuñano I., Inchaurrealde Besga C., Sánchez García J.), Peter Lang, Hamburg, 2007, 9-45.
3. Rosch E., *Cognitive Psychology*, 4, 1973, 328-350.
4. Geeraerts D., *Journal of Semantics*, 5, 1987, 275-291.
5. Lakoff G., *Women, Fire and Dangerous Things*, University of Chicago Press, Chicago, 1987, 436.
6. Cruse D. A., *Lexical Semantics*, Cambridge University Press, Cambridge, 1986.
7. Inchaurrealde C., in *The Lexicon-Encyclopedia Interface* (Peeters B.) Elsevier, Amsterdam, 2000, 97-114.
8. Peeters B., *The Lexicon-Encyclopedia Interface*, Elsevier, Amsterdam, 2000.
9. Nelson K., *Making Sense. The Acquisition of Shared Meaning*, Academic Press, New York, 1985.
10. Van Dijk T., *Discourse, Knowledge and Ideology: Reformulating Old Questions - LAUD Series A: 564*, LAUD, Essen, 2002.
11. Wierzbicka, A., *Understanding Cultures through their Key Words. English, Russian, Polish, German, and Japanese*. Oxford University Press, Oxford, 1997.
12. Osgood C., *Focus on Meaning. Volume I: Explorations in Semantic Space*, Mouton, The Hague, 1976.



13. Quinlan, P. T. , The Oxford Psycholinguistic Database, Oxford University Press, Oxford, 1992.
14. Magnus M., What's in a Word? Studies in Phonosemantics, NTNU, Trondheim, 1997.
15. Wierzbicka, A., Understanding Cultures through their Key Words. English, Russian, Polish, German, and Japanese. Oxford University Press, Oxford, 1997.
16. Perry A., Wisnom D., Before the brand: Creating the unique DNA of an enduring brand identity, McGraw-Hill, New York, 2003.
17. Perry A., Wisnom D., Before the brand: Creating the unique DNA of an enduring brand identity, McGraw-Hill, New York, 2003, 68-69.

## **ECOLOGICAL SECURITY OF AUE AS A FACTOR OF FUTURE DEVELOPMENT**

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**Abstract:** Ecology represents the doctrine of balance in nature, dealing with the study of relationships between living things and between living things and the environment. It explores, analyzes, describes the objective, systematized and arguments explaining these relationships, as part of a broader science of environmental . Today the term "ecology" became "popular" and is often used in combination with concepts: safety, culture, family, health and others. However, in recent decades, is used most often in conjunction with the crisis - ecological crisis, suggesting the unsatisfactory state of human society. The United Arab Emirates are faced with the same problems. Due to the fact that the country is a predominantly arid land containing habitats and communities adapted to survive both small amounts of infrequent precipitation, and extremes of heat with consequent high evaporative losses. Only the ingenuity and technology to exploit these resources would have been required to survive in relative affluence. Since those times there has been a trend toward increasing aridity, demanding a nomadic hunter- gathering lifestyle. It was solely in the relatively well-watered Hajar Mountains, with their permanent running supply, that cultivation would have been possible, a development which took place only in antiquity. Terraced fields there attest to such an agricultural economy . Today this system has fallen into disuse, although the proximal cause was a shift in the socio-economic base rather than necessarily the increasing irregu- larity of winter rainfall.

In contrast to the past, when the human population was still small and natural resources were used sustainably without conscious effort, a burgeoning human population, increased longevity and commercial exploitation have served to put mounting pressure on the environment. Commercial fish catches in the Arabian Gulf continue to decline. We have reached the time when use of ecological security standards in preservation of environment is not only concerned with ethics and security, yet it is a question of survival of mankind.

**Keywords:** security, protection, ecological security standards, protection of the environment.

### **1. INTRODUCTION**

It is estimated that the need for a comprehensive mobility of addressing the issue of environmental security, which is ambiguous. In the field of science, their knowledge, their experience and practice are required to confront the policy and the state with the responsibility and consequences of the lack of perpetrating in the field of environmental safety and protection, establishing the strategic and operational objectives.

The National Security concept is still the most present and applicable in the domain of practical shaping of security function of modern state. According to [1]: 'Security of the state

(state security), or the concept of the national security (National Security) belongs to the so-called old, traditional approaches to security. In the center of security is a sovereign state, meaning its existence.

State territory and national sovereignty as vital values and interests that are protected with military capacities and the ability to deter military aggression, or to successfully respond to it.' Together with the system of national security, which is instrumentalized security function of the state, today has a broad and multifaceted content.

First, national security implies national state function used for protection of identity, interests, and other values that are highlighted as basic to the survival of the nation. Of course, it is a broader notion of the nation-state, thus state-made people/nation and its citizens. It is said "State of American nation", "state of the French nation," etc., but it involves a broader meaning of the concept of nation-state of US citizens, French citizens, citizens of Republic of Serbia, etc.

In the science of security, we find that [2] "Some authors do not make the necessary distinction between the state and national security. It is never, in fact, really known, unless previously clarified, on what relevant object of security is referred to: the state as an institution in the narrow sense, the ethnically defined and usually the majority of people in it, the political community of all citizens or, what is most desirable to all citizens, members of the society, regardless of their ethnic, religious, social or ideological affiliation. "

## 2. STRATEGIC OBJECTIVES

Strategic objectives should be defined through a systematic approach that the man and his environment is safe from the aspect of environmental safety. It is referred to the existence of man, water, air, food and everything that makes life on earth.

The term environmental safety is introduced by General Assembly UN, upon adoption of the "resolution of the international environmental safety (1978) ", in response to the Chernobyl environmental and human catastrophe and to the proposal of Mr. Gorbachev [3].

In view of the increasingly frequent number of different hazards based on the technological development of the country and society, and increasingly evident climate changes and their consequences on the global and local level, it is necessary to provide all required conditions for the construction of the overall system for security and protection, and in the context of such, a system of environmental protection.

Such a system has the task of making community resistant and is ready to respond to all forms of ecological threats and challenges. For the materialization of such a strategy is necessary to identify all the challenges by the ecological security of the protected values for the environment, for people, for good. Also, it is important to come to know which tasks and measures it is necessary to take so that the estimated risks reduce to an acceptable measure, and communities more resilient to the same.

Ecological values a healthy environment and of the natural resources, as a value in itself but also as an integral element of the overall national wealth – in modern countries they are being classified in the security interest sphere not only of national states but also in the wider security level - regional and global.

### 3. OPERATIONAL OBJECTIVES

The operational objectives are tasked to ensure that the ecological functions of security and safety becomes an issue that is important for civil society and which must not and can not be exempted from the responsibility in creating and implementing operational objectives in this area. It is also important to ensure that the function of environmental protection is introduced in all business and production processes, business and public community activities that will permanent improve and control.

Inclusion of all human and material potentials certainly is one of the preconditions for efficient implementation of the operational objectives of environmental protection in the community. Development of techniques and technologies, application procedures and standards for environmental safety includes personnel profiling and competence. This certainly implies a certain financial scope of funds for realization of the planned, its sources and its planned implementation.

The function of ecological security and protection as an operational objective examines the part that regulates the overall coordination of the community, normative regulation, decision-making on all spheres and at all levels of community life, care planning, implementation of the protection equipment- it for protection , training and training for protection, environmental education, training of educators, control and supervision in the implementation of these objectives in the community.

Environmental security and protection is established according to the principle:

unity with elements of uniqueness and respect of levels of subordination at the community level;

rationality which includes all available resources (human and material, organizational);

comprehensiveness that has the task of organizationally and functionally provide a preventive action, the efficient operation in removal of consequences and sources of endangering, with the possibility of simultaneous practice on the multiple levels and routes in order to achieve optimal effects;

selectivity that aims accurately and continuously defining, delegating and defining the tasks in the community by the parties;

flexibility which has the task of training for rapid and functional activity in the accordance to the newly created changes in the community;

reliability that has the ability to work in the ecological safety and protection of individuals and groups, as well as a system operating in accordance with the procedures and the defining standards.

The system of environmental security should necessarily include elements that allow it to function, and are related to: actors, rights, obligations, jurisdiction, responsibilities, structure and function of relationships, work, work control methods, measures, actions and funds. Factors in the system are all those who make up the community, narrower or wider, depending on how we look at it. However, what necessarily have to define all the environmental risks and threats, forms and methods of compromising, and exposure to diverse

and continuous, permanent natural and human influences, artificially sparked threats, which are the possible consequences of large direct or indirect damages to people and environment, goods and health, to water and air, and to land. In the article of UN: World disaster losses up to 300 billion US dollars [6] it is stated that "World Economic losses of natural disasters such as earthquakes, the floods, drought and cyclone annually reaches 250 to 300 billion dollars (e. according to the UN, the total damage caused by natural disasters in the world in 2014 were close to \$ 300 billion). The report of the UN Office for Disaster Risk Reduction is estimated that an investment of six billion dollars a year with efforts to reduce the risk of natural disasters, saved the world from a loss of 360 billion dollars over the next 15 years. "This report is a wake up call for countries to increase investments in smart solutions to enhance disaster resilience," said Representative of mentioned office in UN Margareta Wallström. She said that this will be the main theme of the third World Conference on the reduction of the risk of disasters to be held in Japan (held from 14 to 18 March this year). "

The values of the community who are exposed to environmental threats are before all: life and health, infrastructural facilities of the economy and public community activities, production and work processes in the community, community capital, the assets of members of the community and the community itself. Living and working environment, which includes water, air, land, food, and all that is life in the community.

Ecological safety may be compromised due to human functioning: ignorance, incident, poor designing, due to causes that are within or outside the state borders. Environmental safety can be defined and in the way that this is a term which connects the environmental conditions of the conditions of total safety. In that sense, environmental security includes solving problems that may arise due to: lack of resources, degradation of the environment, biological hazards, climate change, etc.

On the state of environmental safety in a community by the degree and quality, particularly affectes:

- the economic situation of the community
- forms of environmental risks and threats that are related to non-compliance with procedures and standards
- uptrend of natural disasters (earthquakes, floods, landslides, fires, snow caused disasters, storm wind, etc.)
- the tendency of increase technical-technological hazards and accidents (fire, explosion, eruptions, emission of dangerous or harmful liquid or gaseous substances, nuclear and radiological accidents)
- insufficient legal regulation of the field of the environmental safety and community protection
- insufficient training of community in measures of preventive safety and environmental culture in the community
- policy stance in relation to environmental safety and protection
- offenses which harm society efficiency is safety and protection, and are related in particular to the failure to implement legally defined norms, procedures and standards
- Sabotage and deviations of technological processes and causing environmental accidents
- various types of pollution and the release of toxic substances into the ground, and water wells

economic crime performed by community members most often in conjunction with business partners from inside or outside of the country, or self-continuously, as well as various types of abuse, corruption, bribe and especially when the situations of emergency to specific areas or community offenses causing general danger and crimes against human health and environmental executed by action or lack of same (example: floods and the abuse of dead animals, produce that are ecological defective etc.) violating regulations on the protection, preservation and improvement of the natural environment failing to take measures to prevent pollution Failing to act according to regulations or technical rules on environmental protection and security social and other unrest in the long-term timeframe that could destabilize the community and affect the functioning of the community which disrupts order in ecological security.

It remains committed to a safe and healthy environment of each member of the community, health protection, that reduce risk of injury to people, the environment and property. All these elements have a single objective which is reflected in the timely consideration and evaluation of ecological risks, their prevention and identification, as well as taking measures for responding to performing risk and its management and bringing the measure to an accepted level.

In strategic terms, the environmental safety is based on timely assessment, planning, prevention and risk management. The risk, by definition, is the product of the likelihood of unwanted or analyzed event occurs and its consequences for the ecology, economy, health of people in the community, pollution of water, soil, air and so on.

Management of environmental risks and threats secures a modern proactive approach that allows communities to effectively plan and carry out an assessment in the field of environmental security and to work with known and acceptable level of risk. Unlike traditional reactive approach, a proactive way points to the way how to realize an management of environmental risks and threats, in order to improve the overall safety of the community.

Effective proactive approach can help the community to reduce the number of environmental incidents in the future. Each community and society as a whole must have a positive view about applying and improving the existing reactive approach as a response to the incident, and simultaneously develop and enhance long-term proactive methodology of environmental safety.

Generally, each methodology of managing ecology protection and its risks, at the highest level is based on the following general procedures:

- identification of all types of resources in the community
- determination the damage caused by environmental threats to all the resources in the community
- identification of safety deficiencies that factors of endangerment can take advantage of

- Determination of how to minimize the risk of ecological endangerment by applying appropriate management measures.

Methodologically, proactive managing of the risks and environmental threats is a process designed based on the international and national strategies, policies, standards and procedures that establish various management models applied in the interactive procedure through four phases:

- The first phase represents: an assessment of environmental risks;
- The second phase presents: making decisions on the basis of environmental risk assessment;
- The third stage is: Implementation of managing environmental risks;
- The fourth phase represents: measuring the efficacy of implemented solutions of managing environmental risk;

Each phase of the estimated environmental management of the risk consists of several components and executive steps. Since it is estimated and predicted that the process of environmental risk management continuously runs, a new cycle starts with a new assessment of the environmental risks.

The periodicity with which to execute the cycle depends on the type of community or society, but it is thought that the annual cycle long enough for community to make a proactive monitoring for new resources, security flaws and threats and on that basis determine new solutions for managing environmental risks.

For these reasons it is essential that in each complex community or society establish a function that will continue to be engaged in the management of the ecological protection and research of security and eco-ecological risks through the mentioned four phases of activity.

During this period, in the context of the development of the methodology of environmental risk management, defined are the components of each phase of the process cycle of environmental risk management. It is particularly important to define the evaluation of risk, which consists of the following elements and activities:

- planning,
- data collection,
- identification of environmental risks and threats.

In the phase of risk assessment data are collected on resources and risks that are then used to create a list of priorities. In addition to planning activities in this phase are defined and all other documents which are:

- forms for data collection in the community on an environmental risks, as well as the overall risks,
- the list of priority of overall risks and environmental risks.

Result from the evaluation of risks (risk is usually defined as: the product of the probability that the undesired or analyzed event will occur and its consequences (e.g., economic, environmental and / or other) [4]), is the priority list that comprises of qualitative ranking of risks and its quantitative assessment, which is then used in the next stage of the decision-making process for the evaluation and selection of optimal solutions to manage environmental and security risks. The model we describe is a functioning business model, which allows a community or society to consider all essential functions and processes, which are reflected in:

- leadership
- management
- planning
- management of all kinds of risks
- Monitoring
- Control/ oversight / Inspection
- Research
- Education
- Management of Information System at the level of society and community.

To define the direction of development and control of the realization of components of security challenges systems in terms of environmental protection, it is necessary to remind ourselves of the fact that security challenges in terms of environmental protection necessarily have to analyze the past in order to manage present and predict the future.

If we analyze the security risks in the past hundred years, it is clear that global changes brought a growing number of disasters and accidents of all kinds, but the number of victims does not justify non of any technological achievements, a number of patients and the pollution of the planet warns that it depends on us where we are today and where we plan to be tomorrow. Also, we can not overlook the fact that the most crucial factor is human factor in lack of organizing and taking preventive measures and systematic protection.

#### **4. ENVIRONMENTAL AWARENESS**

Security culture and awareness of each individual stems from the fact that man in praisto- terial age had the urge to protect themselves and their loot for themselves. The development of the state and society develops awareness of men about their safety and security culture. Security culture had its own history and scale which varied in accordance with the technical and technological concepts and standards. Security for cultural tour has been developed in parallel with the development of industry, technology and technicians will, and ranged from pathological over reactive and is calculated to proactive and productive. Achievement of the desired objective to HSSE (Health, Safety, Security and Environment) scale, contributes to constant improvement, increasing the level of information to enhance mutual trust and competence.



In our opinion, the role of security culture is to use education and experience of individuals, social groups and nations to reach such a level of security awareness among the population, which will change their thinking, behavior and attitude towards security issues. This attitude towards the security must be in compliance with the existing security system, without prejudice to the survival of humans and other security subjects. In some ways, the concept of security set to desirable standards of thought and behavior towards security; what is deliberately modern concept of security, safety culture translates into reality.

Although concern about the protection of nature has always existed, to the development of environmental awareness comes with the appointment of the first theorists of the environment that are related to the second half of the eighteenth century. Since then, we highlight the following theories, about the environment: theory Benthamite, Malthusian, affairs and borders of growth in global balance, theory of organic growth, the transformation of the international order, steady state, the level of life, post-industrial era, decentralization of the social system, global mathematical model (conceptual model) biosphere, environmental policy, theoretical assumptions of environmental dimensions and many other. Benthamite theory was based on the desire to improve the hygienic conditions of households in working industrial neighbourhood, mostly built in the vicinity of industrialization ised plants and mining pits. Defect of Benthamite theory reflected in the approach of providing only efficient working conditions. The theory Malthusianism drew attention to the problem of human population growth. it started from the fact that the human population increased faster (geometric progression), from the production of means of subsistence (arithmetic progression).

The basic starting point the concept of active protection of collective arrangements, is that the environment must be protected and improved as a whole. Protection of environment must include all of its content, regardless of the fact that protections of individual segments require specific approaches and scientific ventures. In this connection it is necessary to always and everywhere to take account of the complexity of ecological relationships and processes. In a series of appropriate actions to protect and improvement of the environment it is necessary to proceed from the fact that the relations between man and the space that surrounds it, are both natural and social. From regular, purposeful and contemporary regulations of relations in the system of man-technology-nature, it is possible to define the right strategy for protection of the environment. All this points to the need to take all possible ways to avoid inadequate and improper use of the environment [5].

When we do look at the world around us, definitely the environmental problem is one of the key marks of modern civilization. Ecological problem can be defined as "any change in the physical state, which occurred due to human activities that distort this situation, which has the consequences that the society consideres unacceptable by the already accepted environmental standards." These problems can be identified in the different order-picking levels: the global - warming the atmosphere of the ozone layer depletion, the regional - acid rain, pollution of underground water, oil spills, and local - which is mainly about pollution of water, air.

Neither one of these environmental problems cannot be completely solved if we do not focus on changing human behavior, because no matter how much we encourage the process of remediation methods resulting from research within the natural sciences, if human with the behavior remains unchanged, we will again and again come across the same or even a new and more dangerous problems.

From the results obtained so far we can conclude that the environmental awareness of the importance of knowledge of the environment and the need to preserve it and, where possible, improve both for the present and future Generations. Moreover, it is not only the interests of the people but of the need to preserve the biosphere of our planet as a whole. The ecological awareness is gained primarily education not only in schools but also in families, via mass media and in other ways, including participation in the work of environmental organizations. An important role in this process can have a well-conceived legislation (sentencing and awards, the strengthening of institutions dealing with the regulations, etc.). "Environmental awareness and safety culture in the context of Serbia must be seen as a result of the operation of a number of factors: the concrete environmental problems and the degree of the impact of environmental activists (such as "stimulation from below"), through the concept of media reporting on environmental problems (as an mediator), to the operation of the national and global institution (such as "stimulation from above"), all in the specific social context "[6].

In our opinion, the security culture in contemporary understanding of security is such a pattern of thinking, behavior and conduct, which takes into account the extensive understanding of the concept of security, specifically taking into account all the requirements that are set with new concept. It must take into account all types of security forms: individual, military, environmental, economic school and others. Through its framework includes embodiment of the idea of individual and collective security, collective defense and the improvement and expansion of stability. It can finally be confirmed that the safety culture category which is influenced by changes in the system and the concept of security is changing. How wide we understand security, reflects our understanding of the culture of safety, how many reference objects we understand reflects the complexity of our security culture.

The UAE has undergone something of an environmental renaissance in recent years. Environmental awareness is high on the agenda and reminders are constant of our obligation to the natural world, and none more so than in the particularly sensitive environment of the southern Gulf. There is now, in addition to the governmental structure, a plethora of non-governmental environmental groups and a clear conviction exists across the board amongst federal bodies, individual agencies and non-governmental organizations, together with their domestic and international alliances, of the need for environmental protectionism.

Sophisticated environmental legislation has been promulgated, involving several separate laws. Some apply at a federal level, others only at individual emirate level. There is a clear move toward consistency across the federation, although each emirate retains, constitutionally, a certain degree of overall autonomy. The task of putting into practice what is enshrined in such laws, backed up by monitoring and strict enforcement, is now being addressed. The UAE is endeavouring to restore the balance and ensure resources are used both sustainably and equitably, while at the same time maintaining a place for nature.

Before providing a description of the UAE environment and the organizations responsible for its upkeep, it is appropriate to provide a brief note of the relationship between Arab tradition and culture and the natural world.

A land management system evolved to ensure lean periods could be weathered. *Harim* and *hima* lands were set aside (by individuals, communities or the state) for grazing only during drought, something which could be the norm rather than the exception. Nomadism was typical in many areas, to avoid overexploitation of available resources. Coastal communities were somewhat better off for food, although water supplies remained similarly scarce. Close to

the Hajar Mountains, part of the UAE's population once comprised transhumant pastoralists and farmers who retired to the hills in spring to cultivate terraced fields, but otherwise resided along the coast. Their lifestyle was not a choice, but a necessity, thrust upon the community by the severity of the environment.

## 5.CONCLUSIONS

Questions of environmental security and environmental protection are issues of overall security, since it directly challenges the following: open conflict, potentially to destabilize the situation in the society, lead to population displacement and even to the collapse of the state. The environment and the issue of environmental security is a legitimate national or planetary question and depends on the political, social, cultural, religious, economic and every other assistance and cooperation. In this context, the relevant norms and rules that are binding on the institutions of society and citizens through the implementation of normative legal regulation.

Rendered strategies, policies, laws, conventions, declarations, resolutions, agreements, norms and acts of community materialize through:

- analysis and identification of all types of environmental risks;
- total consideration of environmental requirements and the needs of the community;
- analysis and methodological organizational and technological determination and establishment of the systems and the mechanisms of environmental protection with the introduction of environmental standards;
- consideration of the introduction of modelling, planning and implementation of environmental protection to the community thus makes each individual holder of the same;
- raising the total conscious and environmental safety and culture of each individual in the community, which is an essential prerequisite for the efficiency of operation of the system of environmental protection;
- evaluation and analysis of the role of politics and the state and its impact both in the work of the legislative body, and the work of the executive and control body of the overall process;
- human influence in the process of globalization and disorders resulting from climate change.

For the realization of the said elements in the environmental protection and safety delegated as carriers are: politics, government, local communities, organizations, the media, print and electronic, citizens and individuals.

Ecological culture is an essential element of environmental awareness, since it is not based only on certain personal and collective ecological knowledge, but also on the specific action of society to seek solution of environmental problems to the community. Certainly one of the most important elements of the environmental awareness is the ecological knowledge as a necessary condition for the formation of environmental ethics and a good basis for

assessing the vulnerability of the environment. Establishing ecological knowledge conditions in the near future for the establishment of an adequate education for environmental protection are created with the aim of developing harmony in relations of man-nature-society-technique.

Ecological culture should express the unity of nature and society and to facilitate the development of essential abilities of man in the process of spiritual and material conquest of nature in order to preserve its integrity. Nature is nothing but a part of the general culture which determines relationship of men and society with environment which is understood as unity of natural and social elements.

towards the growing environmental degradation and indicate the need for rational use of natural resources. For its creation necessary are changes in the value systems of individuals and society, qualitative changes in social consciousness and the formation of environmental awareness and environmental ethics.

In the formation of ecological culture of modern man, ecological system of education has an important role. Educational process in role of protection and improvement of the natural environment is a conscious and planned development of knowledge of the human environment during the whole life, which aims to develop awareness of the basic characteristics of the human environment, relations within it and the relationship with her, based on which man will strive to preserve and improve the environment. Environmental education should provide a very secure knowledge about basic ecological issues of contemporary society, develop a critical attitude .

## REFERENCES

1. Adam Smith. 1776. Wealth of Nations. Harriman House. 2009.
2. Benjamin K. Sovacool and Björn-Ola Linner. The Political Economy of Climate Change Adaptation. 2016. Palgrave.
3. Carolyn Pumphrey. Editor. Global Climate Change: National Security Implications. May 2008. Pp 452.
4. David Ricardo 1817. On the Principles of Political Economy and Taxation.
5. Dimitris Stevis, Valerie J. Assetto. The International Political Economy of the Environment: Critical Perspectives. Lynne Rienner Publishers. P.2001 – 309.
6. [Donella H. Meadows](#), [Jorgen Randers](#), [Dennis L. Meadows](#). Limits to Growth: The 30-Year Update. 338 pages. Chelsea Green Publishing; 3 edition (June 1, 2004). ISBN-10: 9781931498586. ISBN-13: 978-1931498586.
7. [Horst Siebert](#), [Ariane BerthoinAntal](#). The Political Economy of Environmental Protection. JAI Press, 1979.
8. Jae-Yong Chung, Richard J. Kirkby. The Political Economy of Development and Environment in Korea. Routledge. 2002.
9. [James K. Boyce](#). The Political Economy of the Environment. Edward Elgar, 2002. Toward a Political Economy of Sustainable Development.

10. [Jennifer Clapp](#) and [Peter Dauvergne](#). 2011. Paths to a Green World: The Political Economy of the Global Environment. MIT Press. P. 384.
11. K. J. Walker. The Political Economy of Environmental Policy: An Australian Introduction. 1994.
12. Paul Vedeld, Darley Jose Kjosavik. The Political Economy of Environment and Development in a Globalised World: Exploring the Frontiers. Social Scientists' Association, 2012

## **THE FISCAL CHARACTER OF THE EXCISE AND ITS INFLUENCE ON THE CONSUMPTION AND SOCIAL POLITICS IN THE REPUBLIC OF SERBIA**

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*Visoka škola za poslovnu ekonomiju i preduzetništvo, Serbia*

**Abstract:** In the focus of this paper are excises as a specific type of indirect taxes that, in addition to value added taxes, take an important place in the structure of public revenue of the Republic of Serbia. How? The excise doesn't only have a fiscal character and in this paper we paid attention to other reasons for the implementation of excises – the influence on the consumption of certain products harmful to health of the citizens, management of social politics, politics of our environment etc.

We also paid special attention to emphasize the excises in the tax system of the Republic of Serbia and their legal regulative through the Law on Excise. We analyzed new legislative solutions of excises on tobacco (the method of calculating excises on tobacco and tobacco products), as well as the rates of some of the most important excise products.

**Keywords:** Excise, Excise Rate, Taxation through Excises, Tax, Public

### **UVOD**

Kada se govori o bilo kojoj vrsti davanja od strane poreskih obveznika, nezaobilazno je podsetiti na neke osnove poreskog sistema, odnosno poreze i njihove tri osnovne funkcije: fiskalna, ekonomska i socijalna. U poreski sistem je ugrađen veliki broj poreskih oblika koji se u svakom sistemu razlikuju. Ovaj sistem predstavlja skup instituta i instrumenata koji stoje na raspolaganju poreskoj vlasti za ostvarivanje određenih fiskalnih, ekonomskih, socijalnih i političkih ciljeva u okviru ekonomskog sistema. To je, dakle, vrlo značajan podsistem ekonomskog sistema koji se stalno menja i usavršava, prilagođavajući se društveno-ekonomskim sistemima.

Porez snažno deluje na preraspodelu nacionalnog dohotka, kroz vođenje ekonomske i socijalne politike, kao sredstvo kojim se deluje na procese proizvodnje, raspodele, potrošnje, investicija, demografske faktore, izvoz-uvoz i niz drugih privrednih agregata. Porez kao instrument fiskalne politike postaje jedan od osnovnih instrumenata stabilizacione politike, posebno u pravcu borbe protiv inflacije, s obzirom na to da deluje na sužavanje novčane tražnje na tržištu i na uspostavljanje robno - novčane ravnoteže.

### **1. AKCIZE**

Može se reći da su akcize najstariji porez na proizvode i njihovom primenom se prvi put ostvaruje ideja oporezivanja potrošnje. Akcize su izuzetno primamljive za državnu vlast i prevashodno se uvode iz fiskalnih razloga jer su izvor značajnih poreskih prihoda državi.

Istovremeno, kod njih je izostavljen princip pravednosti jer se prilikom njihove primene ne poštuje načelo plaćanja poreza prema ekonomskoj snazi. Ipak, pored fiskalnog cilja, uvođenje određenih akciza može biti inspirisano i drugim razlozima. Tako se, na primer, akcize na alkoholna pića i duvanske proizvode opravdavaju i razlozima odgovarajuće zdravstvene politike (uticanje na potrošnju proizvoda koji škode zdravlju), dok se za neke druge akcize mogu naći drugi razlozi, zasnovani na potrebama vođenja socijalne politike, politike očuvanja čovekove okoline (ekološki razlozi) i dr. Oporezivanjem ovih proizvoda postižu se istovremeno dva cilja: smanjuje se njihova potrošnja, a povećava potrošnja drugih proizvoda neophodnih za život čoveka (brašno, so, mast, obuća, odeća i sl.) i tako se indirektno utiče na zdravlje ljudi.[1]

Akcize su specijalni porezi kojima se oporezuje potrošnja uglavnom monopolističkih proizvoda, tj. proizvoda masovne potrošnje. Oni spadaju u grupu tzv. indirektnih poreza (koji se ubiraju preko proizvođača, prodavaca i drugih posrednika, a ne direktno od pojedinaca) na domaća dobra i usluge. Osnovni cilj uvođenja akciza je bio i ostao fiskalnog karaktera. Da bi se taj cilj dostigao, akcizama se oporezuju proizvodi koji se ne mogu supstituisati ili je njihova supstitucija teško izvodljiva (duvanske prerađevine, naftini derivati, alkoholna pića, i sl). Akcizama se oporezuju proizvodi koji štete ljudskom zdravlju i životnoj okolini i deklarišu se kao „luksuz“ u odnosu na namirnice koje su od ključne važnosti za ljudsku egzistenciju. Rezultat su potrebe odvratanja od potrošnje određenih proizvoda (duvan i alkohol) i pojedinih usluga (kockanje i igre na sreću) te eliminisanja štetnih posledica na potrošače, domaćinstva i društvo u celini.

Akcize spadaju u poreze na pojedinačna dobra i usluge bilo prema klasifikaciji OECD, bilo klasifikaciji MMF-a. [2] Akcize su, dakle posebni (specijalni) porezi na potrošnju. Istorijski posmatrano akcize se javljaju kao najstariji oblik potrošnog poreza, s njihovim uvođenjem je prvi put primenjena ideja oporezivanja potrošnje. Akcize se lako i efikasno ubiraju, sistem obračuna i naplate je jednostavan. Poreska evazija kod akciza je mala, a kontrola obračuna i naplate laka i jednostavna.

Akcize se uobičajeno obračunavaju u apsolutnom iznosu po jedinici mere proizvoda (kilogram, litar, komad, paklica duvana i sl.) - to je tzv. „specifična stopa (osnovica)“ akcize ili ređe u odredjenom procentu prodajne cene – tzv. akciza « ad valorem» (U Republici Srbiji, na primer, akciza iznosi 30% na uvoz kafe, a kumulativno na cigarete od 35% u 2009. do 70% u 2016. godini). Promenama Zakona o akcizama (“Sl. glasnik RS”, br. 61/07), u periodu do 31. decembra 2009. godine akciza se plaćala se na cigare i cigarilose po stopi od 33% na osnovicu po vrednosti koju je činila maloprodajna cena (MPC) po komadu. Od 1. januara 2016. godine iznos akcize na duvanske proizvode iznosi 43% (Čl.40g i 40d cit. Zakona o akcizama).

Akcize imaju zadatak da doprinose zaštiti domaće proizvodnje, ekonomisanju tražnje za energijom (naftna industrija) te redukciji plaćanja javnih troškova (zdravstveni troškovi u vezi sa pušenjem i alkoholizmom) i dodatnih taksi (upotreba puteva za vožnju automobila). Radi se o proizvodima čije su cene prilično visoke, a nisu neophodne za egzistenciju čoveka. Na drugoj strani štetno deluju na zdravlje ljudi (alkohol, duvan i sl.). Oporezivanjem ovih proizvoda postižu se istovremeno dva cilja: smanjuje se njihova potrošnja, a povećava potrošnja drugih proizvoda neophodnih za život čoveka (brašno, so, mast, obuća, odeća i sl.) i tako se indirektno utiče na zdravlje ljudi.

U Republici Srbiji pitanje akciza regulisano je Zakonom o akcizama.

## 2. AKCIZE U SRBIJI

Akcize kao posebni - specijalni porezi na potrošnju u Kraljevini Jugoslaviji bile su u primeni pod nazivom „trošarine“. One su u ograničenoj meri i sa malim značajem egzistirale par godina posle Drugog svetskog rata, kada nestaju iz poreskog sistema Srbije, sve do devedesetih godina prošlog veka.

Od 1. januara 2008. u Srbiji se primenjuju jedinstvena specifična i proporcionalna akciza na sve cigarete – domaće i cigarete iz uvoza, a visina stope i iznosi akciza su utvrđeni za svaku godinu u periodu do očekivanog usklađivanja sa zakonodavstvom Evropske unije. Nestabilni privredni tokovi i značajna inflacija usloveli su potrebu usklađivanja dinarskih iznosa akciza godišnjom stopom rasta cena na malo u kalendarskoj godini koja prethodi godini u kojoj se usklađivanje vrši, prema podacima republičkog organa nadležnog za poslove statistike (tzv. indeksacija). To usklađivanje primenjuje se kod svih slučajeva gde osnovicu akcize čini jedinica mere (specifična osnovica). Dakle, pomenutim usklađivanjem obuhvaćeni su i iznosi dela akciza na cigarete koji se utvrđuju u fiksnom iznosu po jedinici mere (po paklici - pakovanju od 20 komada). Novim propisima, plaćanje akcize složenije je kod cigareta, duvana za pušenje i ostalih duvanskih prerađevina. Komplikovanost obračunavanja akciza kod pomenutih proizvoda nastala je uvođenjem u sistem obaveznosti plaćanja tzv. minimalne akcize, u slučajevima kada je obračunata akciza primenom odredaba Zakona o akcizama manja od nje (Zakon o izmenama i dopunama Zakona o akcizama, „Sl. glasnik RS“, br. 61/07, član 10).

Prema Zakonu, obveznik akcize je proizvođač ili uvoznik akciznih proizvoda. Proizvođač akciznih proizvoda je lice koje u proizvodnom pogonu pravi, obrađuje, prerađuje, doraduje i sl. proizvode na koje se plaća akciza, a uvoznik akciznih proizvoda je lice koje u svoje ime i za svoj račun uvozi, odnosno lice za čiji račun se uvoze iz inostranstva proizvodi na koja se plaća akciza.

Postupak indeksacije vezane za derivate nafte tako je doveo do značajnog uslozňavanja. Razlog ovome je taj što je zakonodavac hteo da se putem akciza vodi i elastična ekonomska politika u cilju stabilizacije privrednih tokova.

U strukturi ukupnih prihoda budžeta za 2008. godinu učešće akciza u Srbiji iznosi 17,4%, a poreza na dodatu vrednost (PDV) 48,7% sa trendom rasta u budžetu za 2016. god gde akcize učestvuju sa 25,4 %, a PDV-a iznosi oko 42%, što potvrđuje tvrdnju da su akcize i porez na dodatu vrednost stubovi poreskog sistema Republike Srbije, kao i da akcize beleže dimaničan rast u strukturi javnih prihoda Republike Srbije. [3]

### 2.1. OSNOVICA AKCIZE

Osnovicu za obračun akcize čini jedinica mere. Za derivate nafte - motorni benzin i dizel gorivo npr. jedinica mere je litar, a za tečni naftni gas za pogon motornih vozila i ostale derivate nafte koji se dobijaju od frakcija nafte je kilogram, osnovica za obračun akcize za sve vrste alkoholnih pića je litar itd. Osnovicu za obračun akcize pri uvozu kafe (sirove, pržene, mlevene i ekstrakta kafe) čini vrednost proizvoda utvrđena po carinskim propisima, uvećana za iznos carine i drugih uvoznih dažbina. Kada je reč o duvanskim prerađevinama osnovicu za obračun ad valorem akcize na cigarete čini maloprodajna cena po paklici cigareta, koju određuju proizvođač, odnosno uvoznik cigareta, a osnovicu za obračun akcize na duvan za



pušenje i ostale duvanske preradevine čini maloprodajna cena po kilogramu, a koju, takođe, određuju proizvođač, odnosno uvoznik tih proizvoda.

## 2.2. IZNOSI, STOPE AKCIZA I UMANJENJE PREMA VAŽEĆEM ZAKONU

Prema Zakonu iznosi akciza na derivate nafte, alkoholna pića i duvanske preradevine usklađuju se jednom godišnje (do kraja januara tekuće godine) sa stopom rasta cena na malo u kalendarskoj godini koja prethodi godini u kojoj se usklađivanje vrši, a prema podacima republičkog organa nadležnog za poslove statistike. Usklađeni iznosi akciza (za sve akcizene proizvode) primenjuju od narednog dana od dana objavljivanja u „Službenom glasniku Republike Srbije”. Iznosi akciza, mogu se, izmeniti samo izmenom Zakona.

U 2016. godini, važeći iznosi akciza iskazani su u sledećoj tabeli, kao i poređenja radi, važeće stope u 2010. godini.

Tabela 1. Vrste proizvoda na koje se plaća akciza i njihovi iznosi u 2010. i 2016. godini [6]

Vrsta akciznog proizvoda	Iznos akcize 2016.	Iznos akcize 2010.
A) Derivati nafte:		
1)olovni benzin	56,71 din/lit.	44,70 din/lit.
2)bezolovni benzin	52,50 din/lit.	44,70 din/lit.
3)ostali derivati nafte koji se dobijaju od frakcija nafte	62,00 din/kg	48,20 din/lit.
4)tečni naftni gas za pogon motornih vozila	41,00 din/kg	15,24 din/kg.
B) Alkoholna pića:		
1) rakije: a) od voća, grožđa, specijalne rakije b) od žitarica i ostalih poljoprivrednih sirovina	124,00 din/lit. 316,00 din/lit.	87,58 din/lit. 222,20 din/lit.
2) žestoka alkoholna pića i likeri	203,00 din/lit.	142,42 din/lit.
3) niskoalkoholna pića	21,00 din/lit.	14,62 din/lit.
4) pivo	24,00 din/lit.	16,56 din/lit.
C) Kafa		
1) nepržena kafa	80,00 din/kg	30% MPC
2) pržena kafa	100,00 din/kg	30% MPC
3) ljuspice i opne od kafe	110,00 din/kg	30% MPC
4) ekstrakti, esencije i koncentracije od kafe	150,00 din/kg	30% MPC
D) Duvan i duvanske preradevine:		
1) Cigarete	33% MPC + 58,5 din/pak.	35% MPC + 17,27 din/pak.
2) Cigarilosi	15,50din/kom.	15,74din/kom.
3) Duvan za pušenje i ostale duvanske preradevine (rezani duvan, duvan za lulu, duvan za žvakanje i burmut)	43% MPC	35% MP
E) Električna energija	7,5% MPC	

Kao što se može videti iz tabele, u periodu 2010-2016 stope akciza su povećane drastično, pre svega zbog fiskalne funkcije ovih javnih prihoda. U istom periodu, 2010. godine procenat akciza u ukupnim prihodima RS bili su oko 20%, dok je 2016. godine taj iznos 25%. Brojčano, u budžetu RS akcize su iznosile 131.500.000.000 din 2010. godine, dok je 2016. iznos akciza 254.200.000.000 din. [4]

Proizvođači, odnosno uvoznici cigareta i alkoholnih pića (osim piva), dužni su da pri proizvodnji, odnosno pre uvoza cigareta i alkoholnih pića, obeleže kontrolnom akciznom markicom svaki od tih proizvoda posebno. Način i postupak oko dobijanja akciznih markica, obeležavanja cigareta i alkoholnih pica i razduživanja markicama, propisane Uredbom o izgledu kontrolne akcizne markice, vrsti podataka na markici i načinu i postupku odobravanja i izdavanja markica, vođenja evidencija o odobrenim i izdatim markicama i obeležavanja cigareta i alkoholnih pića („Službeni glasnik RS”, br.137/04...108/06). Zabranjeno je staviti u promet na tržištu Republike Srbije akcizne proizvode koja nisu obeležena propisanom akciznom markicom i da ovakavo postupanje, saglasno članu 176. Zakona o poreskom postupku i poreskoj administraciji («Službeni glasnik RS, br. 20/02.....i 72/09), predstavlja poresko krivično delo.

Obveznik akcize sastavlja obračun akcize tromesečno, i najkasnije u roku od 20 dana po isteku tromesečja podnosi ga nadležnom poreskom organu, na osnovu knjigovodstvene evidencije, tako što sabira iznose faktura, otpremnica i drugih dokumenata na osnovu kojih je akciza obračunava. Oni podnose Poreskoj upravi obrazac PP OTA - pojedinačna poreska prijava o tromesečnom obračunu akcize. Ovaj obrazac dostavlja se samo za period u kome je promet ostvaren. Uz obrazac PP TOA dostavljaju se i fotokopije naloga o uplati akcize u tromesečnom periodu za koji se sastavlja obračun.

Takođe, obveznici akciza moraju podnositi nadležnom poreskom organu i obrazac PPOAK - poreska prijava o kumulativno - godišnjem obračunu akcize za obračunski period sa propisanim priložima. Tromesečni obračun se podnosi, i za period u kome nije postojala obaveza za plaćanje akcize. Ako je po godišnjem obračunu iskazana razlika manje obračunate akcize, kamata se obračunava od dana kada je dospela obaveza po osnovu akcize.

Obveznik uz obračun akcize podnosi i naloge za uplatu razlike akcize ako su uplaćeni iznosi manji od iznosa obaveze utvrđene tim obračunom, a za više uplaćene iznose podnosi zahtev za povraćaj ili pismeno izveštava da će za više uplaćene iznose umanjiti sledeću mesečnu obavezu.

### **3. OPOREZIVANJE AKCIZOM**

#### **3.1. DERIVATI NAFTE, BIOGORIVA I BIOTEČNOSTI**

Derivatima nafte smatraju se svaki proizvod koji se upotrebljava kao pogonsko gorivo kao i aditivi, koji se dodaju u pogonska goriva. Kupac - krajnji korisnik može biti pravno ili fizičko lice, koje kroz prodajnu cenu derivata nafte, biogoriva i biotečnosti snosi trošak punog iznosa akcize koji je propisan Zakonom. Biogoriva, definisana su zakonom kojim se uređuje oblast energetike, kao tečna ili gasovita goriva za saobraćaj, proizvedena iz biomase, dok su biotečnosti, definisane istim zakonom, kao tečna goriva za proizvodnju električne i toplotne energije i energije za grejanje i hlađenje, proizvedene iz biomase, osim za saobraćaj.[5]

U narednoj tabeli dat je pregled kretanja akcize na naftne derivate u period 2010-2016. godine.

Tabela 2. Iznosi akciza na neke od naftnih derivata u periodu 2010-2016. [6a]

Godina	Olovni benzin (RSD)	Bezolovni benzin (RSD)	Tečni naftni gas (RSD)
2010	44.70	44.70	15.24
2013	49.60	49.60	30.00
2014	50.00	50.00	35.00
2015	50.00	50.00	40.00
2016	55.00	52.50	41.00

Iz date tabele vidi se porast akciza između 2010. godine i 2013. godine kod benzina za nešto manje od 10%, sa periodom stagnacije tokom 2014-2015 uz trend rasta tokom 2016. godine, dok je kod tečnog naftnog gasa akciza povećana za 100% tokom prve tri posmatrane godine, sa trendom rasta do 2016. godine - procentualno 16,67% u 2014, 14,28% u 2015. godini i tokom 2016. godine za oko 2,5%. Iz ovoga možemo zaključiti da iznos akciza na naftne derivate ima pozitivan, rastući trend. Razlika u iznosima akcize na tečni naftni gas i benzin, 2010. godine bila je 29,46 RSD, 2014. godina iznosi 15 RSD, dok 2016. godine svedena na 11,5 RSD.

### 3.2.DUVAN I DUVANSKE PRERAĐEVINE

Kada je reč o oporezivalju duvana i duvanskih preradevina akcizom u Republici Srbiji, na cigarete se plaća sledeća akciza, u skladu sa članom 40 Zakona o akcizama:

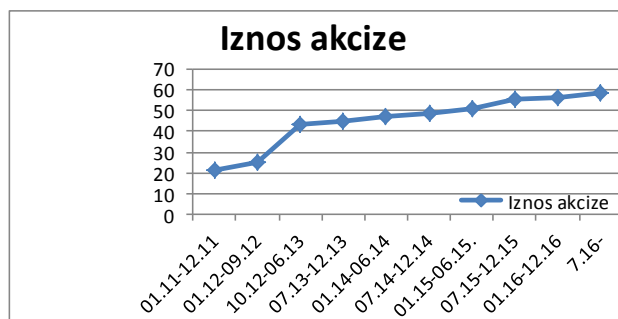
specifična akciza, koja prema poslednjem usklađivanju iznosi 58,50 din/pak i primenjuje se od 01. jula 2016. godine i ad valorem akciza po stopi od 33% na maloprodajnu cenu cigareta.

Zakonom je propisano da se stopa „ad valorem“ akcize na cigarete ne menja, bez obzira na period primene, dok je kod „specifične akcize“ propisan različiti iznos akcize, u zavisnosti od perioda primene, tako da je: [7]

- u periodu od 01.01.2011.do 31.12.2011. iznos akcize je 21,00 din/pak,
- u periodu od 01.01.2012.od 30.09. 2012 iznos akcize je 25,00 din/pak,
- u periodu od 01.10.2012. do 30.06.2013 iznos akcize je 43,00 din/pak,
- u periodu od 01.07.2013. do 31.12.2013 iznos akcize je 45,00 din/pak,
- u periodu od 01.01.2014. do 30.06.2014. iznos akcize je 47 din/pak,
- u periodu od 01.07.2014. do 31.12.2014. iznos akcize je 49,00 din/pak,
- u periodu 01.01.2015. do 30.06.2015. iznos akcize je 51,00 din/pak,
- u periodu 01.07.2015 do 31.12.2015. iznos akcize je 55,50 din/pak,
- u periodu 01.01.2016. do 30.06.2016 iznos akcize je 56,00 din/pak,
- u periodu 01.07.2016 iznos akcize je 58,50 din/pak.

Vlada, na predlog ministarstva nadležnog za poslove finansija polugodišnje utvrđuje, i to do 31. januara, odnosno do 31. jula tekuće godine, iznose prosečne ponderisane

maloprodajne cene i akcize, zato se može i primetiti da se baš tada iznosi akciza menjaju, kao i maloprodajna cena cigareta. Takođe primećuje se da kriva akciza ima pozitivan trend i očekuje se povećanje iznosa akcize na oko 60 din/pak do kraja 2017. godine.



Slika 1. Kretanje akciza na cigarete u periodu 2011-2016

### 3.3. ALKOHOLNA PIĆA

Alkoholnim pićima smatraju se pića koja i svom sastavu, između ostalog sarže etanol, i kao takva se stavljaju u promet. Jaka alkoholna pića su alkoholna pića sa preko 15% alkohola, dok su nisko alkoholna pića ona koja sadrže više od 1,2% alkohola, a najviše 15% alkohola koja se proizvode od voćnih sokova uz dodatak rafinisanog etil alkohola, fermentacijom biljnih ekstrakata (vina, cider i dr.) i svih vrsta piva, osim bezalkoholnih piva.

Osnovica za obračun akcize kod alkoholnih pića je litar, i to u sledećim iznosima:

- rakije od voća - 124,00 din/lit
- rakije od žitarica - 316,00 din/lit
- ostala jaka alkoholna pića - 203,00 din/lit
- niskoalkoholna pića - 21,00 din/lit
- pivo - 24,00 din/lit

Ukoliko je piće pakovano u različitim pakovanjima od litar, onda se akciza plaća srazmerno pakovanju.

Možemo zaključiti da su najviši iznosi akcize upravo kod oporezivanja alkoholnih pića. Razlog tome leži u sprovođenju zdravstvene politike i zaštite zdravlja stanovništva, usmeravajući ih na ovaj način konzumiraju druge, zdravije vrste pića.

### 3.4. KAFA

Kada se govori o oporezivanju kafe akcizom, kafom se smatra nepržena i pržena kafa, ljuspice i opna od kafe, ekstrakti, esencije i koncentрати od kafe.

Osnovica za obračun akcize na kafu je kilogram i to u sledećim iznosima:

- na neprženu kafu - 80 din/kg,
- pržena kafa - 100 din/kg,
- ljuspice i opna od kafe - 110 din/kg,
- ekstrakti, esencije i koncentрати od kafe - 150 din/kg.

### 3.6.ELEKTRIČNA ENERGIJA ZA KRAJNJU POTROŠNJU

Krajnjom potrošnjom smatra se isporuka električne energije krajnjim kupcima u Republici Srbiji, uključujući i korišćenje električne energije od strane snadbevača za sopstvene potrebe, obračunata u skladu sa zakonom kojim se uređuje oblast energetike. Obveznik akcize na električnu energiju je snadbevač električne energije. Osnovica za obračun ove akcize je cena električne energije koju potroši krajnji korisnik i iznosi 7,5%. U Republici Srbiji snadbevač električnom enegrijom je Elektroprivreda Srbije (skr. EPS). EPS obračun potrošene električne energije koristikao osnovicu za obračun akcize.

Obračunski period za plaćanje akcize je kalendarski mesec za koji je izvršeno očitavanje potrošene električne energije, a obaveza za plaćanje najkasnije do 15. u sledećem mesecu.

Остварена просечна цена електричне енергије (дин/кWh): 4,82			
4	ЗАДУЖЕЊЕ ЗА ЕЛЕКТРИЧНУ ЕНЕРГИЈУ У ОБРАЧУНСКОМ ПЕРИОДУ (1+2+3)		6.002,99
5	Полуст 5% за плаћање претходног рачуна у року доспећа		
6	Накнада за повлашћене произвођаче електричне енергије	1.245	0,093 115,79
7	Основица за обрачун акцизе (4+5+6)		6.118,78
8	Износ акцизе (7.5%)		458,91
9	Основица за ПДВ (4+5+6+8)		6.577,69
10	Износ ПДВ (20%)		1.315,54
11	Умањење за енергетски угрожене купце		
12	ЗАДУЖЕЊЕ ЗА ОБРАЧУНСКИ ПЕРИОД (9+10+11)		7.893,23
13	Такса за јавни медијски сервис		150,00
A	УКУПНО ЗАДУЖЕЊЕ ЗА ОБРАЧУНСКИ ПЕРИОД (12+13)		8.043,23

Slika 2. Deo računa za električnu energiju sa akcentom na iznos akcize i njenu osnovicu

## 4. ZAKLJUČNA RAZMATRANJA

Počevši od devedesetih godina prošlog veka, u Srbiji se u poreski sistem uvodi specijalni potrošni porez pod nazivom akciza. U toku razvoja propisa koji su regulisali ovaj poreski oblik, težilo se ka harmonizaciji sa propisima Evropske unije, eliminisanju sive ekonomije i obezbeđivanju izdašnih prihoda za budžet Republike. Akcize spadaju u grupu indirektnih poreza na potrošnju i jako su bitne za prikupljanje javnih prihoda jedne države, što im je i jedan od osnovnih ciljeva. Kao vrsta selektivnih poreza na potrošnju proizvoda uvode se zbog potrebe većeg oporezivanja određenih ili specifičnih proizvoda. Akcize su specijalni porezi kojima se oporezuje potrošnja uglavnom monopolističkih proizvoda, tj. proizvoda masovne potrošnje (sa niskom elastičnošću tražnje), koji štete ljudskom zdravlju i okolini, a nisu od posebnog značaja za život čoveka. Tu spadaju: derivati nafte, bezalkoholna pića,

alkohol i alkoholna pića, pivo, kafa (u svim oblicima), duvanske preradevine i od skoro električna energija.

Poreski (akcizni) obveznici su proizvođači i uvoznici tih proizvoda. Akcize spadaju u poreze na pojedinačna dobra i usluge bilo prema klasifikaciji OECD, bilo klasifikaciji MMF-a. One se lako i efikasno ubiraju, sistem obračuna i naplate je jednostavan. Poreska evazija kod akciza je mala, a kontrola obračuna i naplate laka i jednostavna. Međutim, gledano sa aspekta poreskog destinatora - potrošača, može se primetiti da su akcize kao fiskalni prihod nepravedne zbog svog regresivnog delovanja. Uobičajeno je da se kod akciza poreska obaveza određuje u fiksnom iznosu po kategoriji i jedinici proizvoda (komad, paklica duvana, litar benzina, litar alkohola, kilogram i dr.), kao „specifična akciza” a ređe kao proporcionalna stopa iskazana u procentima na maloprodajnu cenu proizvoda – tzv „akciza ad valorem” a često se primenjuje kombinovani sistem, kao što je to slučaj kod oporezivanja duvana u našoj zemlji. Još jedna karakteristika akciza je prevaljivost, tj. ovaj porez se prevaljuje (prenosi) na krajnjeg potrošača (osobu koja je konzument akciznih proizvoda).

Postoji široki spektar razloga i opravdanja uvođenja akciza – od fiskalnog kao osnovnog cilja uvođenja poreza, do niza nefiskalnih ciljeva – ekonomskih, socijalnih, ekoloških, zdravstvenih i dr.

## REFERENCE

- [1] Cvetanović, S., Ekonomija, Ekonomski fakultet, Niš, 2004.
- [2] Stakić B., Barać S., Javne finansije, Univerzitet Singidunum, Beograd, 2009.
- [3] <http://www.parlament.gov.rs/upload/documents/3204-15.pdf>, datum pristupa 01.05.2017.
- [4] <http://www.parlament.gov.rs/upload/documents/3204-15.pdf>, datum pristupa 30.04.2017.
- [5] <http://www.poreskauprava.gov.rs/sr/o-nama/pravilnici/1054/pravilnik-o-nacinu-obracunavanja-i-placanja-akcize-vrsti-sadrzini-i-nacinu-vodjenja-evidencija-dostavljanja-podataka-i-podnosenje-poreske-prijave.html>, datum pristupa 30.04.2017.
- [6, 6a] [www.paragraf.rs/propisi/zakon\\_o\\_akcizama.html](http://www.paragraf.rs/propisi/zakon_o_akcizama.html), datum pristupa 29.04.2017.
- [7] Radičić, M., Javne Finansije, Ekonomski fakultet, Subotica, 2008.

## THE COMPLEXITY OF COMPANY'S VALUATION PROCESS THROUGH ITS BASIC VARIATIONS

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**Abstract:** Value determination has been always recognized as a process during which economic rule of *ceteris paribus* cannot be efficiently applied. That is due to the high number of process given variables. In the same time it is recognized as one of most challenging economic research topics. In praxis, once companies are subject to value determination analysis it becomes very complex to define and measure properly number of variables influencing the process. Furthermore connection of the value concept as an economic value and various needs of the valuation concept remains recent challenge.

Hereby task of the research will be directed towards description of the basic concepts that are having potential to unify subjective and objective variables within the value concept in different situations and perspectives of analysis. In particular, specific concepts different than the fair market and investment value will be analyzed.

**Keywords:** Valuation, Concepts of value, Company law, Competitiveness

### 1. VALUE AS A CONCEPT AND INCREASE OF THE COMPANY'S VALUE

In context of company valuation - term of value is usually equalized with economic value. Such value is consisted of sum expressed in money that is to be paid for return of obtaining property right, right for management of assets or gaining of future benefits of such asset composition<sup>24</sup>.

But praxis confirms that concept of value is not static or homogeneous. Value of any asset is dependent on many factors, changing from time to time such as:

- Overall business environment;
- Potential use of the valuation subject;
- Time framework for making value forecasts;
- Location of the valuation subject;
- Availability of the subject for business purposes as well as its substitutes
- Number of owners;
- Subject liquidity and market existence for the valuation subject<sup>25</sup>
- Physical conditions of the valuation subject.

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<sup>24</sup> David Laro Judge, U.S.Tax Court Shannon P. Pratt CFA, FASA, MCBA, CM&A, MCBC, *Business Valuation and Taxes Procedure Law and Perspective*, John Wiley & Sons, Inc. p. 5 2005

<sup>25</sup> Company liquidity is frequently reason for the mergers and acquisitions and opposite - Jose M. Campa, Caterina Moschieri- *The European M&A Industry, Trends, Patterns and Shortcomings*, IESE Business School, University of Navarra, Barcelona, Spain, p. 22 2008 p. 21-35

The value concept is often different depending on the price and cost. Price can be determined as actual price spent with aim some asset to be obtained. Cost is seen as money value of the input factors used output to be produced. The phrase “asset is overpaid” usually indicates situation where was executed above payment of money for one asset that its value usually was.<sup>26</sup>

There is a difference between terms value and cost also. Cost for the construction and establishment of a trade mall, for example might not reflect its value if suddenly after his construction there have been changes in the business environment such as bankruptcy of large scale employer. In that case cost could be much higher than value. The value, price and the cost are different concepts and they are rarely showing same amounts of cash for the same asset.

In the last 70 years the contours were formed of several value concepts out of which we have chosen to elaborate twelve, that are frequently exploited:

- Fair market value. That’s an amount expressed in cash of equivalent after which the property right of one asset was changed voluntarily between the buyer and seller having in mind that both are having enough information and facts confirmed, about the asset.
- Investment value. The value of future benefits gained through the property of one asset;
- Fair value. The fair value concept is directed towards a kind of statutory standard of value developed according to the judicial case law as well as similar transactions from the past;
- Fundamental value. Determined by the existence or non-existence of an option for returning of the investment;
- Value in use/value in exchange. It is value that overcompasses productive use of all assets that one company is consisted of as well as on the amount that is needed to be invested for other assets to be bought as a replacement for the ones in use if the second has become unproductive;
- Goodwill value. It is a difference between the value that is given to a company as one unit/one name and the value of all the tangible and nontangible assets owned or used by the same company.
- Current value. Was meant on the current company value from the point of view from a single time moment or period;
- Accounting value. That’s a typical concept of value used for tax and accounting purposes<sup>27</sup>;
- Liquidation value. The liquidation value in its essence might not be analyzed as separate value concept but as set of circumstances under which value of a subject could be considered if the business is closing down;
- Insurance value. That is a money value for the allowances for the parts of the business that can be insured and in case insured risk to happen;
- Replacement value. Directs towards the costs made in order new asset to be bought with the same characteristics.
- Compensation value. This concept is used in order the amount to be determined that should be transferred if the subject of value does not executes the functions for which was its purpose and to be set out of use.

Belo are mentioned eight concepts of value that in the period of time mentioned (recent 70 years) evolved mostly.

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<sup>26</sup> Frank C. Evans David M. Bishop, *Valuation for M&A - Building Value in Private Companies* John Wiley & Sons, Inc. 2001 p. 28-30;

<sup>27</sup> David Laro Judge, U.S. Tax Court Shannon P. Pratt CFA, FASA, MCBA, CM&A, MCBC, *Business Valuation and Taxes Procedure Law and Perspective*, John Wiley & Sons, Inc. 2005;



## 1.1 VALUE IN USE/REPLACEMENT VALUE

Value in use is not considered as a type of value but as a way through which some hypothesis were made considering the valuation of a particular type of asset. It is usually applicable to the assets that are having productive use and could be explained as a value of one asset in relation with its contribution towards certain output, produced through use of an asset valued in that case also considered as an input. There is no particular definition for the value in use from a relevant institution or researcher. Despite it is important to understand that the concept of value in use is related mostly with the processes of merging of companies or acquisitions because valuation in that case is to be undertaken through the process of asset valuation towards their productive use into the company.

The replacement value is essentially different that the value in use. Concept of replacement value is related with the value of particular asset in the time of selling the asset, and analyzed as single one with no any connection of the working environment in which it was used previously.<sup>28</sup> Typically, replacement value is lower than the value in use in certain business entity. For example the replacement value is usually lower than the value in use of a single asset used by one company. Cash machines and their software can be hardly used for other purpose and even by other banks than the original owner due to their tailoring.

## 1.2 GOODWILL VALUE

Goodwill is a specific type of value, an intangible assets concerning the business in whole has higher value than its parts one by one both tangible and intangible. For example since 1960 Anglo-Saxon case law defines the goodwill as a sum of qualities for which joint denominator cannot be identified but which are attracting the clients.<sup>29</sup>

From the side of mergers and acquisitions, the goodwill value is calculated as a difference among the value paid for business buy out and the fair market value for the assets that has been bought through the process of buying out the same business. The goodwill concept has significant use within the companies for the tax purposes, financial reporting as well as the regulatory issues.

## 1.3 GOING CONCERN VALUE

Such kind of value does not represent standard value as fair market value or investment value. By the other meaning of words it is wrong to be said that “going concern value of the company XYZ is 100 million EUR value”. But the statement “fair market value as a going concern value of the company XYZ is 100 million EUR is a true statement. Such difference might be seen as a semantic one with little practical usage but in the essence is represents a key for understanding of the value of a single asset or company.

The going concern value is usually applied when businesses are valued through their profit units or branches and with the hypothesis that profit unit or branch will not stop with revenues in a recent period of time. The last one is essential premise for such valuation

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<sup>28</sup> Barber, Gregory A. “Valuation of Pass-Through Entities.” Valuation Strategies Magazine, USA, 2001, p. 50-65

<sup>29</sup> Bhide, A., *The Causes and Consequences of Hostile Takeovers*, Journal of Applied Corporate Finance, v2, 1989 p.20-36

method. From the taxation point of view the valuation has different meaning. In that case the going concern value has been seen as a value from which the depreciation coefficient has been deducted. Dozens of case law materials are using the going concern value as a basis.

#### 1.4 ACCOUNTING VALUE

Most of the errors in valuations nowadays are in connection with the accounting value. It is a valuation from the accounting and taxation point of view and does not need to be economic valuation in the same time. For particular asset the accounting value is simply historical cost of a single asset and historical benefit of the same. For a business entity the accounting value is a complete value of assets from which liabilities has been deducted. In the terms of the accounting terminology this has been noted as a net value<sup>30</sup>. This concept is of high importance, that is to be applied when mergers or acquisitions are undertaken, at least in order fair market value or investment value to be compared with the accounting value. Examples are showing that always there is an existing difference among the fair market value or investment value and the accounting value.

In the table below there is an example of a value of the bank for which there is an interest for acquisition and the difference occurred between the fair market value and the accounting value.

Table 1. An example of differences between the accounting value and the fair market value (in money units )

Assets	Accounting value	Fair market value
Cash and equivalent Готовина и еквиваленти	11,694	11,694
Investments	34,369	31,812
Loans	56,718	52,892
(reserves for nonperforming loans)	(780)	(780)
Net loans	55,938	52,112
Premises and fixed assets	3,517	4,703
Other real estate	810	525
Other assets	2,860	
Nontangible assets	/	
Assets total	109,188	

Source: Zabihollah Rezaee, Financial Institutions, Valuations, Mergers, and Acquisitions, The Fair Value Approach, *Second Edition*, John Wiley & Sons, Inc. New York, USA, p. 170, 2001

<sup>30</sup> J Fred Weston and Samuel C Weaver *Mergers and Acquisitions, Tax and Accounting Guidelines, Legal and Regulatory Frameworks and Guidelines for Postmerger Integration*, McGraw-Hill Publishing Executive MBA Series, New York, 2003 p.-50-65

## 1.5 LIQUIDATION VALUE

Liquidation value does not represent the separate type of value- but as a precondition or premise under which the valuation process has been undertaken. It is a net sum that can be gained if the business has been closed and its assets are being sold out as a single or in whole until the liabilities are not compensated fully. Under the principle of liquidation value it is not true to say that “value of the asset X in liquidation is 100 EUR”. Liquidation value can differ among the forced and voluntary liquidation. From the Net value in the first situation should be deducted all the provisions and administrative fees occurring from the forced liquidation legislative.

## 1.6 INSURANCE VALUE

The insurance value is analyzed as a total of a price paid or gained if the company has been lost of its assets and the risk case insured happened. Such kind of value has not significant use in cases of mergers and acquisitions but is often used in cases when the business is confronted with high risks in his business environment.

## 1.7 REPLACEMENT VALUE

The replacement value of an asset is a price that is to be paid in relation with procurement of a new assets, materials and technology. This value is not equal with the reproduction value. The second represents the cost of asset duplicate production under the actual prices. The replacement value are used mostly in cases when there is a valuation of a tangible assets that are not giving direct revenues such as for example furniture, equipment etc.

## 1.8 SELLING VALUE

It is a value or sum that is to be received from the sale of particular asset if it cannot be used any more for the current owner and it has to be set out of use. In the cases of trade mergers and acquisitions such valuation method is usually applied when there is a case of a several companies joined together through mergers and acquisitions and which are having the same assets appearing two or more times.

## 1.9 TYPES OF PROPERTY THAT CANNOT BE VALUATED

Valuation is an economic concept closely connected with the property concept. When there is a discussion about the term valuation usually means rights and benefits related with the property. The legal concept of property and owning is very complex albeit some points are of essential meaning in order for his better understanding.

The clearest way of property is identified through tangible assets. Such an asset is having physical type. Within the companies they are shown within the asset balance as fixed assets.

Property rights are also considered as nontangible.<sup>31</sup> They are consisted of those assets that are not having physical value and are having contribution to the revenues of the company. Such nontangible assets in the business environment are including the following elements:

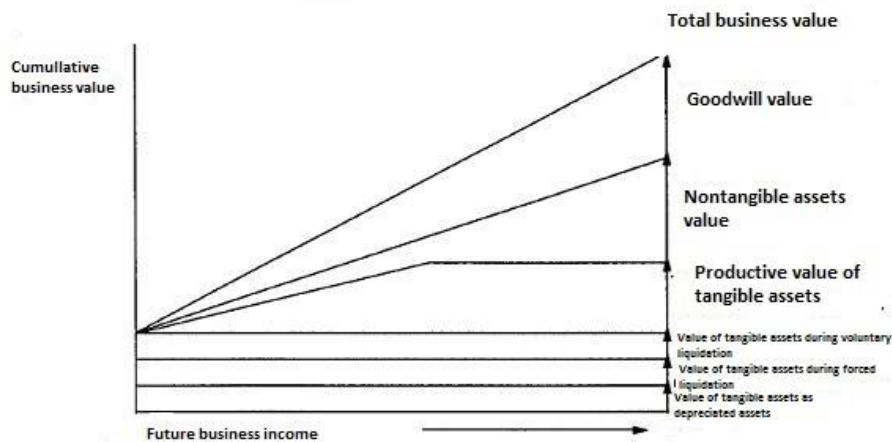
- Money base;
- Contracts for loan servicing;
- Computer software;
- Image;
- Goodwill etc.

Every single of those types of nontangible assets could be valued also.

The third type of property that can be valued is a business in whole as a combination of tangible and nontangible assets and property rights. In order concept of total valuation to be understood tangible and nontangible assets are to be analyzed as a unity of use that is produced through tangible and nontangible assets.

#### 1.10 RELATIONSHIP BETWEEN THE DIFFERENT TYPES OF VALUE

From the aspect of complete business management from the various types of valuation certain relations can be established. In the table below it is shown that various types of future revenues are having influence on the different types of valuation.



Graph 1. Illustration of the relations among the various types of value and valuation and future revenues of the business

Source: M&A Valuations- Building value in private companies Frank C. Evans David M. Bishop -John Wiley & Sons, Inc. New York 2004

The lowest value that business could gain is the value as per the depreciated tangible assets which remains the same with no influence by the value of revenues that are obtained by

<sup>31</sup>Geoffrey H. Smart *Management Assessment Methods In Venture Capital: Toward a Theory of Human Capital Valuation* Claremont Graduate University 1998 p. 10-28

the company. For example value of the write –offs is constant in certain period of time no matter of the earning that business had.

Value of the company in the terms of forced liquidation is the second lowest value, but from the practical point of view this might be the lowest value that company could have if it has to be sold as a whole. Likewise the value of the written-off (depreciation value) tangible assets, in this situation value is also not dependent on revenues company could have in future. Voluntary liquidation is conceptually identical as forced liquidation except the fact that in the last case there is probability higher price to be gained in comparison with the forced liquidation, due to possibility for longest waiting period transaction to be made , in which period probability better buyer to be found, increases.

The value in use is a value of the tangible assets that typically increases as the revenues of the company. Once the revenues of the company will become zero the value in use and the value of the voluntarily liquidation are theoretically equal but as the business becomes more and more successful the meaning of tangible assets becomes higher and in such cases the value in use is higher than the value in case of voluntarily liquidation. The value of tangible and nontangible shows the tendency for increase as the revenue of the company increases.

The goodwill value is often increasing as business profits are going high since such value is calculated on a basis of difference between the value of a business as a whole and the value of identified tangible and nontangible assets. Same as the profit of the business raises it creates the raise of the goodwill value.

Cumulative result shows the total business value. It is a value of all tangible and intangible assets increased for the revenue expected in future. The most of the business valuations are undertaken as per the cumulative value of business.

## **2. PROPERTY VALUATION IN REPUBLIC OF MACEDONIA**

In Republic of Macedonia long time ago there was no legal basis for valuation of the various kinds of property. Since 2010 there is a Law on valuation that is regulating property valuation with the primary aim for the tax purposes but the same law also stipulates use for valuation for private purposes.<sup>32</sup> Property has been categorized within the 12 categories: real estate, movable goods, machines and equipment, information technology, intellectual property rights ,trade companies as a whole,military equipment, industrial property, receivables and obligations, agricultural goods, information technology, environment protection.<sup>33</sup> For each of the previously mentioned categories there is a separate methodology based on several standards. For the real estate key standards are environment and location within Republic of Macedonia, for the information technologies, transport goods, military equipment key standard is depreciation, while for the industrial property and property rights, agricultural property machines and equipment as well as movable goods are both depreciation factor as well as the possibility for future receivables. For each of the last can be used revenues method, costs method or market value method.

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<sup>32</sup> Law on Valuation , Official Gazet of RM 115/2010

<sup>33</sup> Same, articles 1-9.

### 3. CONCLUDING REMARKS

- Valuation concept is a key economic concept that is strongly connected with the property concept. When valuation has been analyzed -usually are examined rights and benefits arising from the property that is object of valuation. Potential use of the property, timeframe for the value forecast, property location, relative presence and value of substitutes, number of owners, liquidity and presence of market for such property, physical conditions and overall economic environment are mainly considered as factors of highest impact on the valuation concept for certain property.

- Due to the impacting factors in recent 70 years mostly in business use (business as usual) are valuation concepts such as : fair market value , investment value , fair value, fundamental value, replacement value, going concern value, book value, goodwill value, replacement value, insured value and compensation value.

- Most significant changes of the concept were made in: Value in use/replacement value, Goodwill value, Going concern value, Accounting value, Liquidation value, Insurance value, Replacement value, Selling value etc.

- In Republic of Macedonia legal basis for valuation can be found within the Law on valuation as of 2010 where concept and methodology for the property valuation are determined on the basis of previous categorization of property in 13 categories. .

### REFERENCES

1. Zabihollah Rezaee, Financial Institutions, Valuations, Mergers, and Acquisitions, The Fair Value Approach, *Second Edition*, John Wiley & Sons, Inc. New York, USA, p. 170, 2001
2. David Laro Judge, U.S. Tax Court Shannon P. Pratt CFA, FASA, MCBA, CM&A, MCBC, *Business Valuation and Taxes Procedure Law and Perspective*, John Wiley & Sons, Inc. p. 5 2005
3. Jose M. Campa, Caterina Moschieri- *The European M&A Industry, Trends, Patterns and Shortcomings*, IESE Business School, University of Navarra, Barcelona, Spain, p. 22 2008
4. M&A Valuations- Building value in private companies, Frank C. Evans David M. Bishop -John Wiley & Sons, Inc. New York 2004
5. Geoffrey H. Smart *Management Assessment Methods In Venture Capital: Toward a Theory of Human Capital Valuation* Claremont Graduate University 1998
6. Patrick Kelsey, *Human Resources & Valuation of Intangible Assets* Nyack College, Nyack, New York, 2004

7. David Laro Judge, U.S.Tax Court Shannon P. Pratt CFA, FASA, MCBA, CM&A, MCBC, *Business Valuation and Taxes Procedure Law and Perspective*, John Wiley & Sons, Inc. 2005;
8. Frank C. Evans David M. Bishop, *Valuation for M&A - Building Value in Private Companies* John Wiley & Sons, Inc. 2001 ;
9. Barber, Gregory A. “*Valuation of Pass-Through Entities.*” *Valuation Strategies Magazine*, USA, 2001
10. J Fred Weston and Samuel C Weaver *Mergers and Acquisitions , Tax and Accounting Guidelines , Legal and Regulatory Frameworks and Guidelines for Postmerger Integration*, McGraw-Hill Publishing Executive MBA Series, New York , 2003
11. Bhide, A., *The Causes and Consequences of Hostile Takeovers*, *Journal of Applied Corporate Finance*, v2, 1989
12. Law on valuation. Official Gazette of RM 115/2010

## **THE MODEL OF STRATEGIC PLANNING IN THE DEVELOPMENT OF ECOTOURISM: A CASE STUDY ECO-LODGE IN EASTERN SERBIA**

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**Abstract:** The concept of sustainable development has become the main guidelines in the field of environmental management. Strategic planning of development of all forms of tourism, especially ecotourism, requires a detailed analysis of all positive and negative impacts that this industry has on the environment. An adequate model could help in defining methods for incentive tourism trends, while helping to protect, preserve and improve the quality of the environment in a particular region. Tour of valuable habitats, untouched nature and ecosystems, ecological value and degradation of habitat, are some of the frequently mentioned concepts in the so-called. "nature tourism". One of the forms of accommodation in the area of ecotourism are eco-lodging. Given that the construction of units of this type does not require a large financial investment, this type of accommodation can be seen as an ideal way of improving ecotourism in Serbia, a country with extremely limited funding. The analysis of natural resources of the region in Serbia, pointed out the significant advantages of one of the areas in southeast Serbia. This region was, thanks to the characteristic and unspoiled nature, popularly called the "Alps of eastern Serbia."

The aim of this paper is to conduct a detailed review and identification of natural and cultural resources of the selected region, using the SWOT analysis. In this way, it is possible to set up a reliable basis for strategic planning of ecotourism development in this area and to minimize the negative anthropogenic impact on nature. Further, AHP methods will help in prioritization of defined strategy for tourism development in the region by building ecolodges.

**Keywords:** ecotourism, eco-lodging, strategic planning, sustainable tourism development, AHP

### **1. UVOD**

Nagli porast stanovništva tokom XX veka doprineo je konstantnom smanjivanju raspoloživih prirodnih resursa i životnog prostora, kao i ugrožavanju ekoloških faktora životne sredine. Prepoznavanje urgentnosti rešavanja postojećih i prevencije daljeg nastanka ekoloških problema, dovelo je do nastanka koncepta održivog razvoja. Održivi razvoj se najčešće definiše kao "...razvoj koji zadovoljava sadašnje potrebe, ne ugrožavajući mogućnosti budućih generacija da zadovolje svoje potrebe" (UN, 1987). Koncept održivog razvoja je svoju najveću afirmaciju stekao na konvenciji UN o životnoj sredini i razvoju, u Rio de Žaneiru 1992. godine. Baziran je, prvenstveno, na potrebi za integrisanjem društveno – ekonomskog razvoja i unapređenja kvaliteta životne sredine. Stoga je, prilikom planiranja, odlučivanja i realizacije privrednih aktivnosti, neophodno maksimalno uvažavati potrebe životne sredine, jer se isključivo na taj način može obezbediti dugotrajan razvoj. To se



naročito odnosi na turizam kao delatnost koja se odvija u prirodnom okruženju i koristi značajne količine prirodnih resursa. (Scanlon.N.L, 2007). Stepen očuvanosti i atraktivnosti životne sredine predstavlja osnovni preduslov turističkog razvoja. Jačanje ekološke svesti dovelo je do toga da turisti prilikom odabira turističke destinacije sve češće teže približavanju istinskim vrednostima, kao što su ekologija, poštovanje tradicije i sl. Ekoturizam, odnosno zeleni turizam je jedan od odgovora na novonastale potrebe potrošača. Destinacije ekoturizma treba da zadovolje osnovne principe održivosti, kako u ekološkom, tako i u socio-ekonomskom pogledu. Preduslovi za razvoj ovih destinacija su sledeći:

- prisustvo zaštićenih prirodnih dobara ili predela sa očuvanim prirodnim karakteristikama i bogatim biodiverzitetom;
- oblasti i objekti namenjeni za rekreaciju gostiju usklađeni sa prirodnim kapacitetima;
- turistički objekti u vlasništvu lokalne zajednice;
- lokalno stanovništvo svesno svog kulturnog identiteta i spremno da učestvuje u promociji lokalnog nasleđa
- prijateljski odnos ekoturista i lokalnog stanovništva.

U skladu sa novim turističkim trendovima, došlo je do promena i u poslovnoj politici smeštajnih objekata. Hotelijeri i ugostitelji se sve više bave merenjem i kontrolisanjem uticaja koje vrše na okruženje. Na početak primene ekološke prakse uticalo je više razloga. Najvažnijim se smatra prepoznavanje negativnog uticaja ove delatnosti na prirodu, što se ogleda u smanjenju broja prirodnih staništa, zagađenju vode, proizvodnji otpada i doprinosu globalnom zagrevanju (Briguglio & Briguglio, 1996; Kirk, 1998). Ostali razlozi se ogledaju u težnji menadžera da objekat dostigne konkurentnu poziciju i odgovori na zakonodavne propise iz ove oblasti.

Jedan od vidova smeštaja koji je usklađen sa filozofijom i principima ekoturizma su ekokonačišta (Russell ,Bottrill, & Meredith, 1995). Ekokonačišta su uslužne i smeštajne jedinice koje su locirane unutar ili u neposrednoj blizini prirodnih područja (Osland i Mackoy ,2004, p. 110). Karakteriše ih skromna opremljenost i potreba za malim finansijskim ulaganjima. Programi koje pravo ekokonačište treba da ponudi svojim gostima su bazirani na obilasku prirodnih i kulturnih znamenitosti, direktnom kontaktu sa lokalnim stanovništvom, upražnjavanju sportskih aktivnosti, a sve uz poštovanje osnovnih etičkih principa i minimiziranje uticaja na okruženje. Raznovrsnost prirodnog nasleđa i kulturne baštine Srbije ukazuje na velike mogućnosti za razvoj ekoturizma. Uprkos tome, u Srbiji nisu u potpunosti implementirane strategije ovog tipa. Pravih ekokonačišta nema još uvek nema. S obzirom na to da ne zahteva velika ulaganja i da podrazumeva uključivanje lokalne zajednice, izgradnja ovih objekata u prirodno i kulturno autentičnim oblastima omogućila bi ekonomski razvoj čitavog regiona. Ipak, razvoj ekoturizma mora biti zasnovan na temeljnoj analizi svih uslova u okruženju i jasno definisanim strateškim ciljevima i aktivnostima.

Razvoj ekoturizma zasnovan na strateškom planiranju je složen multidisciplinarni zadatak čiju osnovu čine principi koncepta održivosti. Jasno definisani i unapred postavljeni ciljevi mogu biti se ostvariti jedino uz dobro koncipiran ekološki menadžment u turizmu. Zadaci ekološkog menadžmenta turističke destinacije usmereni su na očuvanje životnog ambijenta tog prostora, što podrazumeva primenu svetskih standarda, aktivno uključivanje u relevantne ekološke akcije i stvaranje partnerstva sa drugim učesnicima u ciju realizacije ciljeva (Đorđević, Kokić Arsić, 2010). Održivi razvoj, u tom smislu, predstavlja opšti okvir ekološkog menadžmenta.

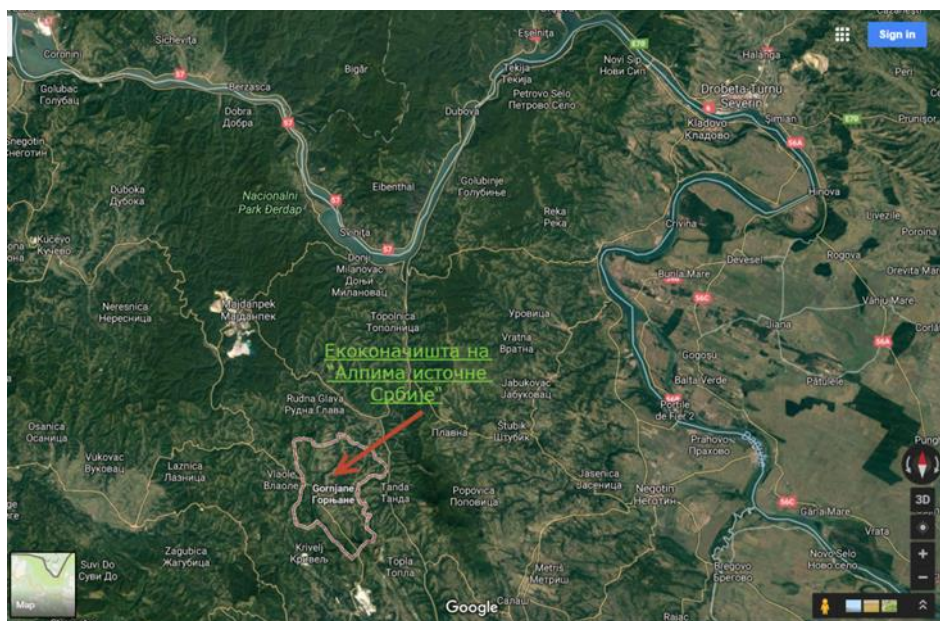
Cilj ovog rada jeste da se na praktičnom primeru predstavi proces kreiranja adekvatnog modela strateškog planiranja u cilju razvoja ekoturizma. Za ovu svrhu su primenjene integrisane SWOT (*Strengths, Weaknesses, Opportunities, Threats*, engl) i AHP (*Analytic Hierarchy Process*, engl.) metode. Zadatak SWOT analize bio je da se, na osnovu procenjenih snaga, slabosti, šansi i pretnji koje vladaju na odabranom lokalitetu, definišu strategije koje mogu biti najefikasnije za razvoj ekodestinicije i izgradnju ekokonačišta. AHP metodom zasnovanoj na SWOT analizi izvršena je prioritizacija strategijskih alternativa prema njihovom stepenu značajnosti.

Analiza zasnovana na primeni SWOT–AHP hibridnog modela korišćena je u različitim oblastima kao što su energetska, poljoprivredna i mašinska industrija, ali ne postoji mnogo studija u kojima je primenjena u turističkoj delatnosti (Kaharaman, Demirel, & Demirel, 2007). Faze realizacije SWOT-AHP analize su: (1) SWOT analiza, (2) uporedna analiza SWOT faktora unutar svake SWOT grupe, (3) uporedna analiza četiri SWOT grupe i (4) definisanje strategije na osnovu dobijenih rezultata.

## 2. METODOLOGIJA

### 2.1. OBLAST ISTRAŽIVANJA

Analizom prirodnih i kulturnih potencijala na teritoriji Republike Srbije, mogu se prepoznati brojne regije pogodne za razvoj ekoturizma i izgradnju ekokonačišta. Jedna od njih je oblast locirana u istočnom delu Srbije, udaljena dvadesetak kilometara od Bora. Smeštena je između planina Veliki Krš, Mali Krš i Stol, u narodu poznatih kao „Alpi istočne Srbije“ (Slika 1). Ovaj predeo odlikuje izuzetno očuvana i netaknuta priroda. Raznolikost reljefa pruža utočište i predstavlja stanište brojnim biljnim i životinjskim vrstama, što je ukazuje na raznovrstan biodiverzitet i postojanje nekoliko endemskih vrsta. U ovom kraju se nalazi preko 70 speleoloških objekata, pećina, jama i stanište je 11 vrsta grabljivaca. Takođe, u blizini je i arheološko nalazište Manastirište. Visoravan na kojoj se smenjuju livade, obradivo zemljište i šumarci, pogodno je za razvoj stočarstva, sakupljanje lekovitog bilja, pečuraka... Zahvaljujući tome, stvaraju se izuzetni uslovi za proizvodnju organske hrane (sir, med, mleko, povrće, voće...). Ovaj planinski region pruža mogućnost za razvoj ekstremnih i zimskih sportova (biciklizam, paraglajding, planinarenje, skijanje...).



Slika 1. Oblast istraživanja

Na osnovu navedenog, prepoznate su brojne prednosti ovog kraja za razvoj ekoturizma. Očuvana priroda može da privuče veliki broj ekološki orijentisanih turista, koji žele da provedu aktivan odmor, uživaju u prirodi i upoznaju kulturu lokalnog stanovništva.

## 2.2. SWOT ANALIZA

SWOT analiza je akronim od njegovih glavnih komponenti: snaga, slabosti, mogućnosti i pretnji (Glaister, Falshaw, 1999). SWOT analiza spoljašnjih mogućnosti i pretnji, kao i internih snaga i slabosti važna je za formulisanje strategije i razvoja (Chang, Huang, 2006). Ako se koristi pravilno, SWOT analiza može pružiti dobru osnovu za uspešno formulisanje strategije, a sama svrha njene primene u strateškim odlukama je da izabere ili predstavi i sprovede strategiju koja će rezultirati dobrim fitovanjem između internih i eksternih faktora (Kangas i dr., 2001). Odabrana strategija takođe mora biti u skladu sa ciljevima donosioca odluka. Međutim, rezultat SWOT analize je vrlo često samo spisak ili nepotpuno kvalitativno ispitivanje internih i spoljnih faktora, bez konkretne krajnje upotrebe u procesu donošenja odluka (Kajanus et al., 2012). Ona podrazumeva sistematsko razmišljanje i sveobuhvatnu dijagnozu faktora koji se odnose na novi proizvod, tehnologiju, upravljanje ili planiranje, dok za postupak donošenja odluke je potrebno je primeniti neku od metoda višekriterijumskog odlučivanja.

## 2.3. AHP METODA

Analitički Hijerarhijski Proces predstavlja jednu od najpoznatijih višekriterijumskih metoda koju je 1980. godine utemeljio Thomas I. Saaty. Mnoga istraživanja su potvrdila da je AHP metoda veoma koristan, pouzdan i sistematski MCDM (Multi Criteria Decision Making) alat za rešavanje složenih problema odlučivanja (Saaty, 1980; Kurttila et al., 2000; Kangas et al., 2001; Kajanusa et al., 2004; Lee et al., 2011; Savic et al., 2015). AHP metoda vrši stručno

analiziranje scenarija i donošenje odluka konzistentnim ocjenjivanjem hijerarhija koje se sastoje od ciljeva, scenarija, kriterijuma i alternativa. Ona najpre omogućava interaktivno oblikovanje hijerarhije problema kao pripremu scenarija odlučivanja, a zatim ocjenjivanje u parovima elemenata hijerarhije (ciljeva, kriterijuma i alternativa). Na kraju se vrši analiza svih ocjenjivanja i po strogo utvrđenom matematičkom modelu određuju se težinski faktori svih elemenata hijerarhije. Česta primena AHP metode se prepoznaje u raznim oblastima strategijskog menadžmenta u kojima odluke imaju dalekosežan značaj i gde se donosiocima odluka daje kvalitetan i pouzdan savet u fazi analize mogućih alternativa i utvrđivanja njihovog uticaja na postavljene ciljeve. (Saaty, 1990; Lee et al., 2008).

### 3. REZULTATI

Prvi korak u definisanju potencijalnih i selekciji najefikasnijih strategija za razvoj ekoturizma kroz izgradnju ekokonačišta na odabranom lokalitetu, predstavlja situaciona analiza koja obuhvata internu (analizu snaga i slabosti) i eksternu analizu (analizu šansi i pretnji). Rezultati analize su prikazani u Tabeli 1.

Tabela 1. SWOT matrica

<p style="text-align: center;"><b>Snage (Strengths)</b></p> <p><b>S1</b> Zainteresovanost lokalne zajednice za razvoj ekoturizma  <b>S2</b> Aktivnost lokalne samouprave ka intenzivnijem razvoju regije  <b>S3</b> Značajni prirodni i kulturni potencijali  <b>S4</b> Planinski venac nalik Alpima</p>	<p style="text-align: center;"><b>Slabosti (Weaknesses)</b></p> <p><b>W1</b> Neadekvatna zaštita prirodnih resursa u regionu  <b>W2</b> Nedovoljna iskorišćenost turističkog potencijala regiona  <b>W3</b> Nizak nivo svesti o postojanju destinacije na regionalnom i međunarodnom tržištu  <b>W4</b> Trenutna zainteresovanost investitora za ulaganje u region</p>
<p style="text-align: center;"><b>Šanse (Opportunities)</b></p> <p><b>O1</b> Razvoj turizma u regionu;  <b>O2</b> Nepostojanje ekokonačišta u regionu;  <b>O3</b> Mogućnost upražnjavanja ekstremnih sportova (biciklizam, paraglajding, planinarenje...);  <b>O4</b> Privlačenje inostranih i domaćih turista tokom cele godine;</p>	<p style="text-align: center;"><b>Pretnje (Threats)</b></p> <p><b>T1</b> Slaba razvijenost turizma u ovom okrugu i neupućenost lokalnog stanovništva u koncept ekoturizma;  <b>T2</b> Neuspeh u privlačenju domaćih i stranih investitora;  <b>T3</b> Nedovoljna zainteresovanost države i nezadovoljavajući stepen implementacije strategije razvoja turizma;  <b>T4</b> Predrasude o zagađenju okoline usled poslovanja Rudarsko - Topioničarskog Basena u Boru;</p>

U nastavku je na osnovu dobijene SWOT analize, formirana TOWS matrica prikazana u tabeli 2., u kojoj su definisani kriterijumi i podkriterijumi, kao i generisane strategije.

Tabela 2. TOWS matrica

	<b>Snage (Strengths)</b> <b>S1</b> Interes lokalne zajednice za razvoj ekoturizma <b>S2</b> Aktivnost lokalne samouprave ka intenzivnijem razvoju regije <b>S3</b> Značajni prirodni i kulturni potencijali <b>S4</b> Planinski venac nalik Alpima	<b>Slabosti (Weaknesses)</b> <b>W1</b> Neadekvatna zaštita prirodnih resursa u regionu <b>W2</b> Nedovoljna iskorišćenost turističkog potencijala regiona <b>W3</b> Nizak nivo svesti o postojanju destinacije na regionalnom i međunarodnom tržištu <b>W4</b> Trenutna zainteresovanost investitora za ulaganje u region
<b>Šanse (Opportunities)</b> <b>O1</b> Razvoj turizma u regionu; <b>O2</b> Nepostojanje ekokonačišta u regionu; <b>O3</b> Mogućnost upražnjavanja ekstremnih sportova (biciklizam, paraglajding, planinarenje...); <b>O4</b> Privlačenje inostranih i domaćih turista tokom cele godine;	<b>SO</b> <b>SO1</b> Strategija održavanja i unapređivanja stepena zainteresovanosti lokalne zajednice u cilju razvoja ekoturizma <b>SO2</b> Strategija kreiranja turističke ponude koja će obezbediti mogućnosti za boravak turista tokom cele godine	<b>WO</b> <b>WO1</b> Strategija privlačenja turista isticanjem prirodnih i kulturnih potencijala ovog kraja u promotivnim aktivnostima radi upoznavanja sa destinacijom <b>WO2</b> Strategija iskorišćavanja porasta broja poseta inostranih turista u cilju privlačenja inostranih investitora za razvoj ekoturističke destinacije
<b>Pretnje (Threats)</b> <b>T1</b> Slaba razvijenost turizma u ovom okrugu i neupućenost lokalnog stanovništva u koncept ekoturizma; <b>T2</b> Neuspeh u privlačenju domaćih i stranih investitora; <b>T3</b> Nedovoljna zainteresovanost države i nezadovoljavajući stepen implementacije strategije razvoja turizma; <b>T4</b> Predrasude o zagađenju okoline usled poslovanja Rudarsko - Topioničarskog Basena u Boru;	<b>ST</b> <b>ST1</b> Strategija integracije svih stejholdera u izgradnji i razvoju ekokonačišta <b>ST2</b> Strategija promovisanja destinacije radi razbijanja predrasude o zagađenju industrijske okoline	<b>WT</b> <b>WT1</b> Implementacija strategije razvoja turizma za period od 2016-2025. Godine, koju je donela Vlada Srbije sa naglaskom na razvoj ekoturizma <b>WT2</b> Strategija uticaja na lokalnu samoupravu u kreiranju fonda za razvoj eko-destinacija

U daljoj analizi, izvršeno je određivanje značaja kriterijuma i podkriterijuma primenom AHP metodologije od strane ekspertskog tima. Ovim grupnim odlučivanjem,

eksperti su ocenjivali kriterijume i podkriterijume, pri čemu su uzimali srednje vrednosti za svaki, i na osnovu konačnog ranga donosili su odluku. Dobijeni rezultati daju informacije o međusobnom značaju pojedinih SWOT faktora. U ovom slučaju najveći značaj imaju šanse (0.519), zatim slabosti (0.295), slede snage (0.133) i pretnje (0.053).

$$W_1 = \begin{bmatrix} S \\ W \\ O \\ T \end{bmatrix} = \begin{bmatrix} 0.133 \\ 0.295 \\ 0.519 \\ 0.053 \end{bmatrix}$$

Lokalni i globalni prioriteti SWOT faktora su izračunati, a rezultati su predstavljeni u Tabeli 3.

Tabela 3. Značajnost kriterijuma i podkriterijuma SWOT analize, određeni AHP metodologijom

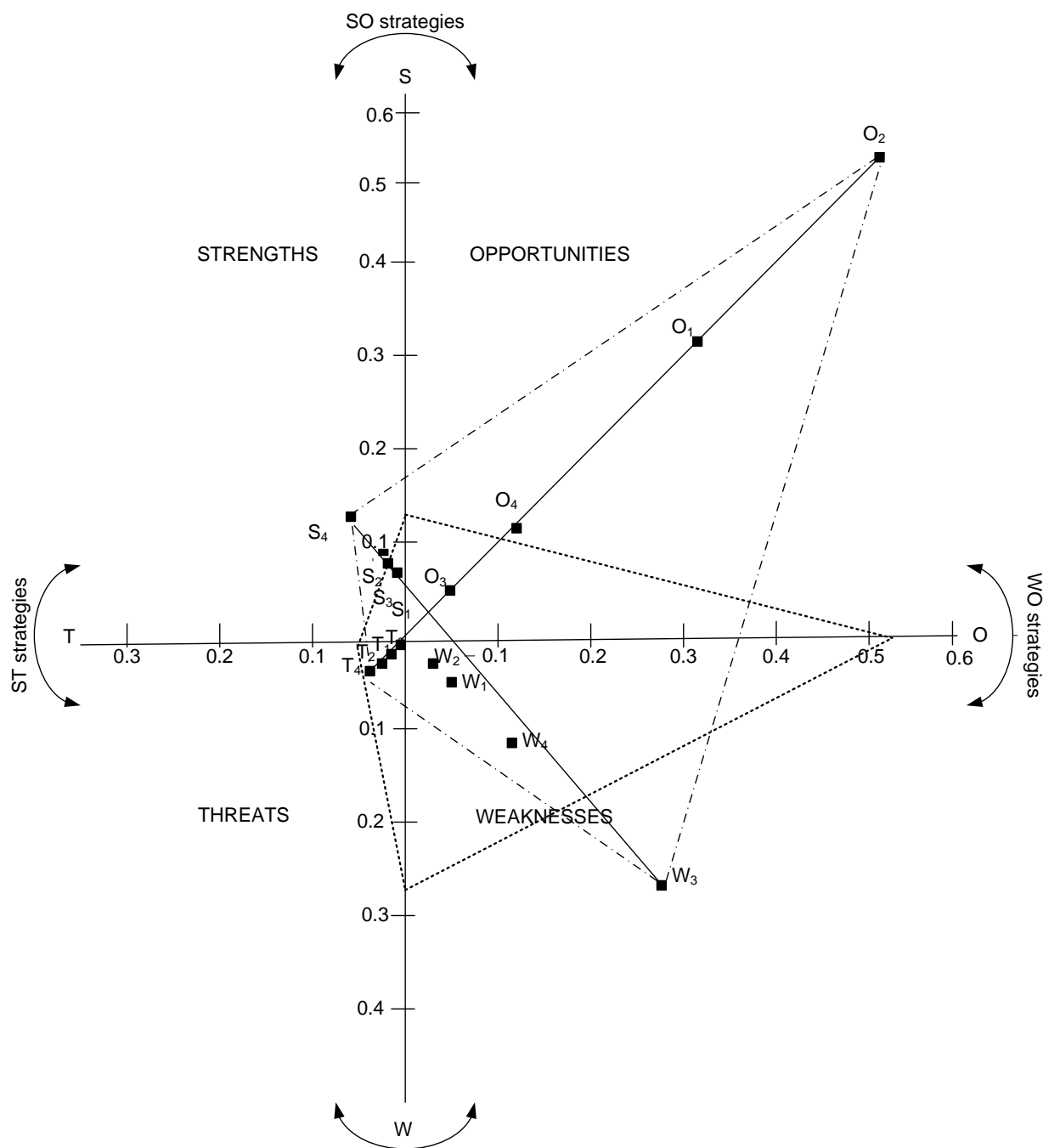
SWOT grupe	Značajnost SWOT faktora	SWOT podkriterijumi	Lokalna značajnost	Globalna značajnost
Snage (S)	0.133	S1. Interes lokalne zajednice za razvoj ekoturizma	0.070	0.009
		S2. Aktivnost lokalne samouprave ka intenzivnijem razvoju regije	0.294	0.039
		S3. Prirodni potencijali (netaknuta priroda; sedativno-terapijsko i stimulatивно dejstvo klime; prirodna i biološka raznovrsnost)	0.130	0.017
		S4. Planinski venac nalik Alpima	<b>0.506</b>	0.067
Slabosti (W)	0.295	W1. Neadekvatna zaštita prirodnih resursa u regionu	0.131	0.039
		W2. Nedovoljna iskorišćenost turističkog potencijala regiona	0.064	0.019
		W3. Nizak nivo svesti o postojanju destinacije na regionalnom i međunarodnom tržištu	<b>0.527</b>	0.155
		W4. Trenutna zainteresovanost investitora za ulaganje u region	0.279	0.082
Šanse (O)	0.519	O1. Razvoj ekoturizma (Bor, Srbija);	0.325	0.168
		O2. Nepostojanje ekokonačišta u regionu;	<b>0.401</b>	0.208
		O3. Mogućnost upražnjavanja ekstremnih sportova (biciklizam, paraglajding, planinarenje...);	0.088	0.046
		O4. Privlačenje inostranih i domaćih turista tokom cele godine;	0.106	0.055
Pretnje (T)	0.053	T1. Slaba razvijenost turizma u ovom okrugu i neupućenost lokalnog stanovništva u koncept ekoturizma;	0.132	0.007
		T2. Neuspeh u privlačenju domaćih i stranih investitora;	0.271	0.014
		T3. Nedovoljna zainteresovanost države i nezadovoljavajući stepen implementacije strategije razvoja turizma;	0.097	0.005
		T4. Predrasude o zagađenju okoline usled poslovanja Rudarsko-Topioničarskog Basena u Boru;	<b>0.501</b>	0.027

Na ovaj način, dobijeni su normalizovani rezultati koji ukazuju na dominantan uticaj sledećih podkriterijuma u okviru svake SWOT grupe: S4- Planinski venac nalik Alpima

(0.506); W3- Nizak nivo svesti o postojanju destinacije na regionalnom i međunarodnom tržištu (0.527); O2-Nepostojanje ekokonačišta u regionu (0.401); T4. Predrasude o zagađenju okoline usled poslovanja Rudarsko- Topioničarskog Basena u Boru (0.501).

Na slici 2. Grafički je prikazana situaciona analiza SWOT rezultata na osnovu podataka iz Tabele 3. Dobijeni rezultati ukazuju na veličinu uticaja SWOT kriterijuma u opadajućem nizu  $O \rightarrow W \rightarrow S \rightarrow T$ . Vrednost sveukupne značajnosti SWOT podkriterijuma sa najvećim znalajem u okviru jednog faktora, takođe u opadajućem nizu  $O_4 \rightarrow W_3 \rightarrow S_2 \rightarrow T_1$ . S obzirom na daleko najveću ulogu šansi u razmatranom primeru (težinska značajnost 51.9%), kao i podkriterijuma  $O_1$  i  $O_2$  (njihov kumulativni globalni značaj je 37,6%), za očekivati je da će strategije, koje su generisane u cilju iskorišćenja šansi iz okruženja, imati prioritet u odnosu na preostale strategije u modelu.





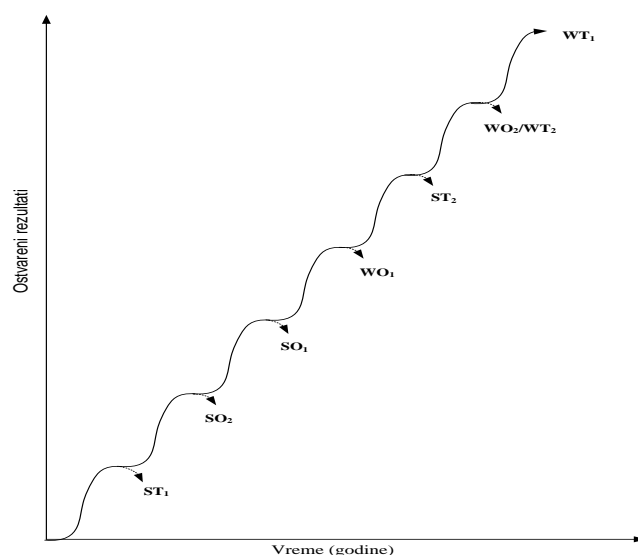
Slika 2. Situaciona analiza težinskog odnosa SWOT kriterijuma I sveukupne značajnosti SWOT podkriterijuma na osnovu AHP procedure

U nastavku je ekspertskim ocenjivanjem određen je težinski značaj svake alternativne strategije (SO1, SO2, WO1, WO2, ST1, ST2, WT1, WT2) u odnosu na definisane “SWOT“ podkriterijume, pri čemu je izračunat sveukupni prioritet razmatranih strategija, kao:

$$W_{\text{alternatives}} = \begin{bmatrix} ST1 \\ SO2 \\ SO1 \\ WO1 \\ ST2 \\ WO2 \\ WT2 \\ WT1 \end{bmatrix} = W_3 \times W_{\text{SWOTsub-factors(global)}} = \begin{bmatrix} 0.312 \\ 0.202 \\ 0.172 \\ 0.100 \\ 0.068 \\ 0.054 \\ 0.054 \\ 0.038 \end{bmatrix}$$

Dobijeni rezultati definišu prioritizaciju predloženih alternativnih strategija u sledećem opadajućem nizu:  $ST_1 \rightarrow SO_2 \rightarrow SO_1 \rightarrow WO_1 \rightarrow ST_2 \rightarrow WO_2 \rightarrow WT_2 \rightarrow WT_1$  ( $ST_1 = 0.312$ ;  $SO_2 = 0.202$ ;  $SO_1 = 0.172$ ;  $WO_1 = 0.100$ ;  $ST_2 = 0.068$ ;  $WO_2 = 0.054$ ;  $WT_2 = 0.054$ ;  $WT_1 = 0.038$ )

Dinamička uloga strategije podrazumeva da se posle ostvarivanja određenog rezultata primenom izabrane strategije, ulazi u novu fazu rasta i razvoja organizacije, što zahteva primenu nove strategije. Prema utvrđenom modelu za određivanje prioriteta predloženih alternativnih strategija, prioritet primene ima  $ST_1$  strategija (Slika 1).



Slika 3. Životni ciklus strategija za razvoj ekoturizma u analiziranoj regiji

#### 4. DISKUSIJA

Na osnovu prethodne analize možemo izdvojiti sledeće strategijske alternative, opisane u daljem tekstu. Strategija integracije svih stejkholdera u izgradnji i razvoju ekokonačišta ( $ST_1$ ) predstavlja ključ uspeha u razvoju održivog turizma. Implementacija ove strategije bi trebalo da omogući uspostavljanje saradnje između svih interesnih strana (lokalna samouprava, lokalno stanovništvo, turističke organizacije i sl.), čime bi se postiglo njihovo sinhrono delovanje i realizacija definisanih strateških ciljeva.

Uspešna primena navedene strategije, predstavljala bi osnovu za kreiranje turističke ponude koja bi obezbedila mogućnosti za boravak turista tokom cele godine ( $SO_2$ ). Rezultat

zajedničke saradnje stejkholdera bi, između ostalog, doprineo uspešnom planiranju i realizaciji aktivnosti za kreiranje raznovrsne i bogate ponude. Na taj način, obezbedili bi se uslovi za uspešno poslovanje ekokonačišta, bez obzira na turističku sezonu. Usluge koje bi se pružale turistima morale bi biti usaglašene sa zahtevima „*Sistema upravljanja zaštitom životne sredine ISO 14001:2004*“, čime bi se zadovoljili kriterijumi propisani međunarodnim standardima.

Kako se realizacija ove strategije privodi kraju, usledila bi implementacija strategije održavanja i unapređivanja stepena zainteresovanosti lokalne zajednice za razvoj ekoturizma (SO1). Cilj strategije SO1 bi se mogao postići stimulisanjem učešća lokalnog stanovništva u razvoju ekoturizma stvaranjem i kreiranjem mogućnosti za njihove preduzetničke aktivnosti i podizanje kvaliteta života. Nakon ostvarene strategije, nameće se potreba za sprovođenjem strategije privlačenja turista isticanjem prirodnih i kulturnih potencijala ovog kraja promotivnim aktivnostima, radi upoznavanja sa destinacijom (WO1). S obzirom da se WO1 strategija primenjuje radi podizanja svesti o postojanju destinacije na regionalnom i međunarodnom tržištu, stvaraju se uslovi za nastavak uspešnog razvoja primenom strategije promovisanja destinacije i razbijanjem predrasuda o visokom stepenu industrijske zagađenosti kraja (ST2).

Realizacijom strategije ST2 moguće je sprovesti i ispuniti strateški cilj o proglašenju lokaliteta za zaštićeno prirodno dobro. Sledeće strategije, koje je prema dobijenim jednakim vrednostima težinskih faktora u AHP analizi potrebno istovremeno sprovesti, su strategija iskorišćavanja porasta broja poseta inostranih turista u cilju privlačenja inostranih investitora za razvoj ekoturističke destinacije (WO2) i strategija uticaja na lokalnu samoupravu u kreiranju fonda za razvoj eko-destinacije (WT2). Ulazak stranog kapitala pozitivno će uticati na vlasti lokalne samouprave da postojećim fondom doprinesu razvoju eko-destinacije. Poslednja u nizu strategija koju je potrebno realizovati je implementacija strategije razvoja turizma za period od 2016-2025. godine, koju je donela Vlada Srbije, a u kojoj je akcenat stavljen na budući razvoj ekoturizma (WT1).

## 5. ZAKLJUČAK

Ekokonačište predstavlja vid smeštajnog objekta koji u potpunosti odgovara zahtevima ekoturista. Izgradnja objekta ovog tipa na analiziranoj lokaciji u istočnoj Srbiji bi mogla da doprinese implementaciji ideje razvoja ekoturizma, definisane zvaničnom Strategijom za razvoj turizma 2016 – 2025 i usvojene od strane Vlade RS. S obzirom na to da izgradnja smeštajnih jedinica ove vrste ne zahteva velika materijalna ulaganja, ovaj tip smeštaja se može posmatrati kao idealan način unapređenja ekoturizma u Srbiji, zemlji ograničenih finansijskih sredstava. Intenzivnijom posetom ovih krajeva, kako od strane domaćih, tako i od strane inostranih turista, značajno bi došlo do porasta državnih i lokalnih prihoda. Takođe, nastala bi i potreba za zapošljavanjem i razvojem preduzetništva lokalnog stanovništva. Okolna sela regije u kojoj je planirana izgradnja ekokonačišta odlikuje prisustvo problema starenja stanovništva i migracije mladih ka obližnjim gradovima. Razvojem turizma, problemi ove vrste bi mogli biti rešeni, jer bi se mladima pružila prilika za samozapošljavanje u oblasti seoskog turizma, kao i prometa domaćih prehrambenih, organskih proizvoda. Time bi se značajno povećao standard stanovništva i delimično rešio problem nezaposlenosti.

Specifičnost posmatranog regiona se ogleda i u blizini bugarske i rumunske granice. Ova činjenica stvara uslove za uspostavljanje čvrste prekogranične saradnje. Imajući u vidu da je usvajanje standarda EU i usaglašavanje zakonodavnih propisa u oblasti turizma i zaštite životne sredine, neizostavan i prioritetan zadatak Vlade Srbije u narednom periodu, a sve u cilju priključivanja EU, bilo kakav napredak i inicijative u tom pogledu mogu doneti višestruke koristi.

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## REFERENCE

- UN: Report of the World Commission on Environment and Development, General Assembly Resolution 42/87, dec. 1987.
- Scanlon, N. L., An analysis and assessment of environmental operating practices in hotel and resort properties, *Journal of Hospitality Management*, 26, (2007), 711–723.
- Russell, D., Bottrill, C., & Meredith, G., *International ecolodge survey*, Burlington, VT: The International Ecotourism Society, (1995).
- Osland, G. E., & Mackoy, R., Ecolodge performance goals and evaluations, *Journal of Ecotourism*, 3(2), (2004), 109–128.
- Briguglio, L., & Briguglio, M. (1996). *Sustainable tourism in islands and small states: Case studies*. London: Cassell Pinter.
- Kirk, D., Attitudes to environmental management held by a group of hotel managers in Edinburgh, *Journal of Hospitality Management*, 17, (1998), 33-47.
- Đorđević, M., Kokić Arsić, A., Ekološki menadžment - uslov održivog razvoja turizma, 5. nacionalna konferencija o kvalitetu života – Zbornik radova, Kragujevac, maj, (2010), 19-21.
- F.R. David, *Strategic Management: Concepts and Cases*, Prentice-Hall, New Jersey, 1998
- Kotler, P., *Marketing Management: Analysis, Planning, Implementation and Control*, sixth ed. Prentice-Hall International Edition, 1988.
- Wheelen, T.L., Hunger, J.D., *Strategic Management and Business Policy*, fifth ed. Addison Wesley, Reading, MA, 1995.
- Miika Kajanus, Pekka Leskinen, Mikko Kurttila, Jyrki Kangas, Making use of MCDS methods in SWOT analysis—Lessons learnt in strategic natural resources management, *Forest Policy and Economics* 20, (2012), 1–9
- Glaister, K. W. and Falshaw, J. R. Strategic planning still going strong. *Long Range Planning*, 32(1), (1999), 107-116
- Weihrich, H., The TOWS matrix-a tool for situational analysis. *Long Range Plan.* 15 (2), (1982), 54–66

- Hsu-Hsi Chang, Wen-Chih Huang, Application of a quantification SWOT analytical method, *Mathematical and Computer Modelling* 43 (2006), 158–169.
- Kangas, J., Pesonen, M., Kurttila, M. and Kajanus, M. (2001), A'WOT: Integrating the AHP with SWOT Analysis, 6th ISAHP 2001 Proceedings, Berne, Switzerland, (2001) 189-198.
- Johnson, G., Scholes, K., & Sexty, R. W. (1989), *Exploring strategic management*. Scarborough, Ontario: Prentice Hall, 1989
- Bartol, K. M., & Martin, D. C., *Management*. New York: McGraw Hill, Inc.
- Thomas L. Saaty, How to make a decision: The Analytic Hierarchy Process, *European Journal of Operational Research* 48, (1990), 9-26.
- Marija Savica, Djordje Nikolica, Ivan Mihajlovica, Zivan Zivkovica, Bojan Bojanovb & Predrag, Djordjevica, Multi-Criteria Decision Support System for Optimal Blending Process in Zinc Production, *Mineral Processing & Extractive Metall. Rev.*, 36, (2015), 267–280.
- Kurttila, M., Pesonen, J., Kangas, M., & Kajanus, M. (2000). Utilizing the analytic hierarchy process (AHP) in SWOT analysis hybrid method and its application to a forest-certification case. *Forest Policy and Economics*, 1: 41-52.
- Kahraman, C., Demirel, N., & Demirel, T., Prioritization of e-Government strategies using a SWOT-AHP analysis: The case of Turkey. *European Journal of Information Systems*, 16(3), (2007), 284-298.

## **CULTURAL DIFFERENCES AND SHAREHOLDER VALUE EXPLORING THE LINK BETWEEN PROFITABILITY, PRODUCTIVITY, AND LONG-TERM MARKET PERFORMANCE IN THE AUTOMOTIVE INDUSTRY**

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**Abstract:** The aim of this paper is to explore the relationship between Financial Performance, Environmental Performance, and impact of National Culture on the decision-makers when adopting new technologies or purchasing products. Six automotive manufacturers were selected: Daimler, BMW, VW Group, FCA, Ford Group and Hyundai with 42 different vehicle brands, 77 manufactures. Financial data were collected for the period 2005-2015 from the S&P DJ Index, Market Watch and through the published annual reports of companies. Data for vehicle sales for the 50 countries were collected from Marklines. Values of cultural dimension indices were gathered from the website of Geert Hofstede. Five cultural dimensions are examined in the different strategic formations for Business Units and Product line strategy. Cultural dimensions included the “*what*” and “*how*” factors, from “a” to “z” strategy. Econometric models use cross section time series in panel data regressions. The research results confirm positive relationship between environmental performance and profitability measured by GHG emissions. There is a growing gap between the production system and the market where the product is intended. The higher power distance and uncertainty avoidance, the higher resistance on the adoption of new technologies and products. The time lag for potential adopt in lagging markets help firms to understand the relative advantage of products, better assessments of technology needs, and to observe the experience of using the leading country adopted products. If the product is successful in leading countries, the risk associated with innovation is reduced.

**Keywords:** Financial Performance, Environmental Performance, Industrial Production Management, Automotive Industry, Strategic Management, Cultural Performance

### **1. INTRODUCTION**

Based on data from the Intergovernmental Panel on Climate Change, transport is responsible for 26 percent of greenhouse gas emissions (EPA, 2014), where over 90 percent of the fuel used for transportation is petroleum based, which includes gasoline and diesel. Strategies to reduce GHG includes measures ranging from technological progress and initiatives in the field of energy efficiency (IEA, 2009; Porter and Rajnhart, 2007; Ruso and Pogutz, 2009), to innovations in the production process. The last few years the industry has fallen into the trap of the high costs and risks, including cost of R&D, cost for high standards for environmental, time risk, and risks from competition and low profit. From the evolutionary point of view on economic change, a new technology equilibrium is in constantly offset by changes in the market. Scientists found relationship between asymmetric

information on technologies with principal-agent problem whenever decision makers rely on advice from others. The *assumption* is that balancing the interests of stakeholders, managers distributed *asymmetric information on technology* to shareholders as decision makers, which could prompt the possible *organizational failure* (Mellahi and Wilkinson, 2004 p. 31). For these reasons, balancing the interests of stakeholders has been placed in relationship manager-customer, in order to determine whether there is indeed a problem sending asymmetric information on technology to shareholders as decision makers.

This study seeks to explore the cultural differences between the decision makers in order to find a clear answer to the question, whether the limited competence and knowledge, can lead to inefficiency and failure in the market. The results of the research may have strong implications for future managerial action who want to include specific national cultures in sales strategies. The study provides a good basis for the development of a new theory that combines several different theories with cultural dimensions. The remainder of this paper provides an overview of literature and propose hypotheses of future research.

## 2. BACKGROUND

### 2.1. THE RATIO BETWEEN FINANCIAL PERFORMANCE AND ENVIRONMENTAL PERFORMANCE

There is an old debate among scholars, that high environmental performance negatively affect the profitability and production costs (Klassen, 1999 p. 1213), while others cite evidence of improving profitability, reduced risk, expected higher firm value (Hart 1997, p. 1467; Russo and Fouts, 1997 p. 1). The first principle, normative approach provides an important conceptual innovation simultaneously refocusing attention on business and the value-creating activity of corporations such as profitability, longevity, market share, market reputation, succession planning, raising capital, growth, social objectives (Freeman, 2010). Scholars argues that GHG prevention is related to continuous improvement in technology and invested capital intensity: “the closer a firm gets to 'zero pollution' emission reductions, more technology- and capital-intensive will become” (Hart and Ahuja, 1996 p. 36; Hart, 1995; Wauey and Whitehead 1994).

Based on the research (Hart, 1996; Dowell et. al, 2000 p. 48) profitability can be measured by using financial performance indicators such as (King, 2001) Return on Sales (ROS) and Return on Assets (ROA). Positive evidence of improving profitability, can be marshalled to support the view that efforts to prevent pollution are positively associated with operating and financial performance within one or two years from the start of implementation of new technology (Hart & Ahuja, 1996 p. 30; Dowell et.al., 2000 p. 1061). In this paper, it is proposed the profitability calculations in relation to the total emissions, the costs of R&D, capital investment, and intensity of invested capital in relation to the firm total annual sales. Thus, the relationship between profitability and environmental performance measured by GHG emissions assumes as a positive.

**H<sub>0</sub>:** The relationship between environmental performance and profitability measured by GHG emissions is positive.

## 2.2. EFFECT OF EMS AND THE APPLICATION OF STANDARDS ON PRODUCTIVITY AND PROFITABILITY

The second principle, known as instrumental approach is essentially hypothetical, it says, in effect, “If you want to achieve higher productivity (Cortez, 2000), then adopt green investment principles and environmental regulations practices”. However, questions persist about the nature of the relationship: “*Do global environmental standards create or destroy corporate market value*”. First **assumption** is, firms that implement an EMS may simultaneously reduce environmental impact and improve the competitiveness; Second, type of standards in use and number of patents could positive influence future manufacturing processes and productivity.

Thus, the decision to adopt clean technology and to incur an irreversible investment costs of pollution reduction without government action is risky for two reasons (Russo & Fouts, 1997 p. 542). First, technologies and processes in the early life cycle can cost more and be lower quality than it will be when they become essentially self-contained, off-the-shelf technology (Groenewegen & Vergragt, 1991 p. 48; Russo and Fous, 1997 p. 536). Second, the viability of new clean technologies has the effect of *high risk*, and *possible economic consequences of their use* (Klaus, 2003 p. 8). The **assumption** is that companies that adopt high standards of environmental protection can overcome organizational inertia of the real costs of new technologies through improved productivity and environmental performance of the firm. Strict environmental regulation (Dowell et. al, 2000 p. 1063) such as the environmental management system (EMS [2]) in principle may have an adverse short-term impact on firms’ productivity (Dowell at.el, 1999, p. 8), may force adoption of an environmental regulation, and may affect the competitiveness of the industry, switching equilibrium with low investment in R&D to a Pareto-improving R&D spillovers (Ambec 2013, p. 6). Therefore, we can assume that the environmental pressures and green investments contribute to improving the competitiveness of the firms, and may force firms to develop sustainable policy for environmental protection. On the other hand, the resource-based view concept for the firm financial performance and the economic theory of productivity, provides a solid foundation for the hypothesis that firms which proactively develop EMS are more competitive, encourage technological innovations, lower the total cost of a production process and increase the efficiency of players across the supply value chain (Porter, 2000 p. 2). Efficiency and productivity (Amini, 1999) was analyzed using the production function Cobb-Douglas, where the production company equal to the input function of labor, capital and materials. The following hypothesis is proposed.

**Hypothesis 1.** The EMS has a positive impact on increasing the profitability and productivity of the firm.

## 2.3. THE INFLUENCE OF NATIONAL CULTURAL CHARACTERISTICS ON THE DECISION-MAKERS

Hofstede and Minkov (2010) defines culture as: “*the collective programming of the mind that distinguishes the members of one group or category of people from others ... it's about shared values, norms, beliefs and practices that an individual holds, together with other members of a social unit or group*” (p. 6). Cultural differences between countries is related to differences in managerial positions and attitudes, behaviors and practices, where one cultural



dimension not necessarily apply to another dimension of culture (Kaasa 2016; Hofstede 1980; 1994). Thus, based on research (Heath and Gifford 2002; Nordlund and Garvill 2003), the relationship between the basic values and intentions in behavior can have a positive impact on potential adoptive parents in the purchase or use of eco-vehicles. Jansson et al. (2010; 2011), showed that moral norms as a principal-agent problem, arising from the environmental awareness of the individual, have a strong positive impact on the adoption of intentions, especially eco-friendly goods, such as decisions concerning the purchase of plug in hybrid electric vehicles.

#### 2.4. UNCERTAINTY AVOIDANCE (UAI)

The cultures with strong uncertainty avoidance may be resistant to innovation (Shane, 1993; Waarts and van Everdingen, 2005). Png et. al. (2001) in a survey conducted in 153 companies in 24 countries found a link between fear and uncertainty or some kind of changes, leading to resistance to adopting new technology. Studies have shown that people in countries with high uncertainty avoidance have higher stress, emotionality, anxiety, neuroticism; while people in countries with low uncertainty avoidance are more tolerant, easy change a job, and the diversity for them is curious. Vastola et. al. (2016) found the negative relationship between the CEP-CFP.

Therefore, we expect that uncertainty avoidance in the national culture, has a negative impact on the adoption of new technologies and products, profitability, and market value of the company. The following hypothesis is proposed.

**Hypothesis 2.** Uncertainty avoidance has a negative impact on profitability, and on the adoption of new technologies and products.

#### 2.5. POWER DISTANCE (PD)

Empirical studies (Taylor and Todd, 1995; Davis, 1993) relating to Technology Adoption Model (Davis, 1989) have shown that the power explains about 40 percent of the variance of the technology use (Bagchi, 2004). In countries with low power distance, the greater is the diffusion and acceptance of innovation (at. el. Bagchi, 2004). High power distance is seen as the basis of social order. Accordingly, in countries with the high power distance we expect a negative relationship to the adoption of new technologies and products. The following hypothesis is proposed.

**Hypothesis 3.** Power distance has a negative impact on profitability, and on the adoption of new technologies and products.

#### 2.6. LONG-TERM ORIENTATION (LTO) | SHORT-TERM ORIENTATION (STO)

Long-term orientation, or 'Confucian Dynamism' refers to the choice of people between the present and the future or the past (Hofstede et al., 2010). Companies tend to build a strong position in the market, where diffusion of technology is characterized by a positive

impact on the development of innovation, stability, reliability, and potentially greater investment in new technologies (Maitland, 1998). The following hypothesis is proposed.

**Hypothesis 4.** Long-term orientation has a positive impact on profitability, and on the adoption of new technologies and products.

## RESEARCH OBJECTIVE

The aim of the paper is to determine the relationship between profitability of the firm, and the impact of cultural dimensions on decision-makers: the individual or group, when adopting new technologies or purchasing products. The *assumption* is that the creation of national cultural and socio-psychological model may contribute to better understanding the dynamic capabilities of the firms. Thus, local centrality and geographical distance in inter-organizational networks, can give us a clear picture how to better access information and resources of capability.

## RESEARCH QUESTIONS

- (Q1) Does better environmental performance increase the firm profitability?
- (Q2) Does the company improve productivity and competitiveness by adopting high standards for environmental protection?
- (Q3) Will the adoption of high environmental standards lead to less product diversification?
- (Q4) Does different cultural values influence the decision-maker related to the adoption of new technologies and products?

## PAPER STRUCTURE

The remaining structure of the paper, Chapter I – Introduction, Chapter II – Literature with hypotheses, Chapter III – Research method, the sample size, data collection, empirical design. In Chapter IV – Discussion of the results. Chapter V – Conclusion, future research questions, limitations and future expectations. Finally, Chapter VI – Appendix.

## 3. RESEARCH METHODS

In this type of research, technology adoption depends on the structural and technological factors, as well as environmental factors. Therefore, it is necessary to create a characteristic motifs for special groups at the national level that can play a significant role in the adoption and application of new technologies.

### 3.1. SAMPLE DATA COLLECTION

In research 6 automotive manufacturing listed on the S&P Dow Jones Automobiles & Parts Titans 30<sup>TM</sup> [13] are selected: Daimler, BMW, VW Group (Germany), and FCA (Italy) represent Europe region, Ford Group (USA) represent South America region, and Hyundai (South Korea) represent Asia region. Main criteria for selection of companies are: (1) to produce annually more than 10.000 vehicles; (2) positive indices based on sustainability trends (long-term economic, environmental and social criteria); and (3) that has a recorded history in the GES database for risk rating.

Financial data were collected for the period 2005-2015 from the website Market Watch [12] and through the published annual reports of companies, data for vehicle sales for the 50 countries were collected from the website Marklines [7]. Data meet the same reporting standards that support the consistency and reliability of data. The GHG emissions transport data (million tons of CO<sub>2</sub> equivalent) were gathered from World Resource Institute (WRI [8]), for passenger cars from European environment agency (EEA [1]). Values of cultural indices were gathered from the website of Geert Hofstede [6]. Descriptive statistics of selected manufactures is presented in Table 3.

Table 3. Descriptive statistics company data, manufacture size, models, series [7]

Company data name	Manufactures sample size		Vehicle models sample size		Vehicle (series) sample size		Number of state sales
	n	%	n	%	n	%	
Daimler	9	11, 69%	27	18, 24%	3530	28, 51%	60
BMW	9	11, 69%	18	12, 16%	2453	19, 81%	58
VW Group	17	22, 08%	31	20, 95%	930	7, 51%	57
FCA Group	10	12, 99%	19	12, 84%	1480	11, 95%	55
Ford Group	9	11, 69%	14	9, 46%	3291	26, 58%	60
Hyundai	23	29, 87%	39	26, 35%	698	5, 64%	62

### 3.2. EMPIRICAL DESIGN

To test the hypotheses of this study, first of all, case of study method is using. The econometric models used cross sectional time series in panel data regressions.

*Model H<sub>0</sub>*

First we test null hypothesis. *Assumption* is that *the higher are the total sales of the firm the higher is the pollution of the firm over time*. To capture firm characteristics influencing FP, vector  $\beta_5 EMP_{it}$  is represented firm's size variable (EMP) into the models.

$$FP_{it} = \beta_0 EE_{GHG} + \beta_1 EE_{it-1} + \beta_2 CT + \beta_4 EMP + \eta_i + \mu_t + \varepsilon_{it} \quad (1)$$

Model  $H_1$

It is assumed that automotive companies which implement an **Environmental Management System** ( $\beta_3 EMS_{it}$ ) may simultaneously reduce firm environmental impact and gain higher productivity. Next econometric model is proposed:

$$\beta_0 EE_{GHG} < \beta_1 EE_{it} + \beta_3 EMS_{it} + \beta_4 EMP_{it} \quad (2)$$

Model  $H_2$

The following **econometric model** includes profitability observed through three **cultural dimensions**: *uncertainty avoidance*, *power distance*, and *long-term orientation*, related to the adoption of new technologies and products. The following econometric model (Ijose, 2010 p. 12) is proposed:

$$Y = \alpha + \beta X + \varepsilon \quad (3)$$

Table 4. Description, labels and formulas for financial and environmental performance.

Variables	Name	Label	Formula	Mean	Std.	Min	Max
Dependent	CO <sub>2</sub> (g/km)	GHG	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, F-gases;	0,100	0,001	0,008	0,030
	Productivity	TFP	$X = TFPL^\alpha K^\beta M^\gamma$	3,850	0,800	0,42	10,73
	Tobin q	Q	$Tobin's\ Q\ ratio = \frac{Total\ market\ value}{Total\ asset\ value}$	0,260	0,01	0,05*	0,43
Independent	Return on Assets	ROA	$ROA = \frac{Net\ profit}{Average\ Total\ Assets}$	4,010	0,689	-0,31	12,01
	Return on Equity	ROE	$ROE = \frac{Net\ profit}{Shareholders\ equity}$	16,64	5,007	-1,26	60,19
Moderator	Uncertainty Avoidance	UAI	the negative impact on profitability, on the adoption of innovations;	1,812	0,101	1,662	1,929
	Power Distance Index	PDI	the negative impact on profitability, on the adoption of innovation;	1,602	0,237	1,041	1,778
	Long Term Orientation	LTO	a positive impact on profitability, on the adoption of innovations;	1,785	0,240	1,414	2,00
Control	R&D	RD	$R\&D_{exp.ratio} = \frac{R\&D}{Total\ sales}$	6,150	5,640	1,43	15,20
	Firm's size	EMP	log number of employees	5,310	0,004	5,00	5,79
Dummy	Certificates	E	0 < 4 years; ISO14001;LCAISO14044;	1,00	0,000	1,00	0,408

<sup>1</sup> For significance tests: \* p ≤ 0.05. \*\* p ≤ 0.01. \*\*\* p ≤ 0.001.

#### 4. RESULTS

The Hofstede cultural model was adopted for three dimensions: uncertainty avoidance, power distance, and orientation on long-term goals. Table 6 present where

We considered three dimensions: uncertainty avoidance, power distance, and orientation on long-term goals in the performance measures of **Strategy Cultural**

**Analyses**—the “*what*”—are factors “a” through “f” in the Table key. The “*how*” to measure is represented by factors “g” through “z.” A **build** strategy implies an increase in production. The **hold** and **harvest strategies** apply a high market share in a high-growth industry. **Low-cost** include advantage of economies of scale, and R&D. **Differentiate strategy** measures number of new products to market. **Focus strategy** targets a competitive market within an industry segment. **Prospector** similar to differentiators focuses on market development, new product development, and search for market opportunities (O’Clock at. el, 2003 p. 18).

Table 6. Formation Analyses of Cultural dimensions (SBU – Product line strategy)

Cultural dimension	Business unit strategy (SBUs)			Product line strategy				
	Build	Hold	Harvest	Low cost	Differentiate	Focus	Defender	Prospector
High (PDI)	a, g, o	b, d, f, g, o	e, f, g, o	e, g, o	c, d, g, o	a, g, o	d, e, f, g, o	a, c, d, g, o
Low (PDI)	a, h, n	b, d, f, h, n	e, f, h, n	e, h, n	c, d, h, n	a, h, n	d, e, f, h, n	a, c, d, h, n
High (UAI)	a, g, n, w, z	b, d, f, n, w, z	e, f, n, w, z	e, n, w, z	c, d, n, w, z	a, n, w, z	d, e, f, n, w, z	a, c, d, n, w, z
Low (UAI)	a, h, o, v	b, d, f, h, o, v	e, f, h, o, v	e, h, o, v	c, d, h, o, v	a, h, o, v	d, e, f, h, o, v	a, c, d, h, o, v
Long-term (LTO)	a, h, j, l	b, d, f, h, j, l	e, f, h, j, l	e, h, j, l	c, d, h, j, l	a, h, j, l	d, e, f, h, j, l	a, c, d, h, j, l
Short-term (STO)	a, g, i, m	b, d, f, g, i, m	e, g, i, m	e, g, i, m	c, d, g, i, m	a, g, i, m	d, e, f, g, i, m	a, c, d, g, i, m

Source: O’Clock, Priscilla, and Kevin Devine, 2003 p. 18

Table 7. Strategy Cultural Formation (26 strategies)

a. focus on market share and/or sales growth	l. business-unit vs. company rewards
b. maintain market share	m. firm-based vs. business-unit rewards
c. new products to market	n. formula-based evaluation/rewards/bonuses
d. quality and/or customer service measures	o. subjective evaluation/rewards/bonuses
e. cost management/efficiency measures	q. performance-based rewards less motivating
f. return-based measures (e. g., ROI, EVA)	r. desire for incentive-based extrinsic rewards
g. tight budgetary controls	t. focus on short*term financial performance
h. slack in budgetary controls	v. future orientation/long planning horizons
i. group-based rewards/evaluation	w. preference for immediate rewards
j. individual-based rewards	z. preference for interactive budget process

Hypothesis 1 is confirmed, the use of EMS has a positive impact on increasing the profitability and productivity of the firm. Number of standards in use does not directly affect the profitability. Hypothesis 2 is confirmed, in countries with a high level of uncertainty avoidance company realized lower profit in selling cars that use new technologies (Green Vehicle). Hypothesis 3 is confirmed, In countries with low power distance, the greater is the diffusion and acceptance of innovation. Hypothesis 4 is confirmed, in countries with a long-term orientation, companies realize higher profits.

## 5. CONCLUSION

Study aims to identify the relationship between the profitability of the company and the impact of national cultural dimensions of the decision-makers on the adoption of new

technologies and products. Financial and market data was collected from the S&P DJ Index, and Marklines for six automobile companies Daimler, BMW, Volkswagen, Ford, FCA and Hyundai in the period from 2005 to 2015 for 50 countries. The Hausman test was performed and adopted random effects model. The calculation of profitability was done in relation to the total emission, the costs of R&D, capital investment, and intensity of invested capital, for total annual sales in time-series of 10 years.

The main problem for the automotive industry is that not sufficiently profitable. The first hypotheses and question confirmed that better environmental performance increase the firm profitability. The research results show that the prerequisite for profitability is in constantly changing directions. Companies are faced with different challenges in an effort to combine the best economic performance with increased social and environmental responsibility. As a solution there is a need for a company to build a series of technological competencies and capabilities that will allow it to create a distinctive area of competitive advantage, as well as to combine the model of product development as part of the innovation.

Our research show that firm could improve productivity and competitiveness by adopting high standards for environmental protection. There is a growing gap between the production system and the market where the product is intended. Companies seeking a competitive advantage technologically differentiated products, and changed process in order to generate these products with a competitive cost structure. Due to customer demands for a wider choice when buying a car that leads to the manufacturer able to offer a range of vehicles with different models for each segment in the range. The measures proposed by the European Commission, 2009b that way to reduce costs is to extending the life cycle of vehicle model, have no competence. In this regard, the life cycle of new cars in Europe decreased from 7 years to an average of 3.5 years. Also, other regulations requiring producers to use materials that are lighter, which can be future recycled. Therefore, amount of environmental damage resulting from product design are far greater than the environmental damage caused by the process itself (Anderl and Katzenmaier, 1995). The team should see all systems of product life, relations between them and the development of these systems (Olesen, 1992) in order to effectively manages the risks and to gain and maintain competitive advantage.

Finally, all three hypotheses for cultural dimension are confirmed, uncertainty avoidance, power distance, and orientation on long-term goals. We modeling the effect of different national cultures in the process of diffusion summarizes the effects of national differences in the rate of adoption of innovations. The market potential is estimated for each country; the growth of new technology is facilitated if there is a relatively large number of consumers who are willing to invest in new technologies. The assumption is that the time lag grants additional time for potential adopt in lagging markets to help them to understand the relative advantage of products, better assessments of technology needs, and to observe the experience of using the leading country adopted products. If the product is successful in leading countries, the risk associated with innovation is reduced. On average, a potential market in developing countries is third of that in developed countries.

Future research can be done using SBUs in relation between market value, and creation of greater shared value of the firm. Also MCDM could be used to test asymmetric information on technology and shareholders decision process as the possible organizational failure.

## 6. REFERENCES

### Books

1. Dowell, Glen, Stuart Hart, and Bernard Yeung. "Do corporate global environmental standards create or destroy market value?". *Management science* 46. 8 (2000): 1059-1074.
2. Freeman, R. Edward, et al. *Stakeholder theory: The state of the art*. Cambridge University, 2010.
3. Frondel, Manuel, et al. "Economic impacts from the promotion of renewable energy technologies: The German experience." *Energy Policy* 38. 8 (2010): 4048-4056
4. Galliers, R. D., Madon, S., & Rashid, R. (1998). Information systems and culture: Applying 'stages of growth' concepts to development administration. *Information Technology for Development*, 8(2): 89–100.
5. Hart, Stuart L., and Gautam Ahuja. "Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance." *Business strategy and the Environment* 5. 1 (1996): 30-37.
6. Kaasa, Anneli. "Culture as a Possible Factor of Innovation: Evidence from the European Union and Neighboring Countries." *Re-thinking Diversity*. Springer Fachmedien Wiesbaden, 2016. 83-107.
7. King, Andrew, and Michael Lenox. "Exploring the locus of profitable pollution reduction" *Management Science* 48. 2 (2002): 289-299.
8. Klassen, Robert D., and Curtis p. McLaughlin. "The impact of environmental management on firm performance." *Management science* 42. 8 (1996): 1199-1214.
9. Orij, R., 2010. Corporate social disclosures in the context of national cultures and stakeholder theory. *Account. Audit. Account. J.* 23 (7), 868–889
10. Porter, Michael E. "2. Green and Competitive: Ending the Stalemate." *The Dynamics of the eco-efficient economy: environmental regulation and competitive advantage* (2000).
11. Porter, Michael E., and Mark R. Kramer. "The big idea: Creating shared value." *Harvard business review* 89. 1 (2011).
12. Pučálka, Marek. "Leadership in Different Cultures-Contrastive Study". (2012).
13. Russo, Angeloantonio, and Stefano Pogutz. "Eco-efficiency vs Eco-effectiveness. Exploring the link between GHG emissions and Firm performance." *Academy of Management Proceedings*. Vol. 2009. No. 1. Academy of Management, 2009.
14. Sandberg, Åke. "Enriching production: Perspectives on Volvo's Uddevalla plant as an alternative to lean production." (1995).
15. Van Zandt, Timothy. "Firms, Prices, And Markets." (2012). (p. 104-148-149-161)
16. Vastola, Vincenzo, Russo, and Clodia Vurro. "Dealing with Cultural Differences in Environmental Management: Exploring the CEP-CFP Relationship (2016).

## Journals

17. Bagchi, Kallol, Paul Hart, and Mark F. Peterson. "National culture and information technology product adoption." *Journal of Global Information Technology Management* 7. 4 (2004): 29-46.
18. De Mooij, Marieke, and Geert Hofstede. "The Hofstede model: Applications to global branding and advertising strategy and research." *International Journal of Advertising* 29. 1 (2010): 85-110.
19. Garfield, M. J., & Watson, R. T. (1998). Differences in national information infrastructure: The reflection of national cultures. *Journal of Strategic Information Systems*, 6(4): 313–337.
20. Hart, Stuart L., and Glen Dowell. "A natural-resource-based view of the firm: Fifteen years after." *Journal of management* (2010): 0149206310390219.
21. Hofstede, Geert. "The cultural relativity of organizational practices and theories." *Journal of international business studies* 14. 2 (1983): 75-89.
22. Ijose, Olumide. "Culture and the Adoption of Practices: An Assessment of the US Automotive Manufacturing Sector." *Journal of International Business and Cultural Studies* 2 (2010): 1.
23. King, Andrew A., and Michael J. Lenox. "Does it really pay to be green? An empirical study of firm environmental and financial performance: An empirical study of firm environmental and financial performance." *Journal of Industrial Ecology* 5. 1 (2001).
24. O'Clock, Priscilla, and Kevin Devine. "The role of strategy and culture in the performance evaluation of international strategic business units." *Management Accounting Quarterly* 4.2 (2003): 18.
25. Russo, Michael V., and Paul A. Fouts. "A resource-based perspective on corporate environmental performance and profitability." *Academy of management Journal* 40. 3 (1997): 534-559.

## Links

- [1] See more 2015 Global CSR RepTrak 100 - <https://reputationinstitute.com> (16.12.2016)
- [6] Hofstede cultural dimension - <https://geert-hofstede.com> (18.11.2016)
- [7] See more MarkLines Automotive Industry - <https://www.marklines.com> (28.09.2016)
- [12] See more Market Watch - [www.marketwatch.com](http://www.marketwatch.com) (08.11.2016)
- [13] See more S&P Dow Jones stock exchange - <http://us.spindices.com> (10.11.2016)



Table 8. Correlation analysis – Testing hypotheses full sample

		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
<b>1</b>	CO <sub>2</sub>	1											
<b>2</b>	P	0,250	1										
<b>3</b>	Q	0,498	0,960	1									
<b>4</b>	DTE	0,104	0,982	0,914	1								
<b>5</b>	ROA	0,250	0,999	0,955	0,976	1							
<b>6</b>	ROE	0,177	0,996	0,931	0,982	0,997	1						
<b>7</b>	UAI	0,526	0,547	0,698	0,565	0,517	0,474	1					
<b>8</b>	PDI	0,640	0,752	0,888	0,725	0,733	0,689	0,941	1				
<b>9</b>	LTO	0,573	0,679	0,817	0,677	0,654	0,612	0,983	0,986	1			
<b>10</b>	R&D	0,128	0,959	0,866	0,929	0,969	0,978	0,289	0,548	0,448	1		
<b>11</b>	Firm size	0,505	0,545	0,691	0,567	0,514	0,473	1,000	0,935	0,980	0,286	1	
<b>12</b>	TFP	0,110	0,945	0,845	0,911	0,956	0,967	0,243	0,510	0,406	0,999	0,240	1

## RENEWABLE ENERGY SOURCES ASSESMENT ACCORDING SUSTAINABILITY INDICATORS: CASE KOSOVO AND METOHIJA

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**Abstract:** After the war 1999. Kosovo and Metohija (Kosmet) is constantly facing with electricity production and distribution problems. Also, electricity restrictions are present almost at daily basis. More than 95% electricity production on Kosmet come from one source – thermal power plant Obilić. Pollution coming from coal burning at central Kosmet is everyday problem. On the other hand Kosmet has and some renewable energy (RE) potentials such as biomass, solar, wind and hydro. Question that arise here is why not to use RE? It would lead to sustainable development of Kosmet energetics. However, just like conventional electricity production and RE projects can have some environmental impacts. Goal of this paper is to asses renewable energy sources according sustainability indicators and to get RE priority list. For that purpose will be used analytical hierarchy process (AHP).

**Keywords:** Renewable energy sources, AHP, hydro, solar, wind, biomass

### 1. INTRODUCTION

Development of any modern society and economy is unthinkable without energy. Unfortunately, tremendous growth of economies and production request enormous quantities of energy sources (coal, oil, natural gas etc.). Using the aforementioned conventional sources of energy greatly pollute the environment but also threatens the energy security of future generations. Most today's electricity production worldwide is based on conventional production (coal). The effects of global warming are already visible, pollution is becoming a greater and fossil fuels in the near future will be exhausted. Will we continue at this way or we can try more sustainable in future? The provision of adequate and reliable energy services at an affordable cost, in a secure and environmentally benign manner and in conformity with social and economic development needs, is an essential element of sustainable development [1].

Many countries introducing different mechanisms to stimulate RES sector development. Also, even developing countries set ambitious goals in RES participation in energy mix. For example, Serbia defined as a goal 27% share of RES in gross final consumption by 2020. Serbian energy sector is characterized by low energy efficiency (both in production and in demand), the old technology in the production of energy, lack of investment, subsidized energy prices and wasteful consumption together with significant (negative) impact on the environment [2]. The total RES potential that is technologically available in the Republic of Serbia is estimated at 5.65 million tons of oil equivalent (toe) per

year. Out of this potential already in use are: 1.054 million toe of biomass (mostly as firewood) and 909 thousand toe of hydropower [3].

After the war 1999. Kosovo and Metohija (Kosmet) is under UN protectorate. From 1999. until today there are constant problems in production and distribution of electricity wide Kosmet. This is especially the case in the Serbian areas in Kosmet. Today, more than 95% of total electricity produced in Kosmet comes from only one source – thermal power plant Obilic. Of course, production is based on coal which impacts environment in many ways. Also, distributive network is old and poor or none maintenance is performed. Results of such business is frequent electricity restrictions.

For that reason the question arise here is why not take advantage of RES potential that exist in almost each local area at Kosmet? Thus would increase energy security and ensure the sustainable production of electricity.

The selection of the most suitable renewable energy technology for a given area or location is typically faced with a range of conflicting environmental, socio-economic and technical criteria [4].

Which RES technology to choose and which will largely contribute to the sustainable development of the energy sector and local society? When evaluating the sustainability of different renewable energy generation technologies, there is a range of important indicators and criteria that needs to be considered [5]. Many criteria, conflicting goals and existing of numerous alternatives impose using of multi criteria decision making methods (MCDM). There are many papers in literature that used different MCDM methods. Atmaca and Basar [6] used analytical network process (ANP) to evaluate six different types of power plants using four group of criteria (technology and sustainability, economy, life quality, socio-economic impacts). Barros et al. [7] presented a model for assessing the global sustainability of power plants (conventional and renewable). They assessed ten power plants (alternatives) throughout life cycles using 16 sustainability indicators. Troldborg et al.[4] employed PROMETHEE method for assessing the sustainability of eleven renewable energy technologies.

The study employed analytical hierarchy process (AHP) and Expert choice software to assess several renewable energy sources. Three RES experts participated in decision making process. AHP is very frequently used method to solve different energy related issues: evaluation of technologies and project for electricity production [8, 9], energy policy and management [10], regional planning [11, 12], planning at national level [13].

## 2. METHODOLOGY

In the decision-making process the AHP method and Expert Choice software will be used for criteria and alternatives assessment.

The methodology consists of several steps:

**Step 1. Defining decision making goal and RE alternatives** – In this initial phase goal and alternatives should be defined. Decision makers or research purchaser can define the goal. Then, according goal defined decision makers can determine adequate alternatives.

**Step 2. Defining decision making criteria** – The second step is to identify a set of relevant criteria that enable the alternatives to be compared from a sustainable viewpoint. To realize

this step relevant literature is collected [4, 6,7, 14]. Then, three local experts are participated in selection most appropriate criteria for this study.

**Step 3. Pairwise comparison and prioritization of selected criteria and alternatives -** AHP-based Expert Choice software is used for pairwise comparison and prioritization. Each of three decision makers participate in this step with equal importance (0.33).

**Step 4. Analysis of decision-making results -** The results of decision-making produce the ranking of alternatives. This step include the sensitivity analysis, the aim of which is to determine how changing priorities of different criteria will affect the changes in the ranking of alternatives.

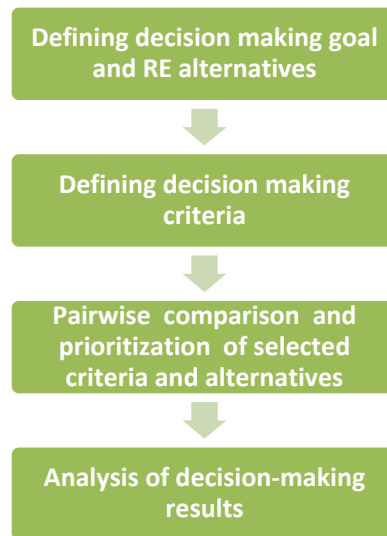


Figure 1. Flowchart of decision making process

## 2.1. ANALYTICAL HIERARCHY PROCESS

Analytic Hierarchy Process (AHP) is a method to select one alternative from a given set of alternatives, where there are multiple decision criteria involved, and to rank available alternatives in a desirability order based on a rational framework of quantitative comparisons [15]. More details about AHP can be found in [16, 17].

The basic steps of the AHP method are as follows [18, 19]:

1. **Creation of a hierarchical structure.** The hierarchy is composed of different levels, from the objective, through a variety of criteria, and with alternatives at the lowest level of the hierarchy. The decision-making objective is presented at the highest level of the hierarchy. The criteria that influence the decision are presented at the intermediate levels. Alternatives are at the bottom level of the hierarchy.
2. **Creation of comparison matrix.** The comparison matrix of elements in one level in relation to elements at a higher level is constructed using individual comparisons translated into scale values. The preferences of decision makers are quantified using Saaty's nine-point scale, with the following meaning: 1 = equally important, 3 =

slightly important, 5 = very important, 7 = much more important, 9 = extremely more important. The 2, 4, 6, and 8 represent the values in between.

3. **Calculation of priority.** Pairwise comparison generates a matrix of the relative rankings for each level of the hierarchy. The number of the matrix depends on the number of elements in each level. After all matrices have been created, the vector of relative weight and maximum eigenvalue ( $\lambda_{\max}$ ) for each matrix is calculated.
4. **Calculation of consistency index and ratio.** The validity of comparisons can be evaluated through the consistency ratio. Before calculating the consistency ratio, it is necessary to calculate a consistency index (CI) of an  $n \times n$  matrix, which is defined as the ratio  $CI = (\lambda_{\max} - n)/(n - 1)$ . Value  $\lambda_{\max}$  is maximum eigenvalue of the matrix, and  $n$  is the matrix dimension. The consistency ratio (CR) is calculated as  $CR = CI/RI$ . RI value is the random consistency index. Table 1 shows the values for the RI of the matrix dimensions of 1–10.

Table 1. Random consistency index

Matrix	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

### 3. RESULT AND DISCUSSION

**Step 1. Defining decision making goal and RE alternatives.** The main goal of the research is the assessment and prioritization of renewable energy alternatives towards sustainable criteria. As a research result is expected to get relevant rankings of RES alternatives that will be great help to the policy makers, public and private sector for future planning and implementation of RE projects at the Strpce. The study consider four RES which are available at Strpce area: biomass, hydro, wind and solar potentials.

**Step 2. Defining decision making criteria.** Goal in this step is to identify relevant criteria. First, draft list of criteria is made by literature research. Decision makers decided to put all criteria into three categories social, economic and environmental which is in line with sustainable development dimensions. Then, decision makers selected in total 12 criteria and sorted them as shown in table 1.

Table 2. Selected criteria for renewable energy sources assessment

Group	Criteria
Economic	EC <sub>1</sub> Investment
	EC <sub>2</sub> Efficiency
	EC <sub>3</sub> Operating and maintenance costs
	EC <sub>4</sub> RES availability
Environmental	EN <sub>1</sub> Land use
	EN <sub>2</sub> Greenhouse gases
	EN <sub>3</sub> Biodiversity impacts
	EN <sub>4</sub> Quality of life impacts (noise, disturbance of landscapes etc.)
Social	SO <sub>1</sub> Social acceptance
	SO <sub>2</sub> Accident fatalities
	SO <sub>3</sub> Energy security increasing
	SO <sub>4</sub> More equal society

**Step 3. Pairwise comparison and prioritization of selected criteria and alternatives.** After criteria is defined decision makers started with criteria assessment using Expert choice software. Each of decision makers has equal importance in the model (0.33) and assessment is carried out independently. Then a synthesis of three decision makers results is done. Overall result of criteria assessment is shown in table BROJ.

As can be seen the highest group weight is given to social group (0.484). In addition, within each group, there are certain criteria that have the greatest weight. Within the group of economic factors the greatest weight is given to the efficiency (0.312). Quality of life impacts (0.368) is the most important criteria within environmental group. And finally, the most important criterion within social group but also with the biggest weight among all criteria is energy security increasing (0.422).

Table 3. Overall criteria weights

Group	Criteria weights
Economic 0.214	EC <sub>1</sub> 0.213
	EC <sub>2</sub> 0.312
	EC <sub>3</sub> 0.263
	EC <sub>4</sub> 0.211
Environmental 0.301	EN <sub>1</sub> 0.295
	EN <sub>2</sub> 0.121
	EN <sub>3</sub> 0.216
	EN <sub>4</sub> 0.368
Social 0.484	SO <sub>1</sub> 0.094
	SO <sub>2</sub> 0.260
	SO <sub>3</sub> 0.422
	SO <sub>4</sub> 0.225

After the synthesis of the all scores we get the alternatives rank. The rank is shown in table BROJ. According to the results of decision making process the best alternative is hydro energy source (0.293) followed by biomass (0.285), wind (0.223) and solar (0.199), respectively.

Table 4. Decision making result – ranking alternatives

RES alternative	Weight	Rank
Hydro	0.293	1
Biomass	0.285	2
Wind	0.223	3
Solar	0.199	4
Overall inconsistency 0.02		

After the obtained results it is necessary to check the stability of the model. In that order, a sensitivity analysis was performed.

First, we checked rank change by increasing and decreasing criteria group weights. A change between the first-ranked and the second-ranked alternatives occur only just if the weight of the environmental group is increased by 19.5%. In that case, biomass (0.278) alternative take first place from hydro (0.277) which fall to second place. Wind (0.242) and solar (0.203) are third-ranked and fourth-ranked, respectively.

The impact of changes in weight of each criterion on the ranking of alternatives is also performed. In this case too, it is necessary large changes in criteria weights to lead to changes in the range of alternatives. Based on the sensitivity analysis, we can conclude that the model is stable.

#### 4. CONCLUSION

Summary conclusions are as follows:

- ✓ In this paper we developed an decision making model to assess RES according sustainability indicators. Three RES experts participated in decision making process using AHP and Expert choice software to rank four alternatives: biomass, hydro, solar and wind renewable sources. Experts used in total 12 criteria to assess RES alternatives;
- ✓ According results the best RES alternative is hydro source (0.293) followed by biomass (0.285) at second place. Wind (0.242) and solar (0.203) are third-ranked and fourth-ranked, respectively.
- ✓ Decision making model is stabile. Stability is checked by conducting sensitivity analysis which shows that only large changing of groups and criteria weights cause modification on alternative rank.

- ✓ Future papers should check this results by extending list of criteria, using more precise data and bigger number of decision makers. Also, in order to avoid possible imprecision model should be conducted in fuzzy environment.

## REFERENCES

1. Vera, I., Langlois, L., & Rogner, H.-H. (2007). *Indicators for sustainable energy development* (INIS-XA--982). International Atomic Energy Agency (IAEA)
2. Stojčetočić, B., Šarkoćević, Ž., Mišić, M., Potential of renewable energy sources in Serbia, *Energija* 1-2, (2014), 392 – 397
3. Energy Development Strategy of the Republic of Serbia by 2025 with projections until 2030 (Government of the Republic of Serbia, Official Gazette RS, No. 101, Belgrade, 2015)
4. Troldborg M., Heslop, S., Hough R., Assessing the sustainability of renewable energy technologies using multi-criteria analysis: Suitability of approach for national-scale assessments and associated uncertainties, *Renewable and Sustainable Energy Reviews* 39, (2014), 1173–1184.
5. Evans A, Strezov V, Evans TJ. Assessment of sustainability indicators for renewable energy technologies. *Renewable Sustainable Energy Rev*,13 (5), (2009), 1082–1098
6. Atmaca E., Basar H., Evaluation of power plants in Turkey using Analytic Network Process (ANP), *Energy* 44, (2012), 555-563.
7. Barros JJC., Coira ML, Cruz Lopez MP., Cano Gochi A., Assessing the global sustainability of different electricity generation systems, *Energy*, 89, (2015), 473-489
8. Stein EW. A comprehensive multi-criteria model to rank electric energy production technologies. *Renew Sustain Energy Rev* 22, (2013), 640–654.
9. Chatzimouratidis AI, Pilavachi PA. Technological economic and sustainability evaluation of power plants using the Analytic Hierarchy Process. *Energy Policy*, 37, (2009), 778–787.
10. Kablan MM. Decision support for energy conservation promotion: an analytic hierarchy process approach. *Energy Policy*, 32, (2004), 1151–1158.
11. Kaya T, Kahraman C. Multicriteria renewable energy planning using an integrated fuzzy VIKOR & AHP methodology: the case of Istanbul. *Energy*, 35, (2010), 2517–2527.



12. Nigim K, Munier N, Green J. Pre-feasibility MCDM tools to aid communities in prioritizing local viable renewable energy sources. *Renew Energy*, 29, (2004), 1775–1791.
13. Kabak M, Dağdeviren M. Prioritization of renewable energy sources for Turkey by using a hybrid MCDM methodology, *Energy Convers Manag*, 79, (2014), 25–33.
14. Wang JJ, Jing YY, Zhang CF, Zhao JH. Review on multi-criteria decision analysis aid in sustainable energy decision-making. *Renewable Sustainable Energy Rev*, 13(9), (2009), 2263–2278
15. Saaty, T.L., *The Analytic Hierarchy Process*. RWS Publications, Pittsburgh, PA, 1990.
16. Saaty TL. *The analytics hierarchy process: planning, priority setting, resources allocation*. New York: McGraw-Hill International Book Co; 1980.
17. Saaty, T., Decision making with the analytic hierarchy process, *Int. J. Serv. Sci.* 1, (2008), 83–98.
18. Ilangkumaran, M., Kumanan, S., Selection of maintenance policy for textile industry using hybrid multi-criteria decision making approach, *Journal of Manufacturing Technology Management*, 20 (2009), 1009 – 1022.
19. Jovanović, B., Filipović, J., and Bakić, V., Prioritization of manufacturing sectors in Serbia for energy management improvement-AHP method, *Energy Conversion and Management*, 98, (2015), 225-235.

## **ORGANIZATIONAL LEARNING AS A KEY PROCESS OF THE LEARNING ORGANIZATION**

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**Abstract:** Organizational learning correspond the one of the most important strategic tool in the contemporary management for accomplishing competitive advantage and stabilize of the organizational success. Organizational learning presents continuous process in the organization which improves its collective ability to adopt knowledge and recognize the meaning of the learning. Also, it improves ability of the company to respond on the internal and external changes. Learning organization is the one which is capable to expand organizational learning, representing fortunate frame for learning, encourages and directs own members towards learning. Build up a flexible dynamic learning organization leads to performance improvements, raising the employee awareness concerning their own role in the success of the company, better anticipating future business, better respond to competitors challenge, sustain the competitive advantage and better employee orientation in the modern organization. The paper examines organizational learning as a key process of the learning organization.

**Keywords:** Organizational learning, learning organization, knowledge management, knowledge

## **ORGANIZACIONO UČENJE KAO KLJUČNI PROCES UČEĆE ORGANIZACIJE**

**Apstrakt:** Organizaciono učenje je strategijski alat savremenog menadžmenta za ostvarivanje konkurentske prednosti i stabilizovanje organizacionog uspeha. Organizaciono učenje predstavlja kontinualan proces u organizaciji koji unapređuje njenu kolektivnu sposobnost da prihvata znanje i prepozna smisao učenja, te da odgovori na interne i eksterne promene. Učeća organizacija je ona koja razvija sposobnosti organizacionog učenja, koja predstavlja povoljan okvir za učenje i podstiče i usmerava njene članove da uče. Izgradnja fleksibilne, dinamične učeće organizacije dovodi do poboljšanja performansi preduzeća, podizanja svesti zaposlenih o njihovoj direktnoj ulozi u uspehu kompanije, boljeg anticipiranja poslovanja u budućnosti, boljeg odgovora na izazove konkurencije, održavanja konkurentske prednosti u uslovima turbuletnog okruženja i boljeg prilagođavanja i snalaženja svakog zaposlenog u savremenoj organizaciji. U radu je analizirano organizaciono učenje kao ključni proces učeće organizacije.

**Ključne reči:** Organizaciono učenje, učeća organizacija, menadžment znanja, znanje

## 1. UVOD

Sve organizacije uče, bilo da je to svesno ili ne jer je to zahtev za njihov održivi opstanak. Neke firme namerno unapređuju organizaciono učenje i razvojne mogućnosti koje su u saglasnosti sa njihovim ciljevima, druge uopšte ne ulažu napor i stiču navike koje su kontraproduktivne.

Poslovanje i donošenje odluka u današnjim uslovima nestabilnog okruženja trebalo bi da bude oslonjeno kako na stara znanja, tako i usmereno na stalno usavršavanje novih veština, sticanje znanja, novih sposobnosti i realnog procenjivanja i iskorišćenja svake pružene šanse. Na ovaj način donete odluke, dovode organizacije do prosperiteta i svakog daljeg razvoja, a takođe i prilagođavanja okruženju. Neophodno je obezbediti sposobnost novog učenja, kao i uvođenje novog ponašanja u organizaciji.

U Srbiji se poslednjih godina otvara mnogo novih kompanija, kao što su *greenfield* i *brownfield* investicije, a isto tako se restrukturiraju neke već postojeće. Za uspešno poslovanje svake od njih neophodno je uložiti veliki napor u procese učenja, bilo da se radi o ulaznim treninzima, tehničkim i proizvodnim treninzima u matičnim kompanijama ili unapređenju već postojećih znanja. Samo posmatranje ljudskog kapitala kroz njihovo znanje, posmatranje tog kapitala kao strategijskog elementa, ovim organizacijama će obezbediti kontinualan rast i opstanak na turbulentnom domaćem i svetskom tržištu.

Da bi organizacije uspele da odgovore na složene promene u okruženju, one pokušavaju da poboljšaju svoje kompetencije kako bi stekle kompetitivnu prednost na odgovarajućem tržišnom segmentu. One se bore da odgovore na izazove niskih troškova koji su im nametnuti od strane drugih, konkurentnih organizacija, pokušavaju da zbog opstanka ili ulaska na određena tržišta uvode nove prakse kojima se brinu o zaštiti životne sredine, ljudskim pravima i bezbednosnim zahtevima. Traže svaku šansu da iskoriste prednosti tehnologija i informacionih sistema, kako bi efektivno sledili svoje strategije i poboljšali svoje strukture. Menadžeri moraju da nauče kako da funkcionišu ako žele da njihove kompanije uspešno posluju.

Ključna kompetentnost preduzeća je njegova sposobnost da svoje poslovanje izvršava bolje od svojih konkurenata, a to postiže upravo tako što uči kako da brže, bolje, jeftinije obavlja procese, dizajnira, proizvodi, distribuira, prodaje bolje od svojih konkurenata. U današnje vreme kompanije su se susrele sa praksom da je profitabilnije ulagati u neopipljive resurse nego u materijalne, tako da kompanije sve više prilagođavaju svoj organizacioni dizajn, organizacionu kulturu i stilove vođstva potrebi podsticanja organizacionog učenja i efikasnog korišćenja znanja.

## 2. DEFINISANJE ORGANIZACIONOG UČENJA

Prvi radovi na temu organizacionog učenja su se pojavili sedamdesetih godina prošlog veka u radovima Marča i Olsena (*March & Olsen*). Međutim, znanje se počelo tretirati kao važan resurs tek nešto kasnije. Danas se smatra da je znanje najdragoceniji resurs koji ne može da se istroši i da je ono najveći izvor konkurentne prednosti preduzeća na tržištu.

Uobičajena definicija učenje je sticanje znanje ili veština. Prema tome učenje objedinjuje dva značenja, sticanje znanja, odnosno *know-how* (znam kako), što ukazuje na psihičku sposobnost da se preduzme neka akcija i sticanje znanja, odnosno *know-why* (znam zašto), što podrazumeva sposobnost da izrazi konceptualno razumevanje i iskustvo. Mnoge

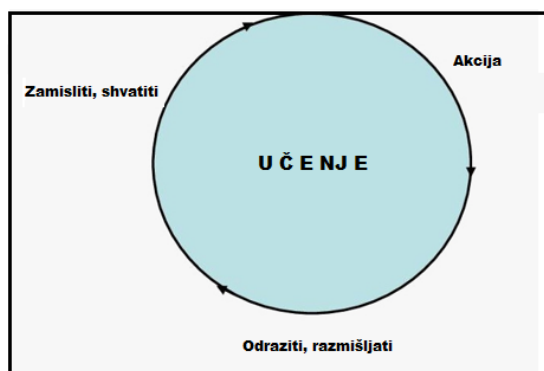
teorije povezuju mišljenje i akciju. Šta ljudi uče (*know-how*) i kako oni razumeju i prihvataju učenje (*know-why*) su dva opšteprihvaćena dela definicije organizacionog učenja. Dakle, ove dve vrste učenja se objašnjavaju na sledeći način: „učenje zašto“ – zaposleni i menadžeri preispituju odnose između faktora i uzroke određenih pojava u kompaniji. Ovim učenjem mogu da nastanu potpuno nove rutine putem kojih kompanija stiče kompetitivnu prednost. I drugo, „učenje kako“ – odnosi se na razumevanje i primenu postojećih veština, pravila i principa rada od strane pojedinaca ili grupa.

Dva najvažnija autora na polju organizacionog učenja su upravo Kris Argiris i Donald Šon, prema kojima je organizaciono učenje proizvod organizacionog istraživanja. To znači da kada god postoji stvarni rezultat koji je različit od očekivanog, pojedinac ili grupa će se posvetiti istraživanju i ako je potrebno rešiti tu nekonzistentnost. U procesu organizacionog istraživanja pojedinac će stupiti u interakciju sa ostalim članovima organizacije i tada će se desiti učenje. Učenje je dakle, prema ovim autorima, rezultat ove interakcije. Ovi autori navode da interakcije često ide ispred definisanih organizacionih pravila i procedura. Argiris i Šon teoretišu o tome da učenje zauzima mesto samo onda kada je novo znanje prevedeno u različita ponašanja i kada se preslikava (Chris Argyris & Donald Schon, 1978).

Organizaciono učenje je proces u kojem organizacija teži novom znanju vezano za svoje okruženje, ciljeve i procese. Herbert Sajmon (Herbert Simon, 1997) predpostavlja tri načina na koja organizacija uči: 1) pojedinci u organizaciji uče neke nove podatke ili procedure, 2) organizacija uzima autsajdere sa znanjem ne samo u organizaciji nego sa sveopštim iskustvom i 3) organizacija pripaja nova znanja u svoje poslovne informacione sisteme.

Kolb tvrdi da je učenje je proces gde znanje kreira mišljenje i menja iskustvo. Organizaciono učenje je kontinualan proces u organizaciji koji unapređuje njenu kolektivnu sposobnost da prihvata znanje i prepozna smisao učenja, te da odgovori na interne i eksterne promene. Organizaciono učenje je mnogo više od samog zbira informacija sakupljenih od strane zaposlenih. To zahteva sistematičnu integraciju i kolektivnu interpretaciju znanja koje vodi kolektivnim akcijama i uključuje rizik preuzimanja ovakvog eksperimentisanja.

Učenje je način na koji se kreira novo znanje i poboljšava postojeće. Proces organizacionog učenja bi se mogao prikazati kao kontinualni tok razmišljanja i shvatanja, akcija koje proizilaze iz toga, a zatim ponovnog razmišljanja o efektima tih akcija, što je svojevrsan *feedback* za ponovno promišljanje i akciju (slika 1.)



Slika 1. Proces organizacionog učenja

Organizaciono učenje je zasnovano na usvajanju znanja zbog svrhe, učenje iz procesa iz rezultata (učinka). Braun i Dugid (Brown i Duguid, 1991) opisuju organizaciono učenje kao

most između rada i inovacija. Ovo ponovo ukazuje na vezu između učenja i akcije, ali takođe upućuje i na korisna poboljšanja.

U teoriji preovlađuju dve paradigme prirode i procesa uključenih u organizaciono učenje, a to su tehnička perspektiva i socijalna perspektiva (Easterby-Smith and Araujo). Tehnička perspektiva vidi organizaciono učenje kao efikasnu obradu, interpretaciju i odgovor na informacije unutar i van organizacije. Ove informacije mogu biti kvantitativne ili kvalitativne, ali obično određene i u javnom području (oblasti). Primer je jednostruko i dvostruko učenje. Socijalna perspektiva vidi organizaciono učenje kao put gde ljudi u svom poslovnom iskustvu vide smisao. Učenje je nešto što se pojavljuje iz socijalnih interakcija, u prirodnoj postavci posla. U slučaju određenih informacija to uključuje zajednički proces davanja smisla podacima (informacijama, saznanjima). Takođe, neizrečene i neotelovljene forme učenja uključuju situacijske prakse, posmatranja i imitacije veštih praktičara i socijalizaciju u praksu određene posmatrane zajednice. Primer su situaciono učenje i učenje kroz prakse zajednice.

### 3. RAZLIČITI PRISTUPI ORGANIZACIONOM UČENJU

Proces učenja podrazumeva sazajne promene kod članova organizacije (kognitivna komponenta) i promene u njihovom ponašanju (bihejvioralna komponenta). Zato kažemo i da postoje dva pristupa organizacionom učenju. Prvi pristup deluje u organizaciji kao celini i posmatra učenje kao kognitivnu perspektivu. Na ovaj način firma se tretira kao veliki mozak sastavljen od pojedinih članova organizacije. Drugi pristup gleda na učenje koje se odvija u zajednici, gde stručni ljudi kreiraju znanje u svojim sopstvenim mrežama nazvanim „zajednice prakse“ (Lave, J. & Wenger, E, 1991).

Organizaciono učenje može da se definiše i kao promena u kognitivnim strukturama i ponašanju članova organizacije koja obezbeđuje podizanje sposobnosti organizacije da se prilagodi svom okruženju (McGill, Slocum, 1994).

Često se u literaturi pojavljuje teza da pojedinci u organizaciji uče radeći i rade učeći. Pojedinci učenje započinju rođenjem, to se dalje nastavlja kroz školovanje, a tada ulaze u organizacije. Oni tada sa sobom donose stečena znanja i stiču potpuno nova kroz praksu u organizaciji, samostalno i u interakciji sa ostalim članovima organizacije. Takođe, oni uče i kroz procedure i pravila koja su formalno sprovedena u organizaciji, uče da menjaju stavove i stanovišta, a koja su vezana za radno mesto. Cilj svake organizacije je da, osim prilagođavanja novopridošlih zaposlenih, održi i kontinuirano povećava znanja, umeća i sposobnosti onih koji su se već socijalizovali svojim dužim boravkom u tom preduzeću. Kompanije koje investiraju u znanje svojih zaposlenih dalje, imaju šansu za veću konkurentsku prednost i lakše prilagođavanje promenama u turbulentnom poslovnom okruženju.

Proces organizacionog učenja se sastoji od pribavljanja, širenja i korišćanja znanja u organizaciji i obuhvata pet faza:

- identifikacija postojećeg znanja (identifikovanje internog i eksternog znanja koje čini ključne kompetencije kompanije),
- kreiranje i generisanje novog znanja u organizaciji,

- difuzija postojećeg i novog znanja (znanje se mora kretati kroz organizaciju i mora biti doći do onih kojima je potrebno),
- integracija i modifikacija znanja (znanje se memoriše, čuva, strukturira i čini dostupnim za sve članove organizacije kojima može biti potrebno),
- korišćenje znanja za promenu ponašanja članova organizacije.

Organizaciono učenje ima socijalni karakter, jer uključuje neku vrstu socijalne interakcije članova organizacije. Ove interakcije mogu da kreiraju znanje koje se ne nalazi niti kod jednog pojedinačnog člana organizacije.

Postoje dva nivoa učenja – operaciono i konceptualno (Clein, 1998). Operaciono učenje predstavlja učenje na proceduralnom nivou gde pojedinac uči korake da bi izvršio pojedinačni zadatak. Konceptualno učenje ide sa mišljenjem o tome zašto su stvari urađene na prvom mestu, nekad izaziva samu prirodu postojanja preovlađujućih uslova, procedura, ili koncepcije i vođenja ka novim okvirima u mentalnim modelima.

Kada govorimo o učenju, razlikujemo individualno i organizaciono učenje. Organizacije uče kroz njihove pojedince, međutim, teorija individualnog učenja je ključna za razumevanje organizacionog učenja. Organizaciono učenje je kompleksnije i dinamičnije nego individualno. Proces individualnog učenja kroz pojedince koji rade u kompaniji prerasta u organizaciono. Tek kada menadžeri u kompaniji razumeju vezu između individualnog i organizacionog učenja moći će aktivno da upravljaju procesom učenja i da ga učine konzistentnim sa organizacionim ciljevima, vizijom i vrednostima. Zašto je bitno prvo razumeti individualno pa tek onda organizaciono učenje? Važno je iz razloga što je svaka organizacija sačinjena od pojedinaca. Proces organizacionog učenja je proces kada individualno znanje postaje organizaciono i zbog toga je ono socijalni proces, jer je neophodno da uključuje više ljudi.

#### **4. ORGANIZACIONO UČENJE KAO KLJUČNI PROCES UČEĆE ORGANIZACIJE**

Znanje je kritičan izvor za različite organizacije poslednjih godina u kompetitivnom kontekstu biznisa (Saadat V.& Saadat Z, 2016). Organizaciono učenje kao strategijski alat je predloženo na polju savremenog menadžmenta u dostizanju kompetitivne prednosti i stabilizovanja organizacionog uspeha. Cilj učenja nije samo poboljšanje znanja zaposlenih već i razvoj i rast organizacije i građenje fleksibilne dinamične učeće organizacije. U sadašnjem svetu poslovanja, koji se naziva i era nauke, učenje i nauka nisu posmatrani samo kao vodeći trend među menadžerima, već kao svetski trend ukoliko kompanija želi da se izbori za svoje konkurentsko mesto na tržištu i održi tu poziciju. Današnji menadžeri moraju da dostignu konstantan razvoj i proizvodnju, da pronađu najbolje izvore finansiranja i odgovarajuću tehnologiju. Zbog toga ne mogu da se oslone na najosnovnije posvećivanje učenju već razvoj treba biti fokusiran tako što će ljudski um i menadžment zasnovan na inteligenciji i organizacionoj nauci biti posmatrani kao strateška imovina organizacije.

Potrebno je razlikovati organizaciono učenje i učeću organizaciju. Organizaciono učenje je proces, a učeća organizacija je posledica tog procesa. Učeća organizacija je ona koja razvija sposobnosti organizacionog učenja, koja predstavlja povoljan okvir za učenje i podstiče i usmerava njene članove da uče.

Organizacije su, kao i pojedinci sposobne da uče. Pojam „organizaciono znanje“ podrazumeva sva ona znanja, veštine i sposobnosti koje dele zaposleni i menadžeri organizacije i na osnovu kojih upravljaju poslovanjem preduzeća. Organizaciono znanje je neophodno permanentno koristiti, ali ga i uvećavati. Veoma je važno na koji način će se u organizaciji sprovesti organizaciono učenje jer je jedan od najvažnijih izvora kompetitivne prednosti organizacije upravo to, da se znanje u organizaciji povećava i adekvatno koristi.

Pod učećom organizacijom podrazumeva se organizacija koja ima značajan kapacitet za učenje, prilagođavanje i promene. Njeni članovi kontinuirano povećavaju svoje sposobnosti za stvaranje novog načina mišljenja i delovanja.

Koncept „organizacije koja uči“ usmeren je na procese usvajanja informacija, interpretiranje podataka, razvijanje znanja, usvajanja procesa učenja. Od krucijalnog značaja za razvoj organizacije je koliko organizacija ima uspeha u upravljanju znanjem. S tim u vezi, ističe se osnovna svrha koncepta upravljanja znanjem. Upravljanje znanjem usmereno je na aktivnosti kao što su stvaranje, osvajanje, čuvanje, podela i primena znanja, na način koji će omogućiti povećanje vrednosti organizacije.

Koncept organizacije koja uči, popularizovan je zahvaljujući Piteru Sengiju (Peter Senge) i njegovoj knjizi „Peta disciplina“. U vreme kada svet postaje više povezan i kada poslovi postaju sve dinamičniji i složeniji, po mišljenju Pitera Sengija nije više dovoljno da u organizaciji postoji jedan veliki znalac ili strateg, osoba koja uči za celu organizaciju i u ime svih zaposlenih, na čije odluke se čeka da bi se one kasnije izvršile bez pogovora. U budućnosti mogu da opstanu i prosperiraju one organizacije koje uspeju da pokrenu sve svoje zaposlene, na svim nivoima organizacije, da uče i da maksimalno iskoriste sve svoje potencijale. Ono što je ključno pitanje nije šta i koliko pojedinci u organizaciji uče, već da li se to njihovo znanje efikasno prenosi na organizaciju kao celinu i da li na osnovu tog znanja i drugi zaposleni u organizaciji mogu da steknu znanje koje im je neophodno za efektivno i efikasno postizanje ciljeva organizacije.

Dakle, organizacija koja uči bi bila organizacija u kojoj ljudi stalno razvijaju svoje sposobnosti kreiranja rezultata koje zaista žele, u kojoj se neguju novi obrasci, u kojoj se kolektivne aspiracije slobodno postavljaju i u kojoj ljudi kontinuirano uče kako učiti zajedno. Dimenzije koje razdvajaju „organizaciju koja uči“ od tradicionalne organizacije su, po Sengiju, pet disciplina: sistemsko razmišljanje, lično usavršavanje, mentalni modeli, zajednička vizija i timsko učenje. Ovih pet disciplina viđene su kao centar učećih organizacija kao i rešenje problema i pitanja u vezi s teorijom i praksom učećih organizacija.

Autor Piter Sengi navodi nekoliko postulata, kao osnovu zakona pete discipline, na koje bi trebalo obratiti pažnju i detaljno ih proučiti:

- Današnji problem dolazi od jučerašnjeg „rešenja“
- Što više pritiskate, sistem sve jače gura nazad
- Ponašanje se poboljšava, pre nego što će se pogoršati
- Preterano lak način da se nešto reši obično nas vraća na početak
- Lek ponekad može biti gori nego sama bolest
- Brže je sporije
- Uzrok i posledica nisu uvek povezani u vremenu i prostoru

- Male promene mogu izazvati velike rezultate – polja najviše moći su često najmanje očigledni
- Možeš imati sopstveni kolač i možeš ga tada pojesti – ali ne odjednom
- Ako поделиš slona na dva dela nećeš dobiti dva manja slona
- Nema tuđe krivice

Učeće organizacije svesno dizajniraju i konstruišu svoju strukturu, kulturu, i strategiju, tako da uzdignu i povećaju potencijal, kako bi učenje zauzelo svoje mesto. Osnovne karakteristike učeće organizacije su:

- Kontinuirano učenje i generisanje znanja – koje podrazumeva da zaposleni kontinuirano razmenjuju znanja između sebe stupanjem u međusobne interakcije, a da im organizacija bude osnova za sticanje i primenu novih znanja,
- Okruženje u organizaciji koje podstiče stvaranje i razmenu znanja,
- Evaluacija postojećeg znanja,
- Planirano učenje,
- Podsticanje zaposlenih da razmišljaju na nov način i nagrađivanje kreativnih rešenja,
- Ohrabrivanje fleksibilnosti i eksperimentisanja – organizacija podstiče zaposlene da preuzimaju rizik i da budu inovativni i
- Komunikacija i *feedback* koji upućuju na razmenu znanja među članovima organizacije.

Posledice upravljanja znanjem su trostruke (Crossan M, Lane H, White R 1999):

- Pojedinaac mora da razume kako da kreira idealno okruženje za organizaciono učenje,
- Pojedinaac mora da bude svestan kako i zašto će nešto biti naučeno i
- Pojedinaac mora da pokuša da obezbedi da učenje koje se desilo bude korisno za organizaciju.

Kako bi kreirali učeću organizaciju, menadžeri moraju da podstaknu učenje na četiri nivoa:

1. **Individualno** - Na individualnom nivou menadžeri bi trebalo da olakšaju učenje novih veština, normi i vrednosti kako bi individualci poboljšali sopstvene veštine i mogućnosti i s tim u vezi pomognu građenju organizacionih kompetencija. Svaka osoba u organizaciji treba da razvije osećaj za lično znanje. Organizacije treba da osnaže zaposlene i probude im volju za eksperimentisanjem, kreiranjem i istraživanjem onoga što oni sami žele i čemu teže. Cilj je da se zaposlenima ukaže na značaj razvoja poštovanja prema svom poslu i na taj način se stvaraju uvećana znanja pojedinaca. Povećanje znanja može značajno uticati na pronalaženje novih, kreativnijih načina za obavljanje sopstvenog posla.



2. **Grupno** - u organizacijama bi trebalo da postoje različite vrste grupa kao što su neformalne, krizne grupe (koje rešavaju određeni problem), formalne, grupe na istom hijerarhijskom nivou, kako bi individualci unutar grupe mogli da dele i ujedine svoje veštine i sposobnosti da reše problem. Grupe omogućavaju stvaranje sinergije, tj. ideje da je grupa mnogo više od njenih pojedinaca, što može da uzdigne performanse preduzeća. Grupno učenje povećava potencijal organizacije zato što članovi grupe imaju više šanse da deluju međusobno i da uče jedni od drugih. Dakle, povećanje grupne efektivnosti nastaje upravo od tih grupnih interakcija. Autori koji se bave ovom tematikom smatraju da ovakvo timsko učenje može više da doprinese od individualnog, tako što se najvažnije odluke donose upravo od strane zajednica kao što su grupe, funkcije i divizije.

3. **Organizaciono** - na ovom nivou učenje se promovise kroz kreiranje određene *organizacione strukture i organizacione kulture*. Organizaciona struktura može biti takva da onemogućava ili olakšava inergupnu komunikaciju, rešavanje problema, što utiče na prihvatanje učenja od strane članova tima. Kultura takođe ima bitan uticaj na učenje na organizacionom nivou. Pod organizacionom kulturom podrazumeva se sistem pretpostavki, vrednosti i normi ponašanja koje su članovi jedne organizacije razvili ili usvojili kroz zajedničko iskustvo koji bitno određuje njihovo mišljenje i ponašanje. Autori smatraju da je za dizajniranje organizacionog učenja bitno stvaranje zajedničke vizije, pod kojom se podrazumeva set vrednosti i normi koji će voditi ponašanje pojedinaca i interakcije između grupa, kako unutar organizacije, tako i između organizacija. Isto tako bitan aspekt organizacione kulture je sposobnost da promovise ili onemogući organizaciono učenje i promenu. Organizacije sa adaptivnom kulturom mnogo lakše prihvataju promene koje se dešavaju u okruženju i njima se prilagođavaju, samim tim su njihove performanse na znatno višem nivou od onih sa inertnom kulturom, koje se pre suočavaju sa rizikom opstanka u takvom promenljivom, nestabilnom okruženju.

4. **Interorganizaciono** - organizaciona struktura i kultura ne samo što određuju viziju uspešnog učenja unutar organizacije već determinišu kako organizaciono učenje funkcioniše na interorganizacionom nivou. Na primer organizacije sa organističkom, adaptivnom kulturom aktivnije traže načine da upravljaju vezama sa drugim organizacijama, dok mehanističke, inertne kulture sporije prepoznaju i iskorišćavaju te mehanizme povezanosti. Generalno, ovakvo učenje je važno zato što organizacije mogu da imitiraju međusobne distinktivne kompetencije. Na taj način one povećavaju kako svoj legitimitet, tako i svoju efektivnost. Putem interorganizacionog učenja moguće je da predstavnici jedne organizacije idu u drugu da bi videli neka njihova znanja i dostignuća, a zatim ta znanja iskoriste i unaprede u svom poslovanju. Taj proces opet može inverzno da se vrati, u smislu da organizacija koja „daje“ znanje ponovo uzima isto, ali poboljšano. I na taj način se konstantno može održavati interakcija između organizacija koje imaju slične interese. Organizacije koje podržavaju ovaj način istraživačkog i eksploatacionog učenja mogu u kooperaciji sa svojim dobavljačima i distributerima da pronalaze nove načine i poboljšavaju ih i time da bolje rukuju sa inputima i outputima. Interorganizaciono učenje je karakteristično i za multinacionalne kompanije koje imaju isti proizvod, ali različitu kulturu, navike, pa čak i proces proizvodnje.

Ukoliko menadžeri žele da kreiraju organizaciono učenje moraju da prepoznaju uticaj jednog nivoa učenja na drugi. IT tehnologija, B2B sistemi, stratezijske alijanse i mreža organizacija su bitan pokretač za povećanje brzine kojom će organizacije „učiti“, zato što okreću organizaciju prema okruženju i pružaju njihovim članovima nove šanse.

Prema japanskom autoru Nonaki (Nonaka, Berhoin, Child, 2003) postoje dva osnovna oblika znanja, a to su objektivno koje je izraženo formalnim i sistematskim jezikom i ono je otvoreno, opipljivo i eksplicitno, i subjektivno koje je skriveno, neopipljivo, sadrži intuiciju, nagađanja i ideje. Nastajanje i konverziju znanja u organizaciji Nonaka objašnjava u 4 faze:

- 1) *Socijalizacija* – kao prvi oblik stvaranja organizacionog znanja. U ovoj fazi dolazi do prenošenja implicitnog, skrivenog ili subjektivnog znanja sa jednog na drugog člana organizacije. Najčešći primer socijalizacije jeste prenošenje znanja sa mentora na učenika, kada mentor ne prenosi svo svoje znanje na učenika, već učenik u interakciji sa mentorom upija i preuzima znanje.
- 2) *Artikulacija* – predstavlja konverziju implicitnog, subjektivnog u objektivno, eksplicitno znanje. Međutim nije svaki stručnjak sposoban da svoje znanje pretvori u eksplicitno. Zato je u tu svrhu pogodno koristiti modele, metafore i analogije. Veoma je korisno ako grupa stručnjaka u organizaciji napiše neko uputstvo ili pravila i tako eksternalizuje svoje znanje i pretvori ga u eksplicitno.
- 3) *Kombinacija* – je faza u kojoj dolazi do konverzije individualnog znanja i pretvaranja u organizaciono znanje. Nakon procesa kombinovanja eksplicitno znanje postaje, po pravilu, više rašireno kroz organizaciju i time dostupnije zaposlenima, jasnije i sistematičnije, i praktičnije u smislu upotrebe.
- 4) *Internalizacija* – u ovoj fazi se eksplicitno znanje pretvara u implicitno na taj način što zaposleni i menadžeri primenjuju eksplicitno formulisana znanja u svom svakodnevnom radu. Učenje tokom rada je najbolji primer za internalizaciju. Kroz obavljanje svog posla znanje do kojeg su zaposleni i menadžeri dosli ugrađuje se u njihove mentalne mape i šeme kao njihovo individualno, implicitno znanje. Internalizacija se može osim na konkretnim radnim mestima izvršiti i primenom treninga i obuka zaposlenih.

Menadžeri imaju veliku ulogu u izgradnji organizacije koja uči i trebali bi da imaju funkcije modela, mentora, menadžera i monitora, koje imaju direktan uticaj na organizaciono učenje. Menadžer kao *model* treba da služi ostalima kao primer od koga će oni da uče. Kada govorimo o menadžeru kao mentoru onda mislimo da on treba da pomogne ostalima da usmere svoje ponašanje prema zahtevima učenja. On je taj koji stimuliše učenje i daje podršku onima koji uče i pomaže u evaluaciji procesa učenja. Treća uloga menadžera je upravo to što sama reč kaže, da bude menadžer, tj. usmerava i unapređuje proces učenja, raspoređuje zadatke i uloge tokom učenja. I na kraju, menadžer kao monitor treba da prati i kontroliše proces učenja, kao i da preduzima korektivne akcije ukoliko je to potrebno.

## 5. ZAKLJUČAK

Organizaciono učenje predstavlja veoma važan proces i zato menadžeri treba da kreiraju učenje na način koji olakšava brzo reagovanje na izazove i promene u okruženju koje su konstantne. Nikad nije problem previše učenja, nego premalo, što se uglavnom u organizacijama i radi. Postoje faktori koji lako mogu da ugroze organizaciono učenje. Zbog toga menadžeri treba da shvate strategijsku ulogu organizacionog učenja, da kroz proces učenja omoguće da njihova organizacija postane „učeca organizacija“, znanje da se posmatra

kao stratejski resurs, jer je u uslovima neprekidnih promena i velike konkurencije to jedini način za opstanak kompanije.

Ukoliko se organizaciono učenje primeni na pravi način možemo uticati na poboljšanje performansi preduzeća, podizanje svesti zaposlenih o njihovoj direktnoj ulozi u uspehu kompanije, boljim anticipiranjem poslovanja u budućnosti, boljim odgovorom na izazove konkurencije, održavanje kompetitivne prednosti u uslovima turbulentnog okruženja i bolje prilagođavanja i snalaženja svakog radnika u organizaciji. Proces učenja isto tako se pozitivno reflektuje na ponašanje zaposlenih, u smislu manjeg broja konflikata, zatim dužim ili čak stalnim zadržavanjem ljudi u svojim organizacijama, povećava se zadovoljstvo radnim ulogama, a smanjuje se strah od neuspeha u izvršavanju radnih zadataka.

Dakle, bihevioralna i kognitivna komponenta organizacionog učenja koje dovode do promena i ponašanja i svesti pojedinaca u organizaciji, znatno utiču na kvalitet ljudskih odnosa unutar iste, a dovode i do novog načina razmišljanja, prihvatanja novog sistema vrednosti i organizacione kulture takve „učeeće organizacije“.

Proces organizacionog učenja je provučen kroz sve aspekte poslovanja kompanije i potrebno mu je posvetiti izuzetnu pažnju, da svaka aktivnost počinje sa učenjem ili je učenje neophodno za izvršavanje iste. Kada je sistem jednom postavljen, tada ne treba stati, već organizaciono učenje treba proširivati, deliti znanje i osmisliti sisteme kako da se znanje i stručni ljudi u kompaniji zadrže.

Autori ovog rada predlažu da se teoretsko istraživanje produbi praktičnim istraživanjem u kompanijama na polju organizacionog učenja, na teritoriji naše zemlje, te da se menadžerima predloži okvir za stratejsko upravljanje znanjem i stvaranje učeećih organizacija, stvaranja i čuvanja znanja, u cilju postizanja konkurentske prednosti, sa krajnjim ciljem ostvarivanja liderske pozicije u poslovanju.

## 6. ZAHVALNICA

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## 7. REFERENCE

1. Argyris C., Schon D., *Organizational Learning: A theory of action perspective*. Reading MA: Addison-Wesley. ISBN 0201001748, (1978)
2. Argyris C., Schon D., *Organizational Learning: A Theory of Action Perspective*, Reading Massachusetts: Addison-Wesley, (1978)
3. Brown J., Duguid P, *Organizational learning and communities of practice: toward a unified view of working, learning and innovation*, in Lesser, E.L., M.A. Fontaine and J.A. Slusher (Ed): *Knowledge and communities*, Oxford, Butterworth Heinemann, (1991)

4. Clein A. David – The strategic management of intellectual capital, (1998) Butterworth-Heinemann, Oxford, The link between individual and organizational learning, Danie H. Kim, Sloan Management Review Association 1993 pp37-50
5. Crossan M. M., Lane, H. W., & White, R. E., An organizational learning framework: from intuition to institution. *Academy of Management Review*, 24(3), 522-537., (1999)
6. Kolb D.A., *Experimental Learning: Experience as the Source of Learning and Development*, Englewood Cliffs, New Jersey: Prentice-Hall, (1984)
7. Lave, J. & Wenger, E., *Situated learning: Legitimate peripheral participation*, Cambridge, England: Cambridge University Press, (1991)
8. McGill, Slocum, s10, McGill, Michael E. and Slocum, John W., "Leading Learning" (1994). *Working Papers*. 167., (1994)
9. Nonaka I, Berthoin Antal, Child J.: "Handbook of Organizational Learning & Knowledge", Oxford, (2003)
10. Nonaka I, Berthoin Antal, Child J.: "Handbook of Organizational Learning & Knowledge", s242-264 (2003)
11. Senge P.M., *Fifth discipline: the art and practice of the learning organization*, 1990.
12. Simon, H. A., *Administrative Behavior*, Fourth Edition. New York, NY: The Free Press, (1997)
13. Saadat Vajihah, Saadat Zeynab, Organizational learning as a key role of organizational success, third international conference on new challenges in management and organization: organizational leadership , 2nd may 2016, Dubai UAE, Social and Behavioral Sciences 230, 219 – 225, (2016)

## OPTIONS FOR IMPLEMENTATION OF MODERN SYSTEM FOR THE PRODUCTION OF ORGANIC FERTILIZER IN MINING RESOURCES AND RISK FACTORS

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**Abstract:** Problem biological reclamation in mining is quite complex and demanding if analyzed from several aspects. In the context of the basic starting point is the fact the real mass volume quantitative need for this kind of material in carrying out biological reclamation of devastated areas in resource depletion or surface mining of coal in the narrow and wider sites in mining. So we're talking about the possibilities of production of organic fertilizers in order to provide sufficient quantities of organic fertilizers to improve the qualitative characteristics of the land in the efficient implementation of the process of biological cultivation and organization of agricultural production on the reclaimed areas where the focus of questions based on the facts of steadily increasing efficiency and effectiveness of the process re-cultivation, the need for the production of organic fertilizers in organic food production as well as the introduction of new technologies for the realization of revenue from the sale of compost on the free market. From the economic point of view, it emphasizes the answer to the question whether it is profitable to buy ready-made compost of professional manufacturer that has a pretty high price on the market or is it justified its own make of their material as a by-product during the surface mining of coal, which would recuperation devastated area after completion of excavation work. Of course, there is present not a few certain types of potential risk in the execution of the above mentioned works, and from this point for analysis as well complete process of detecting a high-risk of destructive mode that could possibly be generated during realization of said process.

**Keywords:** The system, mining, production, organic fertilizer, the risk

### 1. INTRODUCTION

Application of fertilizers began in the mid-20th century. With all the assumption that the fertilizer to create a revolution in food production, it happened to the level of nutrients through mineral fertilizers, reached a point beyond which it is useless to add larger amounts because yields do not increase. Moreover, plant growth is stagnating. The latest research shows that the compost replacement for the need to increase the yield and plant health. Today, compost is highly sought after and profitable product primarily because of a demanding market that requires the certificate / passport organic food, organic production to verify where the obligatory use of natural fertilizers and compost. Market food production is increasingly using compost. It was noted that to be much less compost for the same yield, rather than blown or raw manure. Applying compost microorganisms assisting the plant in the absorption of nutrients, and the Compost improves soil quality (alkaline-water characteristics). Over 90% of all plants live in symbiosis with micro-organisms and fungi. Using compost as a

supplement to the country has many positive effects that can be classified into three basic categories:

- Improve the physical and chemical structure of soil;
- Provided input of beneficial microorganisms and fungi;
- Provides positive effects on growth, health and quality of plants (the fruit).

Compost increases the porosity and loosening soil which directly affects the efficient aeration and deeper penetration of the root. Retains a higher percentage of moisture thereby reducing the need for irrigation, while at the same time because of their dark brown color absorbs much sunlight, which further warms the earth. Microorganisms contained in the compost provide multiple benefits. They decompose organic matter, change the chemical structure of nutrients in the form of a plant can utilize (chelates). Many of them bound nitrogen from the atmosphere (the plant unusable) and converts it into a form that the plant can also be adopted. This process significantly reduces the need for application of fertilizers. A mature compost can be applied to arable land, in principle, at any time, on grassland vegetation is at a standstill or in the meadows after the first cutting, and the pastures after the main grazing. Quantities can vary 20-60 t/ha. Length of operation ordinary compost is from 1 to 2 years. The biggest problem in the production of compost for human consumption are restricted species Materials that can be profitably used for a large number of materials which are prohibited in the human diet. In mining there are a lot of components that can be used for the compost production, and in this sense, the analysis described above, is directed towards the profiled end,[1], [2]. Chemical and physical properties of compost are:

- Density of from 420 to 655 kg m<sup>-3</sup>;
- Moisture content of 23.50 to 32.10%;
- the retention capacity of 3.50 to 4.40 grams of water / gram dry matter;
- The porosity of 60.69 to 72.47% for the different types of device;
- a pH of from 6.3 to 7.8;
- Electrical conductivity of 2.6 to 4.1 m<sup>-1</sup> ds;
- organic carbon from 16.6 to 23.89%;
- organic substances of 28.60 to 41.20%;
- Nitrogen from 0.95 to 1.68%;
- The total phosphorus and total potassium ranges from 0.27 to 1.13%, or 0.27 to 2.11%, respectively;
- C / N ratio in the range of 14.22: 1 to 18.52: 1.

## 2. COMPOST MATERIALS THAT CAN BE USED BUT REQUIRE SPECIAL HANDLING

Table 1. Compost materials that require special handling , [1], [2], [11], [12]

Materials	C/N	R	Comment	Risk level		
				N	S	V
Cardboard (Non-recycled)	C	+	Slowly falling apart. Grind into small pieces. If desired, put in water and add a drop of detergent to extend the rate of decomposition. Slowly disintegrate.			
Corn cob and stems	C	+	They should go through Shredded or chop them into very small pieces, mix with nitrogen rich material.			
Lawn Chemicals	C	+	Pesticides and herbicides are a problem, degradability ranging from one to twelve months. Leave the grass on the lawn (Best), or add to the pile if compostable material, or at least 12 months wait 2-3 weeks before use clippings from lawn after applying chemicals. Do not use the clippings as mulch garden for at least 2-3 weeks (or after 2rollover) after chemical application.			
The remains of the hedge	C ili N	+	Slowly disintegrate. Thin layers of debris hedges may occasionally be used for roughage; chop up twigs and branches on small pieces			
Lime	O, alkalizer	+	Changing the chemistry of the crowd, leading to loss nitrogen, and too much lime kills bacteria and other micro organisms. Omit from the crowd or used very sparingly in thin layers, if bunch goes to anaerobic (not to be confused with fertilizer).			
Shell nuts - walnuts, pecans	C	+	Slowly disintegrate. Crushed shredder.			
Peat moss	O, low The content	+	High moisture absorbed slowly disintegrate. Mix well with other materials, add in small amounts. If possible,			
	nutrients		peat dive in warm water before addingthe crowd.			
Pine cones	C	+	Slowly disintegrate. Grind or cut into very small pieces.			
Pine needles	C	+	Slowly disintegrate. Stir wit hother materials, to add in small quantities.			
Sawdust	C	+	Slow break down, adversely can affectthe ventilation. Work on the crowd to thin layers, mix with nitrogen-rich materials,			

Turf	N	+	Slow to decompose. Break into small clumps, mix well with other materials or cover the top of the piles with roots, grass down (Preferably in the fall), or composted separately with roots facing up, mixed with water covered with a dark tarp.	●		
Pine cones	O, aktivacion	+	Woe be to finish composting. Add small amounts in thin layers as activator land or suppress from piles (Finished compost gives the same results, and usually weighs less).	●		
Ground	C	+	It contains jug lone which can be toxic to plants. Add in small amounts, well mix; toxin to biodegradable in 30 to 40 of the day.			●
The leaves of walnut	C	+	Rizomata weeds system is hard to kill. Expose to the sun in a plastic bag until is fully cured, or omit from the piles.		●	
Weeds, noxious	N	+	Seeds of weeds is difficult to kill. It is best to use when the green or leave in a warm chambers (50 -60 ° C) for at least a week.		●	
Weed, others	O Alkalizer, Kalijum	+	Changes Chemistry piles, may cause imbalance of nutrients. To use very sparingly in thin layers; not used on top of a pile or omitted from the piles.	●		
Ash wood	C	+	Slow to decompose. Grind or chop in a very small pieces; mix with nitrogen rich materials.			●
The level of risk with the number of frequencies				6	5	6
				+	-	-
				8	4	9
				0	2	9
				0	0	8

### 3. THE PROPOSAL OF THE TECHNICAL SOLUTION OF THE SYSTEM FOR COMPOSTING

Conceptually, the system proposed composting outdoors with specialized machines for crushing raw materials and self-propelled machinery for tumbling stack of composting. These modern technical solution is achieved by the entire production device with involvement of not more than 3 employed within the complex for composting. Sizing plant In accordance with the terms of reference as the initial determination of a need for annual quantities of device has an area of 117 hectares The user who intends to fertilized. According to agricultural practice that every year, the agricultural land entries the organic matter of 10 to 30 t/ha, adopting the annual amount of fertilizing compost



10 t/ha, which means that for 117 ha is necessary to provide 1,170 tons each year. On the other hand, for the purposes of biological reclamation of devastated areas need to be initially introduced computational device layer thickness of 5 cm. For rational sizing plant for composting assume that Every year biological recultivation (technical + biological reclamation) of 10 ha, that is, produces 5,000 m<sup>3</sup> of compost that the weight of 2,000 tons. On the other hand, the investor has submitted the information that, at this moment, has annual the amount of raw material in the amount of 990 ton, which, according to the global practice, rational and high quality can produce about 400 tons of compost. Following the latest trends in production and EU guidelines introduced and composting dehydrated, sludge from the plant to the treatment of effluents in the extension, with a daily amount of 10 t and 10 m<sup>3</sup>, (I phase of the construction of wastewater) which is annually about 3000 m<sup>3</sup>. [1], [2], [3], [4], and [13], [14]

Plant for the production of compost per year can handle: A) 7,000 m<sup>3</sup>, B) 3.000 m<sup>3</sup>, Total: 10,000 m<sup>3</sup>.

In addition to a bulk weight of 400 kg / m<sup>3</sup> per year this would amount 4.000 t of the finished device which, with a market value of the compost is about 100 Eur/ton. Income would be: 400,000 Eur. Below is a complex technical solution for the production of compost. Here is the possibility of setting up a complex of compost, near the mines in the mine, the location of which can be rational ensure:

- Access roads,
- Water of the minimum pressure of 3 bar;
- Sanitary sewage connection of buildings to accommodate staff;
- Electric power supply 3x400/231 V, 50 Hz;
- Telephone connection with Internet communications.



Figure 1. Locations composting system in the vicinity of the open pit, [1], [2]

When selecting the installation site is viewed the possibility of delivering proximity secondary raw materials (biomass), or placement device for the purpose of biological reclamation of devastated areas. Determining the future location of the plant will be carried out after the development of appropriate planning conditions, according to the Law on

planning and construction. The location serves primarily for the feasibility study (feasibility) to comprehend the necessary investments and operating costs. For purposes of consideration of costs of raw materials and the finished product (compost) assumed the distance of 20 km. The default location is close to the mines and existing facilities for overhaul Machine mines. The complex is designed area of approximately 1 hectare, surrounded by a wire fence with 2m schoolyard gate. At the entrance to the complex is planned surface scales for receiving raw materials and shipping nearly compost and other materials. It is designed for building worker wases accommodation, sanitary facilities (bathroom with bath), a holiday workers. The building is container type with all the necessary installations. The extension is a carport with storage of tools and space for machines. The complex has its own pole-mounted substation with associated 10 kV power line, fed drinking water and drainage sanitary sewage in the sewer. The fence is tree-lined and the inner side of the fence is planned manipulative 3m wide roads, [1], [2], [5], [6], and [14].

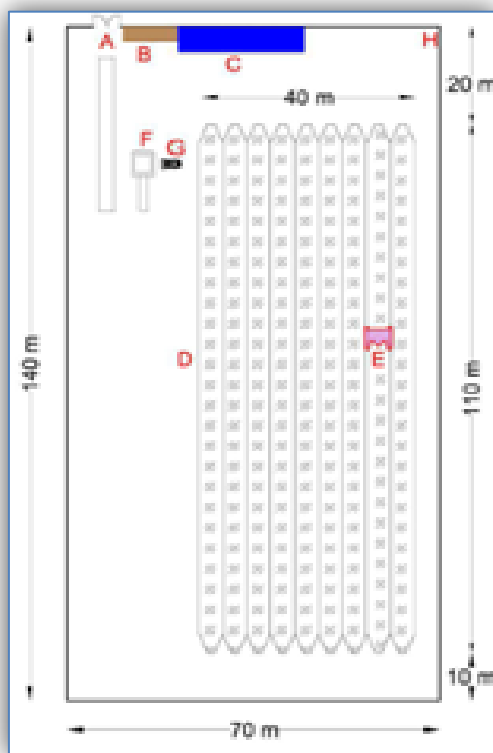


Figure 2. Sketches kompostilišta placed on open ground with leveled, clay, background, (A- Gate scales for B-Vagar, office products, clothing and Bathroom, C-garages and the warehouse, D-Heaps of compost, E-propelled tending device, F-mill and separator, G-wheel, H-railing 2 m), [1], [2]

### 3. PRODUCTION TECHNOLOGY COMPOST

After pruning and harvesting biomass is carried out and grind shredding or on the site or on-site installations composting. The advantage of grinding on the spot is a rational transport (specific volume is much greater than transport without grinding). However,

grinding the biomass site composting technology is more accurate considering that the mixing of different materials, this being technologically favorable to the composting process.

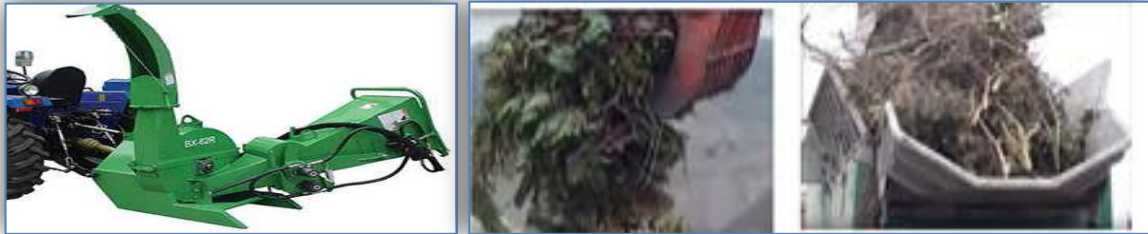


Figure 3. Part of the output device for composting, [1], [2]



Figure 4. Preparation of materials and grinding them with compost disposal to landfill, [1],[2]

- Gricultural waste after harvest;
- Pruning of orchards;
  - Grass clippings;
  - Cutting undergrowth;
  - Care and maintenance of forests and clearing the area under the power lines.

Work on the collection of raw materials, primarily to cut and transport complexes compost production are the responsibility of EPS or workers involved in the preparation raw material. These works are seasonal. After milling to form a longitudinal piles (piles) which are in time Aeris tumbling and mixing. The composting process, in the open air, is 8 to 10 weeks to a particular wetting agent, and control temperature. After finishing the process, the sieving fraction (about 15 mm) and higher fraction is back to the beginning of the composting process. [1], [2], [7], [8], [9]. [12].



Figure 5. Assemble the compost mass at the landfill, [1], [2]

The weight ratio of the finished compost by weight of raw material is 0.35 to 0.50. Amounts green mass would be of approximately 10,000 t/year, except that the final volume 7,000 tons of raw materials and 3,000 t dehydrated sludge, [1], [2], [10], [11], [13].



Figure. 6. Turning over mix the compost mass composting, [1], [2]

Tending to the masses composting is done aerisanje piles and accelerates composting process. certain laboratory analysis is performed determination of moisture and needs for further wetting, state compost and chemical composition. In this mode, the processComposting takes 8-10 week in all weather conditions.



Figure 7. Showing making figures mix the compost material weight, [1], [2]

#### 4. CONCLUSION

The paper presents new aspects to the side at strategic login with the possibility of the manufacture of the spreader kompostnog mix the material contained in large quantities in the mining industry as well as products of the manufacturing process, as logistic processes. Economic indicators are reported economic feasibility of such an approach given that the process of biological reclamation of a continuous surface that need to be re-cultivated biological growing. They occur most complete resource depletion of certain open pit-mining in. There is some risk potentials in living ciklucu such a production system, and they are particularly objectionable and a special analysis with a proposal and the activities to minimize the synergy of their destructive modes as well as a minimization of the destructive peaks in certain phases of the life cycle. There remains room for improvement of the underlying approaches and their adaptation to the locations where they are working towards optimal systems and quality productions with general characteristics.

#### REFERENCES

1. Internal documentation (mining industry and biological reclamation), (May 2017 yeas).
2. Bäuerliche Erzeugergemeinschaft Schwäbisch-Hall (2010): [www.besh.de](http://www.besh.de), (May 2017 yeas).
3. BOELW - Bund Ökologische Lebensmittelwirtschaft e.V. (2008): Zahlen, (May 2017 yeas).
4. Daten, Fakten: Die Bio-Branch, Berlin, (May 2017 yeas).

5. Bund Ökologischer Lebensmittelwirtschaft e.V. (2009): Zahlen, Daten, (May 2017 yeas).
6. Fakten: Die Bio-Branche. BÖLW, Berlin, (May 2017 yeas).
7. Hoffmann, V. et al. (Hrsg) (2009): Handbook: Rural Extension. Volume 1, (May 2017 yeas).
8. Markgraf Publishers, Weikersheim, (May 2017 yeas).
9. Meyer, R. (2008): Agrarwirtschaft 2008 – Betriebe des ökologischen Landbaus, (May 2017 yeas).
10. Veröffentlichung des Bundesministeriums für Ernährung, Landwirtschaft und Verbraucherschutz, Bonn, (May 2017 yeas).
11. www.desingsafe.com, (Author of software: Bruce W. Mein, Design Safe Ingenering, Michigan, USA), (May 2017 yeas).
12. ISO 31000:2009 *Risk management -- Principles and guidelines*. Geneve (Switzerland): International Organization for Standardizations (ISO), 2009. - 24 pp., (May 2017 yeas).
13. Radosavljević, S. and Radosavljević, M.: Risk assessment in mining industry – Apply management. *Serbian Journal of Management*, Vol. 4, No. 1 (2009), pp. 91-104. ISSN 1452-4864., (May 2017 yeas).
14. Radosavljević S., Radosavljević M., Risk technical systems: model and sotware Designsafe 6.0., *International Journal of Software Systems and Tools, (IJSST)*, Volume 1., Number 1., pp. 45-53., (2011), (May 2017 yeas).

## HAZARDOUS WASTE AND WASTE WATER WITH RISK ANALYSIS IN MINING

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**Abstract:** The processes in the field of hazardous waste management and waste water management in the mining industry are very demanding and in the operationalization of the real complex. Oni overall are part of the eco-problems that can have thresholds extremely high risk of environmental affected by mining operations. The overall situation in this area of the Republic of Serbia is burdened by various problems that can be characterized according to different strategic approaches by different influences, levels of government, infrastructure, logistics, capacity of the economy, the availability of material and financial resource potential to eco awareness and eco-culture of almost all component ecosystems with special emphasis on economic entities for activities in mining. When it comes to facilities for the treatment of hazardous waste and waste water in the Republic of Serbia, who are normally the overall strategy on the management of hazardous waste defined as jobs in the first degree of priority, they are in the present context does not take place as planned and that we are faced with problems of it takes a real lot of time in generating quality solutions. U primarily it is indisputable that there is a certain degree of distrust in local communities about the degree of eco safety and potential risks that the planned construction of facilities can bring the spatial locality where they were located or on closer and further environment. There is a total balance of norms and regulations in the context of managing these wastes in the international and national levels, as well as the compliance of national legislation with EU directives, the situation in the region in the field of treatment of hazardous waste and waste water management, programming choices and more. Cited fit points to the need to review the entire situation to redesign existing general strategy of the Republic of Serbia in this area. The paper presents the parameters of the current state of the subject area with the incorporation of some of the possible potential opportunities for overall improvement of the eco status of the environment and the potential risks that need to be minimized and lead to acceptable thresholds above all the general security in the handling of the aforementioned waste in production mining practice. Certainly it necessary to consider the issue of eco awareness and eco-culture with the aim of eliminating mistrust of the general public, to minimize the fear of potential negative effects, but also reduce the opportunities for various abuses that are here really realistic and possible.

**Keywords:** Hazardous waste, waste water, waste management, eco-risk, mining

### 1. INTRODUCTION

Mining activity is the basis for the realization of the strategy of electrical energy reliability, security and development of the Republic of Serbia. With the production of coal annually from nearly 50 million tons for the purposes of processing the finest source of

energy-electricity, it is realistic to expect to generate different types of waste in such a constellation of production, including hazardous waste and waste water, different category of quality in the context of their pollution. These circumstances conditioned and determined actions in the present context, which must be complied with all legal requirements R. Serbia, EU directives and international standards. It is realistic to ask the question how R. Serbia at this moment in a state that all of our strategic eco applications on the management of hazardous waste and waste water fully implement on your site, and that they are implemented and result in a maximum format function for which they were intended i intended. This question is by no means accidental, because it arises from the totality of the circumstances and conditions in which the country finds itself, set priorities for further development and for the realization of the planned eco strategy is necessary as time and very challenging financial logistics. There are several definitions of hazardous waste on the basis tend to have characteristics of hazardous waste. According to standards of the United States Agency EPA hazardous waste is defined as "a particular solid waste, or a combination of solid waste, because of the amount, concentration, or physical, chemical and infectious properties, may cause, or contribute greatly to mortality as well as the increase of chronic and acute diseases, or if it is treated in an inappropriate manner, or are transported and deposited in an inadequate manner, can substantially have negative effects on human health and environmental quality "[1]. As the definition relates to solid waste materials, also apply to the scheme solid components, liquid and gaseous components. According to international standards that are applied in the world, waste is classified as hazardous, if it has one of the following characteristics [1]:

- Exhibiting the properties of flammability, corrosivity reactivity or toxicity;
- Originates from the source of non-specific, (waste generated from industrial processes);
- Originates from a specific source, (or in the special products of the process);
- Specific chemical is a commercial product or semi-finished product;
- Represents the mixture defined of hazardous wastes;
- Represents the substance is not excluded from the list of hazardous waste which is an integral part of the legislation.

The above properties are very close as mining activities and certainly can be identified at a general or de-konponovan process level within the industry so as to process these and their applications. Immediately be seen how realistic this destructive thresholds for all of the media environment and how high are generated modes of risk in this context. Especially if we take into account the negative synergetic complexities more properties of several different materials. According to a dangerous strategy on the management of waste in the Republic of Serbia from 2010-2019, the definition of hazardous waste is taken from the Law on Waste Management, Republic of Serbia and the waste that by its origin, composition or concentration of hazardous substances may cause danger to the environment and human health and has at least one of the intrinsic properties (explosiveness, combustibility, the propensity to oxidation is organic peroxide, acute toxicity, infectivity, the tendency to corrosion, in contact with the air is released combustible gases, in contact with air or water liberates toxic substances, contains toxic substances with chronic sustained activity, as well as



the characteristics ecotoxic), including the packaging in which the hazardous waste is packaged or has been, [2], [3] and [4]. According to the law on waste management R. Serbia hazardous waste is waste which by its origin, composition or concentration of hazardous substances may cause danger to the environment and human health, and has at least one of the hazardous characteristics regulated by law, including the packaging in which hazardous waste was or is packed, [4].

When it comes to hazardous waste, it is considered that the organization of the management of hazardous waste in Slovenia is at a low level and requires an integrated approach at all stages - from the moment of creation, collection, transportation, treatment to disposal. There are facilities for treatment of certain types of specific waste streams (batteries, electronic and electrical waste, waste oil, waste vehicles). However, there are almost no landfills for permanent disposal of hazardous waste. Temporarily conditional postponement is generally carried out within the company in which the waste is produced, and very often in an inadequate manner, with all the risks such a situation from which treatment can have on the environment.

## **2. OBJECTIVES OF MANAGEMENT OF HAZARDOUS WASTE AND WASTEWATER MANAGEMENT IN MINING**

In order to achieve progress in the establishment of an integrated waste management system in mining strategic priorities are reliable and safe disposal of hazardous waste and its further disposal in accordance with the procedures followed in projected statutory determinations. Some of the possibilities are that some of the kind of waste through a physical and chemical treatment are brought into phase of final disposal at the location of mining and the other part is routed via an authorized operator for the management of hazardous waste, in the central facility for physical-chemical treatment of hazardous waste or new warehouse dangerous waste that would be built in the Republic of Serbia. Herein are important and processes that are open towards the integrally establishment of a system for the collection and treatment of specific waste streams (waste oil, waste of electrical/ electronic products, used batteries and accumulators, waste tires, waste vehicles, packaging waste, etc.) To the closure and repair of existing waste dumps, remediation of contaminated sites and hazardous waste finally qualitative revitalization contaminated area of the environment that would be permanent, [2], [3] and [4]. Here, you can ask a question relating to the management of hazardous waste as one of the most essential and important goals to be achieved, how much can realistically establish sustainable implementation potential for hazardous waste management and waste water management in the mining industry and which would be incorporated into national strategies and defined and established national capacity for managing hazardous waste. Waste Management Strategy defining, building an integrated system for the management of hazardous waste, by establishing the proper collection and transportation of hazardous waste, central regional storage of hazardous waste that is kept for treatment, construction of physical-chemical treatment of hazardous waste within the Center for Hazardous Waste Management, construction of incinerators for burning hazardous waste, as well as modern equipment and hazardous waste dumps. According to the provisions of article 39 of the Law on Waste Management, "physical and chemical treatment of waste comprising: neutralization, mineralization, solidification, oxidation, reduction, adsorption, distillation, ion exchange, reverse osmosis and other physico-chemical and chemical

processes to reduce the hazardous waste characteristics . Physico-chemical waste treatment proceeds in accordance with the license issued for the treatment on the basis hereof." [4]. For hazardous waste that can not be treated in the country it is necessary to establish a temporary storage facility for the collection and export of hazardous waste in authorized plants. At the same time it is necessary to develop eco instruments with mechanisms for quickly, efficiently and rationally address the issue of inherited pollution/so-called historical legacy waste, and elimination of environmental damage due to improper waste management in the context of the long preceding period. It is certain that this is a very specific and realistic extensive control applications that need to operationalize locations as mining and other industrial potential. This is a very serious and extensive work and as long as he can not be realized by the end we can not talk about the transition from the option of eliminating eco result of the transition to the eco prevention, which would be the ultimate goal of an integrated approach to the subject issues of waste management and waste water management in the mining industry. This implies a large number of activities from identification of sites contaminated by hazardous waste management, analysis and risk assessment to determination of rehabilitation priorities. It is also necessary to provide the complete necessary infrastructure eco logistics, financial resource potentials to clearly define the obligations of all participants in the process of implementation of the remediation sites, [4], [5] and [6]. Pursuant to the Law on Waste Management All producers of hazardous waste generated by more than 200 kilograms per year, are required to draw up waste management plans. Collection and treatment of packaging waste contaminated by hazardous substances should be carried out in accordance with the principles of treatment of hazardous waste. You must consider the conditions under which the packaging waste contaminated with hazardous substances can be burnt in cement thermal power plants and other plants in which this process can be safely implemented. Certainly operationalization of these processes involves continuous monitoring and control of economic instruments and economic effectiveness (destruction of hazardous waste to the Republic of Serbia in the EU Cost of 3-5 euros in a new plant built in the country about 1 euro), which in this way can be generated with a complete security and safety of the environment.

### **3. HAZARDOUS WASTE AND WASTE WATER IN MINING RESOURCES WITH RISK**

Like all activities in our country and mining represents a specific industry when it comes to resources, starting from the volume to the management of hazardous waste and waste water. Deployment and use of different materials which are a function of the logistics of the basic process of manufacturing a implemented through various of the processing application (oils, fats, acids, etc.) Are in the situation that the general condition of the reliability and safety of the system, if it is not carried out rationally to the optimum a control the same , extremely questionable and represent weak points that can compromise a complete real system and cause potentially miraculous incident to the situation of the large volume and size. Despite the defined legal basis for handling the material are present, their harmonization with EU directives, it is not sufficiently applied in the production practice and in some localities almost do not apply, but as a statement of such a situation we have extremely serious situation that must be dealt with quickly, efficiently, rational and economical. The most common types of materials that are either hazardous waste or used in the processes of becoming hazardous waste are: (oils, fats, waste oils, waste greases, batteries, nickel-

cadmium batteries, non-ferrous metals, electrical and electronic equipment, acid, oil filters, pressure reducing valves, asbestos, JIS 218 paste for welding, PSG coating anti-aging of rubber, mineral / glass fibers, ion exchange resins, waste chemicals, waste oil and mixed fat and oily sludge from the existing and the new washing workshop et al.). The bulk of waste and hazardous waste is temporarily disposed of at a designated location equipped with a conditional container which is in accordance with the definitions of legal regulations and international standards. Waste Management Law stipulates that the temporary storage locations within the formation, and the company may be longer than one year, [2], [3], [4] and [7]. The practice is that contracts to be awarded on an annual basis with authorized operators for certain types or more types of waste and are transported to the same location and still carry out the disposal, recycling in the Republic of Serbia or if there is no recycling centers, perform the same export to countries that have adequate recycling centers. The overall situation is that companies in the mining industry in the current economic situation at the time trying to fulfill their obligations in the context of the disposal and treatment of waste or objectively there are a lot of aggravating circumstances, which makes more complex the overall situation. The circumstances are primarily in the sense that there are not enough containers for the conditional disposal of waste, eco awareness and eco-culture in dealing with different types of waste are not developed enough level so the possibility of destruction through the emergence of various applications of accidental and miraculous things realistically possible, as well as hard to predict. Waste disposal is a particular problem in the mining industry, since they are of a different character in different locations and in different quantities. It is very difficult to unify the system of waste water treatment in several modern systems due to the large number of locations where they are found. One origin may be contaminated with oil and fats for such water is usually used for oily water separators. Separating the oil from the same water and at the outlet of the drain water that meets the parameters of the discharge to the recipient. Water from technological processes the collected runner systems where it is possible in the cleaning system, where we have the physical and chemical treatment of water, [2], [3], [4], [8] and [9]. Production practice shows that such systems after mixing different polluted water in various quantities for, are not able to meet all the parameters of the limit values for purified water. Since this is a very expensive technical solutions recently accessed build smaller individual plants that clean the water from one of the technological process. It is a modern and fast cost-effective systems that fully meet the requirements in accordance with the law and the EU directive on the quality of discharge water from the technological process.

Table 1. Results of analysis of the physico-chemical treatment and the surface water in mining

Parameters	Measur e ent unit unit	Exit ingPP OV	Upstre am	Downstr eam	Degree of nurfication PPOV	
					(%)	Risk
Appearance*		Mu	Malo	Malo		M
Fuzziness						
pH*		7,78	7,77	7,78		M
Suspendov. mat*	mg/l	570,0 0	24,00	26,00	81,61	V
HPK*	mgO <sub>2</sub> /l	895,2 8	81,05	37,70	73,90	V
BPK <sub>5</sub> *	mgO <sub>2</sub> /l	/	1,934	5,479		V
Ammonia *	mgNH <sub>3</sub> N/l	/	0,24	0,27		V
Iron	mg/l	0,94	<0,09	<0,09	63,71	V
Phenols *	mg/l	1,057	0,002	0,004	78,76	V
Arsenic	mg/l	2,62	0,08	0,10	4,38	V
<b>Mineral oil S10S40</b>	mg/l	<0,05	<0,05	<0,05		<b>S</b>



Figure 1. The systems for wastewater treatment of older technology



Figure 2. Installation of a separator for the treatment of oily waste water  
 from car workshops and the new washing

Inadequate management of hazardous waste and waste water can cause a variety of destruktivne applications that are manifested through incidents, accidents and accidental situations. In miraculous situation of some of the declared destruction may be in the form of

options: the emergence of a fire, release of hazardous substances into water and soil, uncontrolled emissions into the atmosphere, an explosion at the plant, machinery and equipment, severe damage to the equipment and devices, etc. [4], [10], [11] and [12].

Evaluation of danger or risk of accidents and danger of environmental pollution, the planning of measures for the preparation of possible accident and remedial action is performed when hazardous materials are present in an amount equal to or greater than those given in the following list of hazardous substances:

Table 2. Only part of the List of dangerous substances with exposure thresholds of risk and synergy same

Hazardous substances		V- high-risk threshold, VV-threshold very high risk		
Substances or groups of substances		Quantity in tonnes		
Named substances			Risk level	
1.	Acrylonitrile	20	V	VV
2.	Ammonia	50	V	VV
3.	Ammonium nitrate or a mixture thereof in which the nitrogen content is greater than 28% by weight and the aqueous solution in the concentration of ammonium nitrite is greater than 90% by weight	350	V	VV
4.	Ammonium nitrate in the form of fertilizers or complex fertilizers containing ammonium nitrate in which the content of an a zota of ammonium nitrate is greater than 28% by weight	1.250	V	VV
5.	Acetylene	5		VV
6.	Bromine	50		VV
7.	Bromo-metal (methyl bromide)	20		VV
8.	Hydrogen	5		VV
9.	Hydrogen sulphide	5		VV
10.	1,2 Dibromoethane (Etilendibromid)	5		VV
11.	Diphenyl-methane-di-isocyan (MD)	20		VV
12.	Ethylene oxide	5		VV
13.	Carbonyl chloride (phosgene)	0.750		VV
14.	Oxygen	200	V	VV
15.	Methyl isocyanate	0.150		VV
16.	Sodium chlorate	25		VV
17.	2-Propylene (Acrolein)	20		VV
18.	propylene oxide	5		VV
19.	sulfur dioxide	25		VV
20.	Sulfur trioxide	15		VV
21.	tetraethyl lead	5		VV
22.	Tetramethyl lead	5		VV
23.	Toluene-di-isocyanate (TDI)	10		VV
24.	Carbon disulfide	20		VV
25.	Hydrogen fluoride	5		VV
26.	Formaldehyde (90% concentration) □	5		VV
27.	chlorine	10		VV
28.	Hydrogen chloride (liquefied gas)	25		VV
29.	Hydrogen Cyanide	5		VV

Risk analysis is possible in different software models and methods in different situations and it should primarily be a tool in the hands of analysts, according to the size of

the estimated risk thresholds designed with the expert team adequate preventive responses to them. Author of the paper is doing a combination of software tools and one of them is DesignSafe 7. Management Strategy on waste and waste water needs to be addressed in the context of an integrated approach with a tendency towards reduction of hazardous waste and disposing of waste in a responsible and safe manner. Inadequate waste management in the Republic of Serbia is one of the biggest problems in terms of environmental protection. An integral waste management system is a series of activity of preventing waste, reducing the amounts of waste and its hazardous characteristics, waste treatment, maintenance of the plant for waste treatment, monitoring, and education regarding the activities of the Waste Management. Harmonization of regulations of national and European legislation in the field of solid waste includes the basic principles, which are used in order to improve the waste management system and solving the problems of waste reduction: prevention principle, the principle of waste separation, the principle of the recycling, the principle of the plant for the treatment and the implementation of law regulations, [4 ], [13], [14] and [15].

#### 4. CONCLUSION

The paper gives an overview of the current situation in the context of strategic projections for the management of hazardous waste and waste water management in the Republic of Serbia as well as the current situation in mining. After full harmonization of legislation in this area with the EU Directives and their full implementation in the mining industry can expect real improvements faster increase quality while reducing the threshold of risk prevention as a suppository in the context of such a small impact on the environment and human security. To lead to the operationalization of that is necessary to provide all the necessary preconditions (location, infrastructure necessary logistics, necessary financial logistics, the full implementation of legislation and other equipment). The aim of the integrated management of hazardous waste and therefore wastewater. It can generate a phased gradual redesign of the existing waste management system significant improvements and eco-advantages with real financial savings as well as a secure and reliable infrastructure logistics. These advantages of strategic commitment shoot the need to start as soon as its implementation in the territory of the Republic of Serbia and in particular in large systems of Mining and Energy. Space for constructive foci of scientists and experts in the context of the preceding definition of eco sustainability in the management of hazardous waste and waste water is not limited to this, and its acceptance as a modern eco thinking in the near future becomes a priority and absolutely necessary.

#### REFERENCES

1. *National Program for Environmental Protection, Belgrade, (2010).*
2. <http://www.ekoplan.gov.rs/src/7-Other-document-127-document.htm>.
3. Waste Management Strategy for the period from 2010 to 2019. [http://www.ekoplan.gov.rs/src/upload-centar/documents/law-and-draft-laws/regulations/Waste Management Strategy final.pdf](http://www.ekoplan.gov.rs/src/upload-centar/documents/law-and-draft-laws/regulations/Waste%20Management%20Strategy%20final.pdf).

4. Law on Waste Management R. Serbia.
5. Internal documentation "Kolubara", Lazarevac, (2016-2017).
6. Radosavljević, S.; Dašić, P. and Radosavljević, M.: Appendix specifics of risk management in mining. *Metalurgia International*, Vol. 18, Special Issue No. 8 (2013), pp. 59-68. ISSN 1582-2214.
7. Radosavljević, S.; Dašić, P. and Radosavljević, M.: Individual maintenance engineering in energy and mining-based of risk. *Metalurgia International*, Vol. 18, No. 6 (2013), pp. 79-86. ISSN 1582-2214.
8. Radosavljević, S.; Lilić, N.; Ćurčić, S. and Radosavljević, M.: Risk assessment and managing technical systems in case of mining industry. *Strojniški vestnik – Journal of Mechanical Engineering*, Vol. 55, No. 2 (2009), pp. 119-130. ISSN 0039-2480.
9. Radosavljević, S. & Radosavljević, M.: Ecological metrics eco risk, eco controlling in the mining. *Tehnička dijagnostika*, Vol. 10, br. 2 (2011), str. 55-61. ISSN 1451-1975.
10. Radosavljević, S. & Radosavljević, M.: FMECA method in mining and energy, process approach. *Tehnička dijagnostika*, Vol. 9, br. 3 (2010), str. 17-28. ISSN 1451-1975.
11. Radosavljević, S. & Radosavljević, M.: *Coal quality work for green energy to energy efficiency*. *Tehnička dijagnostika*, Vol. 10, br. 4 (2011), str. 41-48. ISSN 1452-4864.
12. Radosavljević, S. and Radosavljević, M.: Risk assessment in mining industry – Apply management. *Serbian Journal of Management*, Vol. 4, No. 1 (2009), pp. 91-104. ISSN 1452-4864.
13. Radosavljević, S. & Radosavljević, M.: Modern models for risk analysis in Serbian mining industry. *Tehnička dijagnostika*, Vol. 8, br. 1 (2009), str. 17-24. ISSN 1451-1975.
14. Radosavljević S., Radosavljević M., Contemporary models for risk analysis in the Serbian mining, *Technical diagnostics*, ISSN 1451-1975., Number 1., Beograd, pp. 17-24., (2009).
15. Radosavljević S., Radosavljević M., Risk technical systems: model and software Designsafe 6.0., *International Journal of Software Systems and Tools*, (IJSST), Volume 1., Number 1., pp. 45-53., (2011).

## **APPLICATION OF THE SWOT-MCDM MODEL TO PRIORITIZE THE SCENARIOS FOR MANAGEMENT DEVELOPMENT IN NATIONAL PARK DJERDAP, SERBIA**

**Sanela Arsić, Djordje Nikolić, Ivan Mihajlović, Aleksandra Fedajev, Živan Živković**

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**Abstract:** The main focus in governing national parks all over the world is providing the balance between society needs, economic and ecological principles as well as to enable sustainable regional development through rational usage of resources during a long term period of time.

This paper introduces hybrid SWOT-MCDM model that can be useful for determining the priority among possible scenarios in order to achieve strategic goals and vision for sustainable development of the National Park Djerdap in Serbia.

**Keywords:** SWOT, MCDM, National Park Djerdap



## **ATTITUDE OF EMPLOYEES ON CORPORATE SOCIAL RESPONSIBILITY IN SERBIA**

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**Abstract:** In conditions of global financial and economic crisis, the debate about corporate social responsibility has gained in importance. The modern companies that operate in the market are increasingly becoming involved in society and show a growing interest in Corporate Social Responsibility (CSR). Social responsibility means the obligation of management to undertake certain activities that will contribute to improving the welfare of the whole society and the business system. Therefore, the most important and most difficult task for the management of any company is to make a profit and to satisfy the needs and interests of society at the same time. This paper presents the part of the results of research about Corporate Social Responsibility in Serbia. The aim of this paper is to present the attitudes of employees in Serbia on CSR and in according to their opinion. The study was conducted through questionnaires. The questionnaire for employees was developed based on the literature and employees are being asked to assess different aspects of CSR in theory and practice in companies they are working. Data collected in this questionnaire was processed with adequate statistical methods by using software packages SPSS v.18 based on which we derived appropriate conclusions.

**Keywords:** CSR, the dimensions of CSR, employees, enterprises

## COOPERATION BETWEEN RUSSIA AND HUNGARY CONTRARY TO THE SANCTIONS

**Kseniia V. Baimakova, Ludmila A. Trofimova**

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**Abstract:** This article deals with the current stage of cooperation between Russia and Hungary. Despite the sanctions imposed by the EU in 2014 and the reduction of trade in this regard, Russia and Hungary have not only great potential for expanding economic interaction, but also a great desire for further collaboration. According to V. Orban, "non-economic problems can not be solved by economic methods".

A multidirectional change in trade turnover between two countries from 2013 till the present is examined. Attempts are made to explain the reasons for this change, and, in particular, the human factor is considered as one of the possible reasons for maintaining relations during the period of sanctions.

The authors developed a special survey, which can confirm or refute this assumption. The approbation of the survey is made on a group of teachers and students of the Business technologies institute of the State University of Aerospace Instrumentation (SUAI, Saint-Petersburg, Russia), and it shows interesting results. On their basis, an analysis of the prospects for further cooperation for the return of relationships to the trajectory of sustainable growth is conducted.

**Keywords:** Cooperation, Russia, Hungary, sanctions, human factor

### 1. INTRODUCTION

A characteristic feature of the world economy at the beginning of the third millennium is its global nature: the previously unprecedented economic activity of companies, individuals, state structures, the dynamic activity of international organizations. All this is a way of cultivating the once scattered geographic regions and sovereign states built on the national principle into an integral system of interrelated and interdependent structures, the successful functioning of which largely depends on the growth of foreign economic contacts.

However, globalization and the information revolution, stimulating a new qualitative model for the development of national economies, have brought not only positive features to the modern world economy. The world economy of the beginning of the 21st century is distinguished by a high degree of turbulence, since the former world order of the late 20th century was questioned; the global threat unknown in the face of international terrorism is constantly evolving; risk of the occurrence of planetary epidemics (pandemics) of dangerous diseases increased; the most prosperous states experience numerous social problems as a result of growing demographic migration, accompanied by the onslaught of the culture of developing countries alien to them; the military-political differences of countries are pouring into real economic wars between them, the tools of which are increasingly sophisticated sanctions directed against individual governments, individuals and companies [1].

The aggravation of the current political situation in the world has led to a number of countries imposing restrictive measures on certain areas of bilateral cooperation with Russia, particularly in the sphere of finance, transfers and property of individuals and legal entities, military-technical cooperation. In response to these measures, the Russian Federation in August 2014 introduced, so-called counter-sanctions, restricting the supply of food products to Russia from the countries of the European Union, the United States, Canada, Norway and Australia. These measures, in turn, had an impact on the economic, monetary, and social life of a number of countries. In particular, they call for tense political and economic interaction between the EU and Russia, a large foreign trade turnover, which negatively affected the Russian economy and the economic growth of the EU countries. According to some authors, the most sensitive to this embargo has affected relations with Hungary [2].

Nevertheless, the balanced and restrained position of the Hungarian leadership in connection with anti-Russian sanctions is very encouraging. It can be noted that despite a number of significant changes in relations with Hungary, the whole course is toward cooperation.

It is of interest to analyze cooperation between Russian Federation and the Hungarian People's Republic before sanctions and in the period of sanctions. The article examines changes in dynamics of turnover indicators and investment activity (including positive dynamics in some spheres), perspective areas of mutual relations, and the signing of contracts for new projects. In this regard, the authors raise the following questions, which are answered in the article.

What are the reasons for cooperation between Russia and Hungary contrary to the sanctions? What factor can influence the intensification of cooperation between these countries? How applicable is this factor in the current conditions of mutual sanctions?

The authors suggest that contrary to the sanctions cooperation between Russia and Hungary is not only preserved, but also strengthened by separate positions. Analyzing possible reasons for this, the authors come to the conclusion that not only economic and political interests play a big role, but also the human factor, namely, mutual trust, since any cooperation on a large or small scale should be built on trust between the participants.

## **2. COOPERATION BETWEEN RUSSIA AND HUNGARY IN THE PERIOD OF SANCTIONS (2014-2017)**

Hungary is currently trying to maintain an independent position from the European Union, for which it has repeatedly been criticized by Brussels. The current Hungarian government is pursuing a policy of "turning to the East" in the foreign economic sphere. These priorities are fixed in the approved long-term strategy for the development of foreign economic relations of Hungary for the period until 2020. According to a number of Hungarian economists, "today's Russia is not a threat to Hungary, but new opportunities" [3].

In their article A. Kerekesh and A. Zubarev, according to the classification developed by them, refer Hungary to "friendly pragmatists", i.e. countries that establish close relations and, as a rule, put their economic interests above political goals [4].

However, the sanctions imposed by the European Union in 2014 strongly affected the Hungarian economy. According to Hungarian officials, Russia's retaliatory measures deprived Hungary of 80 million euros [5]. In this regard, it seems interesting to analyze the impact of sanctions on cooperation between the two countries.

With regard to the structure of turnover, it should be noted that the nomenclature of the supply of Russian goods to Hungary is traditional for modern Russia (Figure 1).

Russia delivers to the Hungarian market mineral resources, rubber, products of chemical, engineering, aerospace industries. Nickel - 30.7%, inorganic chemicals - 14.5%, aviation equipment - 12.1%.

Deliveries of goods from Hungary to Russia are more diversified (Figure 2).

The main positions of imports of Russia from Hungary are medicines, electrical engineering, engineering products and vehicles. From this line of goods for Russia, cereals and miscellaneous manufactured articles are particularly important. They make up 13.1% and 11.4% of Russian imports of these goods, respectively.

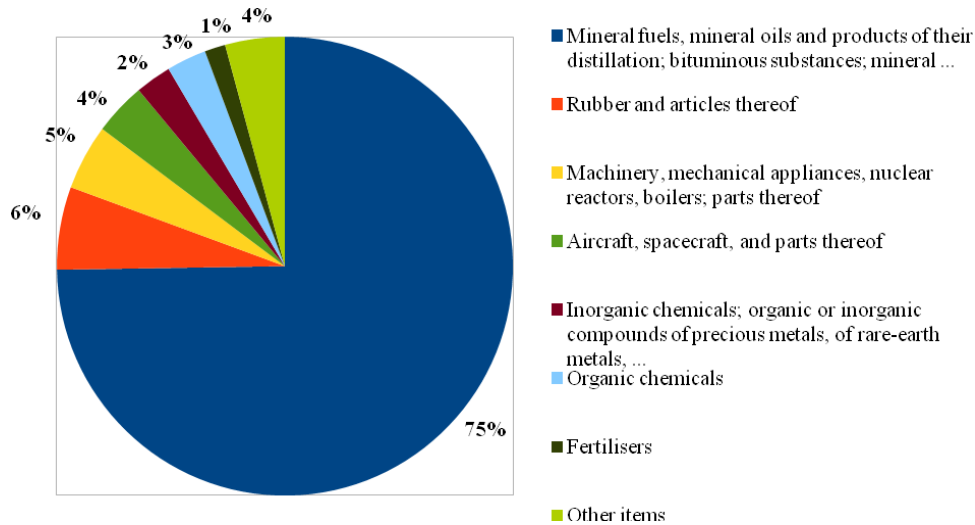


Figure 1. Structure of import of Hungary from Russia, 2015 [6]

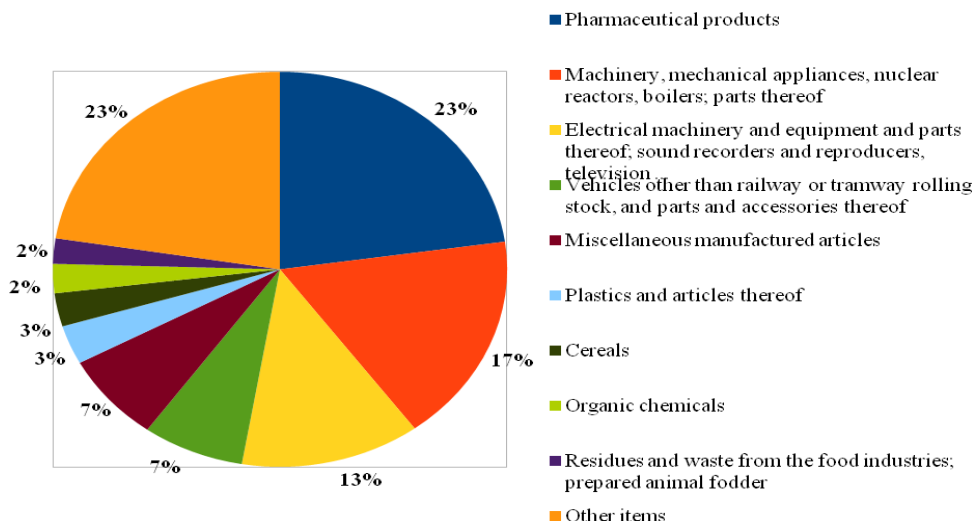


Figure 2. Structure of import of Russia from Hungary, 2015 [6]

To determine the impact of sanctions on the development of trade relations, the authors examined the dynamics of changes in trade between Russia and Hungary (Figure 3).

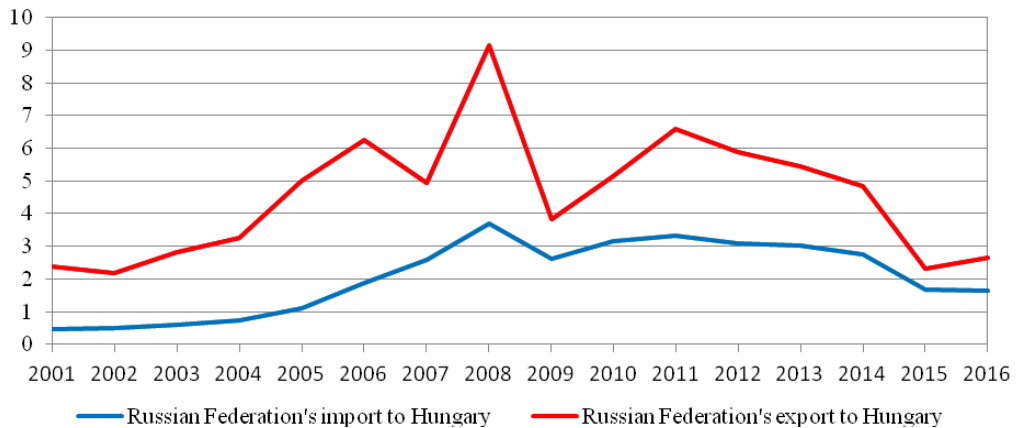


Figure 3. The dynamics of trade between Russia and Hungary, US Dollar billion [6]

Trade relations between Russia and Hungary were developing rapidly at the beginning of the 21st century, reaching their peak in 2008: the trade reached \$ 12.8 billion. Later, there were two obstacles to the development of bilateral trade relations:

1. Under the impact of the global economic crisis the volume of bilateral trade declined by almost 2 times, reaching 6.4 billion dollars in 2009. However, within 2 years, countries managed to reach the level of 2006 by the volume of mutual deliveries.

2. With the introduction of sanctions, the volume of trade began to decline rapidly. In 2016 there is an increase in supplies, however, one year is not enough to draw a conclusion about the reversal of the trend towards a decrease in turnover.

In order to assess how important Russia and Hungary are related to each other as trading partners, the authors analyzed the geographical and commodity structure of each country's imports.

Russia before the imposition of sanctions was an important supplier of goods for Hungary (Figure 4).

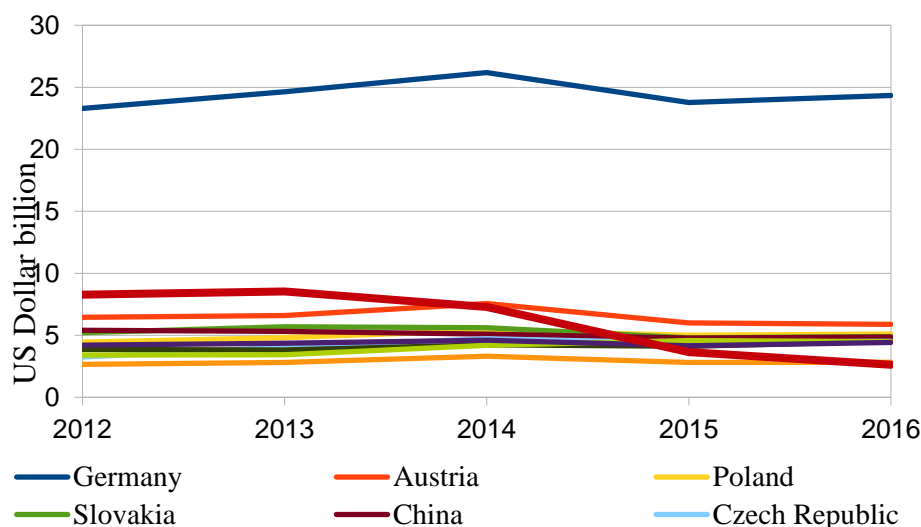


Figure 4. Hungary's trading partners in import [6]

For Russia, Hungary was not one of the main trading partners (24th in 2013, 27th in 2016). The volume of imports of Hungarian goods in the period from 2012 to 2016 was almost halved, while the share of supplies from Hungary in the total volume of Russian imports declined slightly (Table 1).

Both countries are characterized not only by a decrease in imports, but also by a decrease in exports to each other due to sanctions (Table 2).

Table 1. The volume of imports of the Russian Federation [6]

Exporters	2012	2013	2014	2015	2016
World, US Dollar billion	316,19	314,94	286,65	182,78	182,26
Hungary, US Dollar billion	3,10	3,00	2,74	1,69	1,66
Hungary, share in Import of Russia, %	0,98	0,95	0,96	0,92	0,91

Table 2. The role of Russia and Hungary in mutual export [6]

Index	2012	2013	2014	2015	2016
Exported value by Hungary to Russia, US Dollar billion	3,29	3,37	2,80	1,71	1,60
The share of Russia in Hungary's export	3,19	3,13	2,49	1,70	1,55
The place of Russia in Hungary's export	10,00	10,00	13,00	16,00	16,00
Exported value by Russia to Hungary, US Dollar billion	5,90	5,46	4,85	2,32	2,65
The share of Hungary in Russia's export	1,12	1,04	0,97	0,67	0,93
The place of Hungary in Russia's export	20,00	20,00	17,00	22,00	25,00

However, analysis of the data in lines 4 and 5 of Table 2 indicates that since 2015 there has been a trend of increasing volumes of exports from Russia to Hungary. At the same time, Russia's place in Hungary's exports has remained unchanged since 2015.

### 3. INVESTMENT COOPERATION IN THE PERIOD OF SANCTIONS

The situation with mutual investments in the economies of the countries has also worsened. Under the influence of a hostile attitude towards Russian capital invested in the territory of the Ukraine and the EU countries, many companies are rushing to get rid of their assets in these countries. This is what Lukoil did by selling its assets in Hungary. The Russian company founded Hungary's subsidiary Lukoil Hungaria in 2003, through purchase, construction and reconstruction, set up an extensive network of gas stations in Hungary, invested 100 million dollars. The total number of gas stations of the Russian company in Hungary reached 75, and its share in the retail sales of petroleum products in the Hungarian market increased to 5-7 percent, which provided it the fifth place. In the long term, Lukoil planned to invest \$ 150 million in the creation of a network of 120 gas stations in Hungary. Now they had to part with these plans. The largest Hungarian bank, OTP, due to the events in Ukraine in May 2014, finally closed 8 of its branches in the Crimea, and the work of 13 branches in Donetsk and Lugansk regions was temporarily suspended due to hostilities. Russia also had to abandon the project for investing in a logistics center, which was created in Hungarian Nirscheg (in the vicinity of the border Zahony), planned by the Russian retail chain "Magnit", which could create 1500 jobs. Through this center trucks would supply Hungarian food products and other goods to Russian hypermarkets "Magnit".

Russia's withdrawal from the South Stream project was accepted by the Hungarian leadership with understanding. V. Orban noted in this connection that Hungary is still interested in "such a gas pipeline that goes to Hungary, but bypassing Ukraine" [2, 5].

It is worth noting that the development of investment cooperation in the context of bilateral sanctions is a good alternative to trade relations. The volume of investment by Russian companies in the Hungarian economy is estimated at \$ 1.5 billion, and Hungarian companies in Russia - about \$ 2 billion.

The possible investment direction for Russian capital is, first of all, the real estate market and investments in infrastructure. And Hungarian investors consider housing construction, investments in the pharmaceutical and food industries, including innovative agricultural technology, as potential areas of investment [4, 7]. Mutual investments are important for both countries, as Hungary and Russia specialize in the production of different products, and therefore Hungary can help Russia develop pharmaceuticals and agribusiness, and Russia of Hungary - to develop energy and the military industry.

Thus, after analyzing the situation with trade and economic turnover and cooperation in the investment sphere, it can be concluded that the development of Russian-Hungarian relations in the sphere of trade, as well as investment activity, causes significant damage. This external economic environment and such a sharp decline in foreign trade turnover have led to the need to reassess cooperation and adopt anti-crisis measures, to pursue a purposeful search for new innovative approaches to minimize damage in bilateral trade and expand potential areas of cooperation [4].

Hungary was forced to largely reorient the structure of its imports to other suppliers. For Russia, the reduction in trade with Hungary as a whole corresponds to a decline in the

level of trade with the countries of the world. Nevertheless, in a number of positions, these countries are very important for each other: Russia for Hungary - for raw materials and military aircraft, Hungary for Russia - cereals and miscellaneous manufactured articles. In addition, the analysis of the data in Table 2 shows a reversal in the trend of a reduction in mutual trade turnover by some indicators. Therefore, it is of interest to consider possible factors that may affect this situation, including one of the non-traditional factors.

Analysis of modern economic relations between the two countries shows not only a great desire for mutual cooperation, but also a gradual expansion of it, which is confirmed by:

- the signing in 2014 of an agreement on Russia's participation in the construction of two new power units at the Paks nuclear power plant, providing for the granting by Russia of Hungary of a long-term loan of up to 10 million euros for a period of 30 years at 4.5-4.95% per annum [5];
- the purchase of three Russian military helicopters Mi-81, completed in Russia in the midst of sanctions, in the amount of 2 billion forints (about 8.5 million dollars) for the needs of the Ministry of Defense of Hungary [5];
- working visit of V.Putin to Budapest on February 17, 2015, during which 5 agreements on cooperation in the training of personnel for the nuclear industry, on the opening of the Consulate General of Hungary in the capital of Tatarstan city of Kazan, on the development of regional cooperation, as well as cooperation in the field Health and higher education [5].

Considering all mentioned above, it can be concluded that there is a positive trend in bilateral relations. But, despite the fact that foreign trade turnover has decreased, in many areas there is an expansion and diversification of economic relations. Hungarian enterprises take part in various Russian food fairs, many have passed food safety audits and are waiting for the lifting of the embargo [4].

Obviously, these changes must have a solid foundation, which is usually referred to as the mutual economic and political interests of the two countries. However, it should be noted that this is not entirely accurate because there is a human factor that is the third pillar of this foundation, since any interaction in any field is the interaction of people. It is appropriate to recall the words of Russian President V.V. Putin: "In order to develop economic relations, it is necessary to increase trust in each other, and this trust is growing ... This is facilitated by the development of humanitarian relations in education and culture" [8].

#### **4. RESEARCH IN THE SPHERE OF COOPERATION, SANCTIONS AND TRUST**

The authors made an attempt to study the position of certain sections of the Russian population on issues of cooperation, sanctions and trust.

In this study, the authors put forward the following hypotheses:

- 1) the human factor can influence the intensification of international cooperation;



- 2) trust between people is one of the possible reasons for cooperation in general, and also during the period of sanctions, in particular;
- 3) trust must be reciprocal;
- 4) trust is a trait characteristic of most of the inhabitants of Russia.

For this purpose, a survey was developed. The research has a targeted data-collection method. The questionnaire included open questions that should be analyzed with a qualitative approach and closed format questions producing quantifiable data. Participants were recruited via internet: through the universities' internal e-mailing systems and Russian social network Vkontakte. Participants' data was collected anonymously from Russian professors and students related to Business technologies institute (SUAI, Saint-Petersburg, Russia).

This survey consisted of 3 main parts:

- general information (gender, age, nationality, status);
- cooperation of countries, sanctions;
- trust.

The questions of the first part of the test are informational in nature, giving a general idea of the participants. The survey involved 244 people, including 68.4% of women and 31.6% of men, 37 teachers (15.2%) and 207 students (84.8%). The main part of the respondents is young people aged from 18 to 23 years, i.e. the most active part of the population, which in a few years will decide the fate of the country.

Answers to the second part of the test introduce the opinion of the inhabitants of Russia in general about the cooperation of the Russian Federation with foreign countries, including Hungary, their attitude to sanctions, the impact of sanctions on cooperation, their role in the economy of any country, Russia and Hungary in particular. Respondents were also asked questions about the possibility of cooperation contrary to the sanctions and its possible causes. In general, 96.7% of the respondents approve Russia's cooperation with foreign countries, including Hungary (74.2%).

Sanctions are not approved and respondents consider them to be a negative phenomenon (Figure 5). 88.9% of respondents unambiguously replied that sanctions have a negative impact on the cooperation of countries. At the same time, 72.5% believe that the sanctions imposed in 2014 affect both the Russian economy and the Hungarian economy negatively (Figure 6). 55.3% believe that cooperation between Russia and Hungary in spite of sanctions can intensify. 71.3% of respondents say that it is necessary to go to cooperation even contrary to the sanctions. At the same time, 17% call trust one of the possible reasons for cooperation contrary to the sanctions (Figure 7).

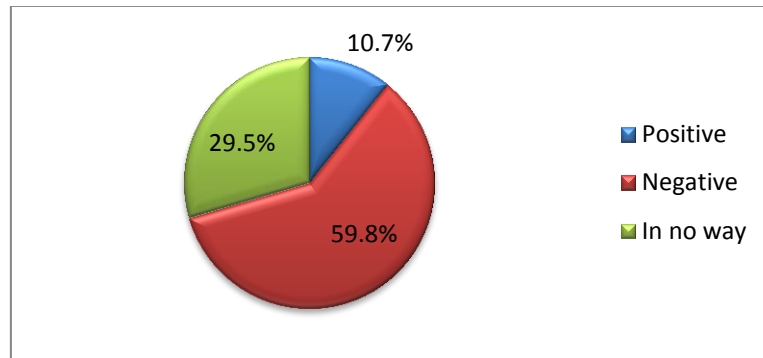


Figure 5. How do you feel about sanctions?

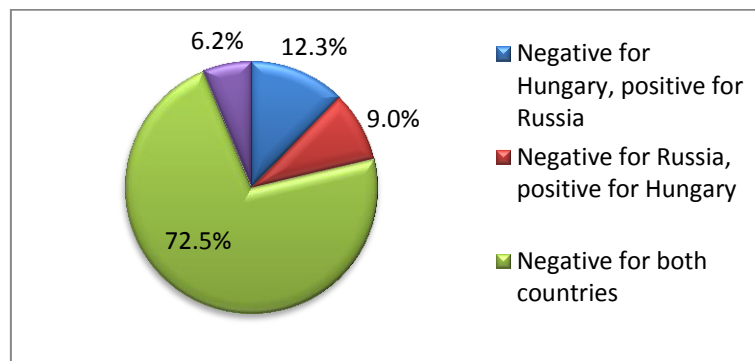


Figure 6. How do the sanctions imposed in 2014 affect the cooperation between Hungary and Russia??

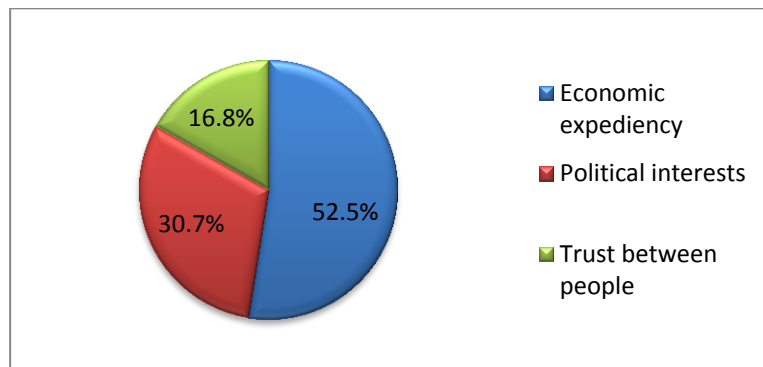


Figure 7. Possible reasons for cooperation contrary to sanctions

However, the answers to the third part of the test show that despite the importance of trust as a factor of cooperation (88.1%) and the certainty of its reciprocal nature (95.5%), Russians are not too trusting (16.4% trust each other, 10.2% for residents of other countries, 11.5% for Hungarians) and believe that residents of other countries also do not trust them (62.7%). All results are shown in Figure 8, which includes 4 questions: 1 - Do citizens of Russia trust each other? 2 - Do citizens of Russia trust residents of other countries? 3 - Do citizens of Russia trust the inhabitants of Hungary? 4 - Do residents of other countries trust the inhabitants of Russia?

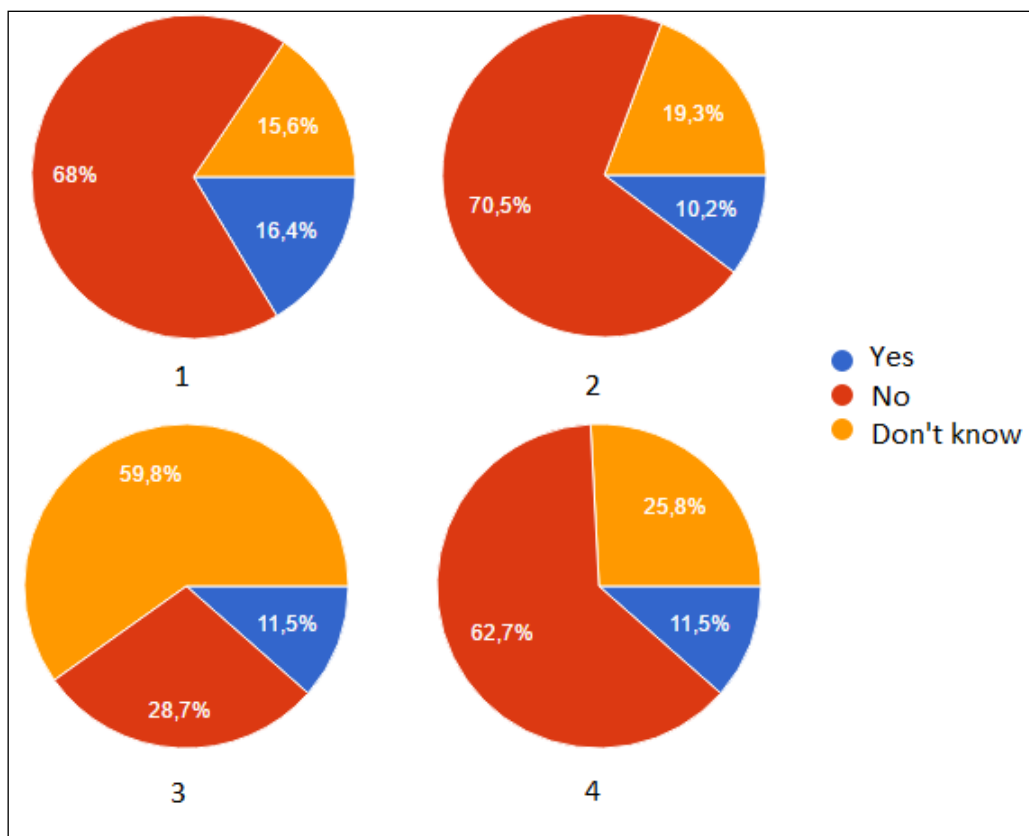


Figure 8. Importance of trust

Thus, some hypotheses of the authors were confirmed, and some were refuted. Respondents are negative about sanctions. They believe that countries suffer losses from the introduction of sanctions. At the same time they believe that it is necessary to cooperate, even in spite of sanctions. One of the possible reasons for continuing cooperation in spite of sanctions (despite prohibitions) is trust between people. Thus, this hypothesis was confirmed. The consequence of it can be considered that the human factor, indeed, can affect the activation of intercountry cooperation. Hence, hypotheses 1 and 2 were completely found in the study. As for trust, 95% believe that it should be mutual. Hence, hypothesis 3 also has the right to exist. At the same time Russians do not trust Russians, do not trust foreigners, and they do not answer anything specific about the Hungarians (most of the answers are "I do not know"). Hypothesis 4, which postulates that "trust is a trait characteristic of the inhabitants of Russia," was refuted.

## 5. CONCLUSION

Summarizing, we can say that in the sanctions period, both countries lost in the volume of trade. As follows from the analysis of trade relations, the introduction of bilateral sanctions caused a loss of about 6.5 billion dollars for two economies. The volume of mutual deliveries has significantly decreased; however, the small increase in trade observed in 2016 allows us to hope for a positive development of trade between Russia and Hungary.

In the period of uneasy relations between Russia and the European Union, Budapest and Moscow were able not only to maintain, but also to strengthen the bridges. "Check the clock" and outline a plan for long-term cooperation - so the Hungarian media formulated the purpose of Russian President Vladimir Putin's visit to Budapest on February 2, 2017. The meetings of the leaders of the two countries have become regular for four years.

According to Hungarian Minister V. Orban, his country seeks good and transparent relations with Russia - proof of this is the contacts that the country's leaders maintain on a regular basis. The head of the Hungarian government noted that it was fashionable in Europe to pursue an anti-Russian course, but in Hungary this trend is not supported: "Hungary continues to assert that non-economic problems can not be solved in economic ways, and it is not necessary to transfer other conflicts to the territory of the economy because it will cause damage. That is why we hope that in the near future we will be able to greet new good relations between Russia and the European Union" [9]. According to Prime Minister V. Orban, "sanctions against Russia are a shot in the foot" [7].

Among the promising areas of cooperation can be identified the following: the issues of oil and gas, interregional cooperation, logistics, engineering, pharmaceuticals, as well as the joint participation of Russia and Hungary in the tenders of third countries. One of the promising projects that Hungary offers is the creation of a joint airline that will operate the Moscow-Budapest flights and other destinations in Europe, and will exclusively use Russian-made aircraft. Russia and Hungary in the future will strengthen cooperation, including in the energy sector. According to Vladimir Putin, Moscow attaches great importance to the project of construction of two new power units at the Paks nuclear power plant, worth 12 billion euros, being implemented by Rosatom [9]. Another area of possible cooperation between the two countries is military-technical cooperation. Russia can help Hungary in the modernization and maintenance of military equipment.

Factors for strengthening further cooperation are not only the economic and political interests of the two countries, but also the human factor - trust between people. According to the results of the survey, based on a survey of Russian professors and students, the following conclusions can be drawn.

Obviously, the factor of trust today:

- is considered as an important stimulus to intensify cooperation, even during the period of sanctions;
- unfortunately, so far it has negligible impact on economic cooperation because of the low degree of trust of the population of Russia;
- trust must be developed;
- it should be started from own country.

It is necessary to cultivate trust. Expand the horizons of young people, acquaint them with the cultures, traditions, and customs of new countries, and get acquaintance with new people. In addition, it is pivotal to expand humanitarian relations in the field of education and culture both within the country and between countries.

In the future, for further analysis, it would be interesting to conduct a similar survey of Hungarian professors and students.

## REFERENCES

1. Pogorletskiy A., Sutyurin S., World economy and international economic relations, Jurait, Moscow, 2017. (Погорлецкий А., Сутырин С., Мировая экономика и международные экономические отношения. Учебник для академического бакалавриата, Юрайт, Москва, 2017).
2. Lakova E., The Russian Foreign Economic Bulletin, 9, (2015), 127-131. (Лакова Е., Российский внешнеэкономический сборник, 9, (2015), 127-131).
3. Lakova E., The Russian Foreign Economic Bulletin, 4, (2015), 116-119. (Лакова Е., Российский внешнеэкономический сборник, 4, (2015), 116-119).
4. Kerekesh A., Zubarev A., Bulletin of the Pacific State University, 3 (42), (2016), 115-122. (Керекеш А., Зубарев А., Вестник Тихоокеанского государственного университета, 3 (42), (2016), 115-122).
5. Volotov O., Volotov S., Free thought, 2 (1650), (2015), 95-112. (Волотов О., Волотов С., Свободная мысль, 2 (1650), (2015), 95-112).
6. UN Comtrade Database, <https://comtrade.un.org/>
7. Shilvian V., Scientific works of the North-Western Institute of Management, 1 (23), (2016), 380-397. (Шильвян В., Научные труды Северо-Западного института управления, 1 (23), (2016), 380-397).
8. Russian Information Agency TASS, <http://tass.ru/politika/2676115>
9. Official website of the President of Russia. Joint Press Conference with Hungarian Prime Minister Viktor Orban, 2 February 2017, Budapest <http://special.kremlin.ru/catalog/persons/424/events/53806>

## INNOVATIVE APPROACH TO INTELLECTUAL POTENTIAL IN ORDER TO CREATE NEW VALUE

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**Abstract:** Each company is there with a purpose. Its main purpose is the creation of new and increase existing tangible and intangible value of the company. Entering into a new era, the era of knowledge, we are conditioned to a radical change of the status of human resources. Human resources in the age of knowledge, are no longer the extended arm of machines, but has become a key resource for the creation of new value. Structural changes in the strategy management system in business processes, conditioned by globalization, computerization, and humanization management processes. In terms of the new economy takes an intellectual resource not only leading, but also a key role. It is scientifically proven that the strategy of open innovation in the company can provide leverage effects, directing intellectual activities on the creation of new high-tech achievements. Many modern companies take intellectual capital seriously when they develop corporate strategy. More and more consulting companies that form products and services in order to increase effectiveness and forming strategies to deal with intellectual resources. The subject of this paper is to emphasize the importance of research value of intangible resources, with a comparative analysis of contemporary professional and scientific literature in the field of intellectual capital and open innovation, as well as current international research projects dealing with the problems of identification and measurement of intellectual capital. The aim of this study is to identify the strategic role of intellectual capital as a resource of the 21st century, the role of modern methods of managing intellectual capital, such as business consulting, business coaching and business mentoring.

**Keywords:** innovation, small and medium enterprises, management of intellectual resources, business consulting, business coaching, business mentoring

### 1. UVOD

Merenje i rukovođenje intelektualnim resursom postao je strateški zadatak kako u malim i srednim preduzećima, velikim kompanijama ali i na nivou državne strategije. Uz podršku države se organizuje sve više centara intelektualnog kapitala. Jedan od primera je: *Centar Intelektualnog Kapitala* u Šotlandiji koji je nastao kroz inicijativu Ministarstva trgovine i industrije Japana, Vojnog ministarstva SAD i Instituta upravljanja znanjem i sl. (Mouritzen, 2003.)

Uloga i značaj intelektualnog kapitala je potvrđena u mnogim istraživanjima. Rezultati sedmogodišnjeg (1992-1999) sprovedenog na slučajnom uzorku od 30 preduzeća u Hrvatskoj ukazuju da postoji uzročno-posledična veza između nivoa intelektualnog kapitala i tržišne vrednosti organizacije (Pulić, 2000). Istraživanje sprovedeno na uzorku 107 malezijskih kompanija takođe dokazuje da, bez obzira na industriju, između intelektualnog kapitala i performansi preduzeća postoji značajna pozitivna korelacija. Uticaj pojedinih komponenata

intelektualnog kapitala na performanse preduzeća je različit u različitim industrijama (Bontis, Keow and Richardson, 2000). Na uzorku od preko pet hiljada francuskih preduzeća ispitivanih u periodu 1998-2000 Kremp i Meriz su došli do rezultata da se prilikom povećanja intenziteta upravljanja znanjem za 1% nivo inovativnosti u organizaciji podiže za 4%, a produktivnost rada za 3% (Kremp, Mairesse, 2002). Firer i Viliams su na uzorku od 75 javnih preduzeća Južne Afrike sa visokim nivoom intelektualnog kapitala istraživanjem došli do rezultata da se na tržištima koja su u razvoju primećuje nizak uticaj intelektualnog kapitala na performanse preduzeća (Firer & Williams, 2003). Tajvanska istraživanja (4254 javna preduzeća, 1992-2002) su pokazala da nivo intelektualnog kapitala utiče na rentabilnost preduzeća, rashode i reklamu (Chen et al., 2005). Još jedno tajvansko istraživanje na 81 javnom preduzeću Tajvana pokazalo je da postoji veoma komplementaran uticaj intelektualnog kapitala na tržišnu vrednost kompanije. Ovaj uticaj je znatno veći kod visokotehnoloških kompanija (Tseng, Goo, 2005). Nelinearni uticaj intelektualnog kapitala na rentabilnost preduzeća pokazalo je istraživanje obavljeno 2003. godine na 297 tajvanskih kompanija (Huang & Liu, 2005). Od 1997. do 2001. urađeno je istraživanje na svim IT kompanijama sa Tajvana. Rezultati su pokazali da pojedine komponente Intelektualnog Kapitala (inovacioni kapital, procesni kapital i kapital odnosa sa klijentima) pokazuju jak linearni uticaj na performanse preduzeća, kao i da ljudski kapital utiče na performanse preduzeća isključivo posredno, preko drugih komponenata Intelektualnog Kapitala (Wnag & Chang, 2005). Da je nivo intelektualnog kapitala u direktnoj vezi sa rentabilnošću preduzeća i njegovom tržišnom vrednošću i bez uticaja na produktivnost, pokazalo je istraživanje rađeno na 80 javnih tajvanskih preduzeća 2003 (Shiu, 2006). Kada je u pitanju uticaj intelektualnog kapitala na tip inovacionih aktivnosti, možemo reći da je on vrlo jak i intenzivan i da što je on veći, inovacije su radikalnije. Ovo je pokazalo istraživanje sprovedeno u 93 američke kompanije (Subramaniam & Youndt, 2005). Ruski istraživači takođe su se bavili pitanjem uticaja Intelektualnog Kapitala na performanse preduzeća. Navodimo samo neka od mnogobrojnih empirijskih istraživanja: Popov i Vlasev su 2006.godine sprovedili istraživanje na 100 preduzeća Uralskog regiona i došli do zaključka da postoji direktan uticaj investicija u proizvodnju novih znanja na vrednost preduzeća (Popov & Vlasev, 2006); Da je tržišna vrednost kompanije direktno određena vrednošću materijalnih i nematerijalnih resursa ustanovilo je istraživanje sprovedeno na 43 ruske kompanije u periodu od 2001. do 2006. godine, s tim da je ustanovljeno da materijalni resursi imaju snažniji uticaj (Garanina, 2008); Istraživanje sprovedeno od 2002. do 2006. godine na 19 velikih ruskih kompanija potvrdilo je da postoji direktna veza između dodate vrednosti stvorene na osnovu intelektualnog kapitala i prinosa na aktivu. Identifikovani su faktori intelektualnog kapitala koji utiču na dodatnu vrednost preduzeća (Bajburina & Golovko, 2008); Da postoji pozitivan odnos između intelektualnog kapitala i stope rasta prihoda kompanije u zavisnosti od industrije, pokazalo je istraživanje na 401 preduzeću Permskog okruga sprovedeno 2005-2007. (Molodčik & Bikova, 2011). Isti autori su 2012.godine objavili rezultate istraživanja sprovedenog tokom 5 godina na 332 trgovinske evropske kompanije koji pokazuju da činioci intelektualnog kapitala mogu i povećati i smanjiti vrednost kompanije i kratkoročno i dugoročno. Pri tome i država i industrija i veličina kompanije igraju veliku ulogu (Molodčik et al., 2012). Među najnovijim merenjima su i meranja vršena u Novom Zelandu i Australiji (Low et al., 2015).

## 2. DEFINISANJE I OSNOVNI ELEMENTI INTELEKTUALNOG KAPITALA

Pojam i koncept intelektualnog kapitala su i dalje nejasni i neprecizno definisani, bez obzira što postoji velika potreba i interesovanje. Problemi u definisanju intelektualnog kapitala nastaju zbog njegovih karakteristika. Intelektualni kapital je proizvod transformacije znanja. Intelektualni kapital može da podrazumeva i ulaz i izlaz procesa stvaranja nove vrednosti. Intelektualni kapital može da bude statičan, kao na primer patenti ili dinamičan kao na primer, sposobnosti i veštine zaposlenih. Određenu smetnju u tim istraživanjima predstavlja nedostatak jedinstvene terminologije, odnosno definicije intelektualnog kapitala. Iz tog razloga se pojavljuju različiti termini kao što su: neopipljiva svojina, intelektualna svojina, neopipljivi resursi, kapital znanja, reputacija (*goodwill*) i sl. Većina radova opisuju komponente i strukturu intelektualnog kapitala ali ne pojašnjava šta ti termini tačno podrazumevaju. Mnoge organizacije razvijaju sopstvene definicije intelektualnog kapitala, s obzirom da postoji mnogo uopštenih definicija.

Švedska osiguravajuća kompanija *Skandia*, intelektualni kapital definiše kao „posedovanje znanja, upotrebljivog iskustva, organizacione tehnologije, odnosa sa kupcima i profesionalnih veština, koje doprinose konkurentskoj prednosti kompanije na tržištu“. Intelektualni kapital se u literaturi označava skraćenicom IC. Obično se pod intelektualnim kapitalom podrazumeva intelektualna svojina, odnosno patenti, robne marke i praksa ljudskih resursa. Intelektualni kapital obuhvata: zaposlene, brendove, robne marke, kao i druga neopipljiva sredstva, intelektualni kapital također uključuje: prava na intelektualnu svojinu, što podrazumeva: patente, autorska prava ili robne marke, kao i druge izvore stvaranja vrednosti kompanije - lojalnost kupaca, organizacionu efektivnost (Stahle et al., 2015). Sve navedene vrednosti imaju važnu ulogu procesu održivog poslovanja kompanije.

Intelektualni kapital se u organizaciji javlja u dva osnovna oblika, kao strukturni kapital i ljudski kapital. Strukturni kapital može da ima svoju eksternu i internu komponentu (Giuliani, 2015).

Ljudski kapital obuhvata veštine i sposobnosti zaposlenih koji rade u preduzeću, njihovo iskustvo, motivaciju, liderstvo itd. i veoma je bitna kategorija. Interni strukturni kapital obuhvata sve ono što kompaniji pomaže da na profitabilan i efektivan način doprinese iznalaženju adekvatnog odgovora na tržišne zahteve. To su baze podataka, sistemi, metodologija i patenti.

Eksterni strukturni kapital je sadržan u odnosima sa potrošačima i odnosi se na ugovore sa njima, lojalnost, satisfakciju, tržišni udeo itd. Nabrojani elementi intelektualnog kapitala nisu nezavisni, već su međusobno povezani i u stalnoj interakciji. Ljudski kapital predstavlja osnovu za izgradnju strukturnog kapitala, dok se iz njihove interakcije kreira kapital sadržan u odnosima sa potrošačima. Interakcijom sva tri oblika intelektualnog kapitala kreira se finansijski kapital preduzeća, kao vidljiva forma kapitala. Ljudski kapital je izvor informacija i ideja. On je ipak beskoristan ukoliko ne postoje sistemi i kanali koji bi ga učinili produktivnim. Strukturni kapital je taj, koji ljudski kapital pretvara u produktivnu vrednost.

Intelektualni kapital, pre svega, podrazumeva znanje zaposlenih koje se stavljanjem u funkciju pretvara u novu merljivu vrjednost. Intelektualni kapital se sastoji od tri komponente:

1. **Ljudski kapital** - znanje, iskustvo, sposobnost, umeće, kreativnost i inovativnost pojedinca. Da bi se znanja pojedinaca stavila u funkciju stvaranja veće vrednosti potrebna je poslovna strategija, koja sistematizovano doprinosi prepoznavanju i



funkcionalizaciji intelektualnog resursa pojedinca.

2. **Strukturni kapital** -Podrazumeva vrednost koja ostaje u kompaniji kada zaposleni odu kući. Strukturni kapital je rezultat procesa stvaranja veće vrednosti kroz ljudski kapital u prošlosti a čine ga patenti, koncepti, modeli, mreže, sistemi i organizaciona kultura.
3. **Klijentski kapital**-Podrazumeva odnose sa stejkholderima, brend kompanije, imidž kompanije, precepciju koju su klijenti izgradili o kompaniji.

Važno je napomenuti da ne postoje jasno definisane granice među navedenim komponentama intelektualnog kapitala. U savremenoj profitno orijentisanoj kompaniji, intelektualni kapital je nesumnjivo ključni elemenat u formiranju poslovne strategije usmerene ka konkurentskoj prednosti. Iz tog razloga je neophodno posvetiti posebnu pažnju strategiji upravljanja intelektualnim kapitalom. Upravljanje intelektualnim kapitalom zahteva promenu sistema vrednosti u privrednoj praksi, promenu načina upravljanja i odnose između zaposlenih i poslodavca, promenu organizacionih sistema i strukture, a naročito promenu kulture poslovanja.

Ljudski kapital obuhvata kombinaciju znanja, veština, inovativnosti, sposobnosti zaposlenih da ispune svoje radne zadatke kao i kulturu, filozofiju, vrednosti kompanije. Ljudski kapital je ključni resurs intelektualnog kapitala i čini osnovu za stvaranje nove vrednosti u kompaniji. Prema Bontisu, ljudski resurs je neograničeni izvor inovativnih ideja, strateških rešenja, bez obzira da li su nastali kao rezultat timskog rada, putem istraživanja, razmišljanja, redizajniranja procesa, unapređenja postojećih veština, znanja ili se radi o novim strategijama prodaje (Bontis, 1996). Uloga ljudskog potencijala sve više dobija na važnosti, a upravljanje ljudskim resursima postaje ključna strateška poslovna funkcija u stvaranju konkurentske prednosti. Ljudski potencijal se pretvara u ljudski kapital preduzeća, tek onda kada radnici svoje znanje i sposobnosti stave u funkciju stvaranja veće merljive vrednosti.

U kompanijama, kao što su *Microsoft-a*, *Google*, *Oracle*, *SAP* i *Yahoo*, zaposleni svojom kreativnošću, inovativnošću i inventivnošću su ujedno i osnovni resurs za stvaranje nove merljive vrednosti.

### 3. INOVATIVNI PRISTUP UPRAVLJANJU INTELJEKTUALNIM KAPITALOM

Sušтина strategije upravljanja intelektualnim kapitalom usmjerena je ka primeni različitih modela upravljanja. Uspešnost upravljanja intelektualnim kapitalom se meri unapređenjem poslovnih procesa, stvaranjem nove vrednosti, razvojem novog proizvoda, boljim iskorištenjem potencijala, kreiranjem imidža kompanije... Da bi strategija upravljanja intelektualnim kapitalom u kompaniji bila uspešna važno je biti svestan činjenice da to podrazumeva sasvim novu dimenziju u poslovanju. Cilj upravljanja intelektualnim kapitalom je usmeren na stvaranje veze između ključnih elemenata intelektualnog kapitala u njihovoj stalnoj interakciji. Kroz takav pristup je moguće pratiti performanse intelektualnog kapitala usmerene prema efikasnom i efektivnom ostavarivanju postavljenih poslovnih ciljeva na svim organizacionim nivoima. Cilj menadžmenta svakog preduzeća je iskoristiti i maksimizirati potencijale zaposlenih u postizanju nove vrednosti i održavanju konkurentske prednosti.

Dokazano je kroz mnoge primere da je unapređenje konkurentske pozicije kompanije moguće jedino ako se unapredi upravljanje ljudskim resursima. Strategijsko upravljanje ljudskim resursima može da stvori neophodnu podršku za inovativnu klumu u kompaniji.

Osnovu strategije upravljanja ljudskim resursima čine četiri osnovna cilja. Prvi cilj je usmeren ka selekciji i odabiru zaposlenih. To podrazumeva da u preduzeću budu zaposleni ljudi sa odgovarajućim sposobnostima. Drugi cilj je usmeren ka motivisanosti, posvećenosti, maksimalnom stavljanju u funkciju ličnog potencijala zaposlenih u cilju stvaranja veće vrednosti. Treća grupa ciljeva se odnosi na angažovanje i razvoj ljudi tako da se prihvataju promene i efektivno upravlja promenama. Četvrti tip ciljeva je administrativnog karaktera i odnosi se na registrovanje neophodnih podataka o zaposlenima i na različite pravne aspekte administrativnih aktivnosti.

Strategija upravljanja ljudskim potencijalom uz klasične obuke, sve više stavlja u funkciju savremene discipline kao što su: poslovni koučing, poslovni konsalting i poslovni mentoring. Uz pomoć navedenih tehnika se ljudski potencijal stavlja u funkciju stvaranja veće vrednosti za kompaniju.

#### 4. POSLOVNI KOUČING

Koučing je tehnika koja pomaže ljudima da obave svoje zadatke i ostvare ciljeve. Do nedavno je pojam trenera-kouča bio vezan isključivo uz sport. Pod pojmom kouč (trener) se obično podrazumeva osoba koja trenira neki sportski tim. Ipak, tim ne mora po svaku cenu biti sportski, jer kouč može trenirati svaki tim u postizanju boljih rezultata. Doduše ne na isti način i ne baš sa istim ciljem a za to su mu potrebna specifična znanja. Koučing se je kao sredstvo ličnog i profesionalnog razvoja pojavio u kasnim 80tim godinama prošlog veka (Hudson, 1999). Poslovni koučing je nova profesija a podatci ukazuju da se radi o jednoj od najperspektivnijih u 21. veku. Uloga kouča je da pomogne u postizanju ličnih i poslovnih ciljeva. Proces koučinga ima ulogu pokretačke snage koja oslobađa ljudski potencijal za stvaranje novih i kreativnijih ideja, modela ponašanja ili aktivnosti koje stvaraju veću vrednost. Napredak koji je rezultat konstantnog procesa rasta i učenja je ključni element coachinga. Svrha *coachinga* je lični i profesionalni razvoj pojedinca izvan postojećih i poznatih okvira. *Coaching* je područje koje se u okviru konsultantskih usluga najbrže razvija. (Liljenstrand, 2003.)

Ako krenemo od činjenice da su sva tehnička i tehnološka otkrića kojima smo danas okruženi, nekada bili samo deo nečije mašte bez ikakvih naznaka o mogućoj materijalizaciji, onda je uloga kouča nemerljivo dragocena u procesu putovanja iz neograničene ljudske kreativnosti zasnovane na mašti u fizički opipljivi prostor u cilju stvaranja veće merljive vrednosti. Profesionalni kouč uvek kreće od pretpostavke da je čovek neograničeni resurs i da je sve moguće, samo je pitanje kako i iz tog razloga podstiče kreativnost. Dok profesionalni menadžer uvek kreće od pitanja kako i na osnovu toga postavlja poslovne ciljeve. Dakle dok profesionalni menadžeri idu logikom: “od dole ka gore” iz realnog ka postavljenom cilju koji je uvek ograničen ličnom percepcijom mogućnosti, profesionalni kouč ide u obrnutom pravcu: “od gore ka dole” od postavljenog idealnog cilja ka realnim koracima koji dovode bliže tom cilju.

Iz tog razloga je potrebno da je *coach* treniran da pažljivo sluša, posmatra i pronade način kako da vodi klijenta od idealne zamišljene destinacije, ka konkretnim koracima koji će je učiniti mogućom. Osnovne karakteristike kvalitetnog coacha su da aktivno sluša, posmatra i primećuje bitne detalje, da ispituje pre zaključivanja, jasan nepristrasan uvid u situaciju. (Projekat, 2012.) Kroz proces koučinga je neophodno da kouč kreće od stava da klijent zaista poseduje prirodne kreativne resurse koje treba pobuditi i pružiti mu podršku da ih dalje

razvija i koristi. Ocenjuje se da je koučing bio uspešan ako je klijent uspeo da prevaziđe postojeće barijere i da je razvio sposobnosti koje su mu potrebne da ostvari postavljeni cilj. Kao rezultat coaching-a možemo imati:

- postizanje vrhunskih rezultata u biznisu, sportu, upravljanju...
- proširivanje ličnih kapaciteta,
- razvijanje lične vizije,
- postizanje životne harmonije,
- otkrivanje i stavljanje u funkciju skrivenih talenata,
- razvoj lične misije,
- razvoj kreativnosti,
- definisanje vrednosti i prioriteta,
- ostvarivanje uspešne karijere, itd.

Jednom rečju, rezultat koučinga je uvek stvaranje veće, merljive vrednosti za klijenta i njegovo okruženje.

Poslovni koučing podrazumeva proces interaktivnog i kreativnog odnosa koji se ostvaruje između klijenta i kouča. Jedna od važnih uloga poslovnog coacha je jeste da klijentu olaša učenje, radi postizanja konkretnih rezultata. Jackson naglašava da je stručno vođenje, coaching u stvari reflektivan proces. (Jackson, 2004). Proces je prvenstveno fokusiran na postizanje i unapređenje konkretnih poslovnih rezultata i ciljeva. Usmerenost procesa koučinga se može odnositi kako na pojedinačno tako i na timsko usklađivanje ciljeva sa ciljevima kompanije. Osim toga poslovni kouč može da radi sa pojedincima ili timovima na postavljanju i na postizanju. Očekivani rezultat procesa poslovnog koučinga je postizanje merljivih i jasno definisanih ciljeva koji se formulišu na samom početku koučinga. Uloga poslovnog kouča podrazumeva: pomoć pri postavljanju merljivih ciljeva, podršku prilikom definisanja strategije za ostvarenje definisanih ciljeva. Takođe podrazumeva podršku kod prevazilaženja izazova na putu do ostvarenja ciljeva. Profesionalni kouč to sve postiže postavljanjem unapred formulisanih pitanja kojim usmerava klijenta ka rešenju izazova na način da pobuđuje kreativnost klijenta u rešavanju problema. Osim toga kouč koristi i koučing tehnike kojima podiže motivaciju i rešenost klijenta da izađe iz “zone komfora” preduzme konkretne korake u vezi sa zadatkom ili projektom na kome su klijent ili tim angažovani.

Kouč svojim zapažanjem i opaskama pomaže klijenu da postane svestan svojih snaga i mogućnosti do kojih zajedno dolaze na kreativan način. U takvoj vrsti saradnje, poslovni coach kroz partnerski odnos sa klijentom teži ka ostvarenju ličnih ali i poslovnih ciljeva u skladu sa vizijom kompanije i sa kompanijskim ciljevima. (WABC, 2006). Kreativnost igra ključnu ulogu pri zajedničkom razvijanju strategije i planova za ostvarenje ciljeva koje je klijent postavio. U procesu koučinga, kouč mora da bude neutralan i objektivan. Kouč je praktično strateški partner na putu do ostvarenja postavljenog cilja. Koučing može da se koristi kao idealan razvojni alat kod:

- usklađivanja individualnog razvoja klijenta sa promenama u organizaciji,

- razvoja lidera u kompaniji,
- postizanju konkretnih poslovnih ili razvojnih ciljeva,
- formiranja i razvijanja timova.

Osnovna vrednost kvalitetnog koučing odnosa je poverenje. Sve informacije sa koučing sesija ostaju poverljivi što daje prostor za izgradnju osećaja partnerstva. Profesionalni kouč se obavezuje da će sadržaj svake sesije držati u tajnosti. Ovakva atmosfera poverljivosti pomaže da se izgradi čvrsta veza i saradnja što značajno doprinosi podršci klijentu na putu ostvarenja postavljenih ciljeva. Ukoliko klijent želi da delove sesija podeli sa menadžerom, timom, porodicom ili drugim ljudima ima punu slobodu da to i uradi što se nikako ne podrazumeva u slučaju kouča.

Obično koraci u procesu poslovnog koučinga idu sledećim redosledom:

- **Uvodni razgovor** – podrazumeva inicijalni razgovor kome obično prisustvuju klijent, osoba iz HR-a ili menadžer i kouč. Cilj ovog susreta je da se jasno i precizno oblasti na kojima će se saradivati, da se definišu kriterijum po kojima će se ocenjivati postignuća, utvrđivanje da li je klijent saglasan i spreman za saradnju i da li je koučing najbolja metoda da se postignu željeni rezultati.
- **Određivanje načina komunikacije između klijenta i kouča** – na početku svakog koučing procesa je važno uspostaviti indikatore koji će ukazivati na postignuti napredak. Odogovarajuće indikatore definišu kouč i menadžer ili osoba iz HR-a.
- **Koučing susreti** – Trajanje koučing procesa, kao i dužina svakog susreta se određuje prema potrebi klijenta ali obično ne duže od 90. minuta svake druge nedelje u periodu od 6 meseci ili 12 susreta.
- **Dodatno vreme** – Klijent je ima mogućnost da između susreta kontaktira kouča ukoliko za to postoji opravdana potreba ako se suoči sa izazovom ili želi da podeli postignuti uspeh. Kouč ima ulogu da ohrabruje klijenta u ostvarenju postavljenih ciljeva tako da je komunikacija usmerena ka postizanju postavljenog cilja dobrodošla.

Proces koučing daje brze i vidljive rezultate u radu sa menadžerima, kao i sa zaposlenima. Koučing proces namenjen menadžerima sadrži elemente sportskog koučinga, sa tom razlikom što je ovaj koučing proces usmeren na pomoć i podršku pojedincu da razvije, unapredi postojeće sposobnosti, postavi značajne ciljeve preuzme odgovornost za postizanje rezultata. Poslovni kouč podržava pojedince i timove da identifikuju, prepoznaju i eliminišu prepreke kako bi efikasno postizali postavljene ciljeve. Rezultati koučing procesa se mogu ogledati kroz unapređenje radnog učinka, kroz bolji odnos prema zadacima, kroz unapređen timski rad, kroz smanjeni broj konflikata. Kada proces koučinga uskladi lične i kompanijske vrednosti i ciljeve, jedan od rezultata često bude povećanje zadovoljstva na poslu i veća posvećenost kompaniji.

## 5. POSLOVNI KONSALTING

Konsultant je osoba sa specijalizovanim zvanjima čije usluge potražuju profesionalci ili organizacije. Konsultanti savetuju i edukuju o prirodi problema i mogućim rešenjima ili najboljim načinima da pojedinac ili organizacija postignu sopstvene ciljeve. Socijalni radnici su česti konsultanti ne samo klijentima kojima je potreban savet kako da se odnose prema određenoj socijalnoj situaciji, već i socijalnih službi, sudova, političkih grupa ili grupa aktivista.

Konsalting se danas smatra osnovnom karikom prenosa savremenih tehnoloških i organizacijskih rešenja kao i kod razvoja savremenog poslovanja. Potreba za angažovanje konsultanata nije isključivo vezana za poslovne projekte velike vrednosti sa visokim rizikom. Skoro da danas ne postoji oblast poslovanja za koje nije moguće angažovati konsultantsku kompaniju ili zatražiti pomoć konsultanata.

U poslednje vreme se posebno ističe potreba za konsaltingom u oblasti menadžmenta, u proizvodnim poslovima, u poslovima kupovine i prodaje preduzeća, unapređenju poslovanja, upravljanju procesima promena u preduzećima, procenama vrednosti intelektualnog kapitala.

Potreba za konsultantskim uslugama u oblasti menadžmenta i organizacije je posledica burnih promena u savremenom poslovanju, i to od tržišnih, političkih..., do tehnoloških. Od menadžera se očekuje da kada u preduzeću nema odgovarajućih stručnjaka, koriste usluge spoljnih konsultanata. Profesionalni konsultanti, lakše mogu uočiti stvarne probleme, neopterećeni aktuelnim problemima, organizacionom klimom, starim navikama i rešenjima, a nisu opterećeni ni potrebom ostvarivanja lične karijere u dotičnom preduzeću. Takođe mogu biti stručni i objektivni ocenjivači, obučeni za korišćenje alata za merenje intelektualnog kapitala u kompanijama.

Pre prvog svetskog rata profesija "konsultant" je bila nepoznata čak i u najrazvijenijim zemljama sveta. Iako unazad nekoliko decenija konsultanti iz SAD, Velike Britanije, Francuske, Nemačke i drugih razvijenih zemalja pružaju svoje usluge u svim delovima sveta, njihovi prihodi predstavljaju sve značajniju stavku u deviznom bilansu tih zemalja. Njihove aktivnosti se mogu videti na reorganizaciji malih preduzeća, kao i na pružanju saveta velikim svetskim kompanijama ili ekonomijama određenih zemalja.

U Srbiji su institucije koje su se bavile proučavanjem rada i unapređivanjem poslovanja u preduzećima počele da nastaju pedesetih godina dvadesetog veka. Ozbiljnije angažovanje konsultanata je kod nas počelo sa procesom tranzicionih promena.

Pojam konsultant obično nije dovoljno jasan i određen. Za to je delimično zaslužna činjenica da je ovaj pojam relativno nov, a delimično i zbog toga što postoji velik broj različitih stručnjaka, kompetentnih za davanje saveta o raznim pitanjima iz različitih područja pa i savetodavne usluge mogu obuhvatati široku lepezu rešavanja problema i pitanja. Saveti iz područja menadžmenta i organizacije, recimo mogu pokrivati tržište, finansijsko poslovanje, proizvodnju, organizaciju proizvodnje, proces promena, unapređenje poslovanja, razvoj i unapređenje poslovnih funkcija u preduzeću, procenu i merenje intelektualnog potencijala i kapitala u kompanijama i drugo.

Konsultantski posao se smatra specifičnom profesijom. Najčešće se poredi sa profesijom lekara ili hirurga. Konsultanti najčešće ne učestvuju u deobi dobiti koja je ostvarena kroz uštede koje je preduzeće postiglo zahvaljujući znanju i angažovanju konsultanta. Fiksna nadoknada za određene poslove, angažmane ili projekte obično

predstavlja izvor prihoda kojima se pokrivaju troškovi utrošenog vremena, istraživanja i ostali troškovi konsultanta.

Usluge konsultanata su namenjene najrazličitijim vrstama preduzeća, kao i svim drugim vrstama organizacija, bez obzira da li je reč o privatnim, državnim ili nekim drugim preduzećima i institucijama u zemlji i u inostranstvu.

Posao konsultanata nije samo davanje saveta već i potpuna usluga koja obuhvata sve radnje do postizanja potpune funkcionalnosti u smislu unapređenja preduzeća i ekonomičnosti njegovog poslovanja.

Profesija koja bi najpribližnije mogla poslužiti za poređenje sa profesijom konsultanta je profesija hirurga koji prima pacijenta, na osnovu ispitivanja donosi zaključke, uspostavlja dijagnozu, izrađuje strategiju (nekada angažuje konzilijum lekara specijalista), izvodi operativni zahvat nad bolesnikom. Posle operacije, nadgleda, kontroliše i aktivno učestvuje u procesu oporavka pacijenta.

Neki od autora ipak, tvrde da konsultant nije lekar koji ima za zadatak da uspostavi dijagnozu i izleči pacijenta. Oni smatraju da su izgledi za uspeh minimalni ako se konsultant angažuje u takvoj ulozi jer se pacijent-klijent verovatno već nalazi u bezizlaznoj situaciji. Donekle možemo se složiti sa tim tvrdnjama iako se, na žalost, kod nas često konsultanti angažuju upravo onda kada su već “sve probali”. To se posebno odnosi na mala i manja srednja preduzeća koja nemaju kapacitete, a ni svest o potrebi blagovremenog angažovanja konsultanata. Suvišno je spominjati tek nedostatak navike planskog pristupa određenim poslovnim aktivnostima, investicijama, strategijama poslovanja...

Idealan momenat za angažovanje konsultanata je kada preduzeće planira da se upusti u organizacione, investicione, inovacione i neke druge vrste aktivnosti kao i pre otpočinjanja bilo kakvog procesa promena ili unapređenja u poslovanju.

Iskusni i renomirani konsultanti ne vole šok-taktike – metode pomoću kojih se na brzinu postiže finansijski učinak, ali oni isto tako dobro znaju da svoju uslugu moraju opravdati odgovarajućim i brzim rezultatima.

Broj konsultanata je u stalnom porastu kako u svetu tako i kod nas. Stručne kompetencije konsultanata postaju sve šire. Možemo takođe da zaključimo da će, obzirom na trend promena i brzog razvoja koji smo ranije spominjali, uloga konsultanata biti sve veća i sve prisutnija u poslovanju, posebno u malim i srednjim preduzećima. Korist od angažovanja spoljnog konsultanta posebno se ogleda u tome, što konsultant ima veliko, specijalizovano iskustvo i znanje iz određenih oblasti.

Konsultant obično ne prodaje samo svoj rad i znanje, ili znanje prikupljeno od drugih konsultanata, nego konsultant takođe prodaje i znanje i iskustvo koje je sakupio i sticao dugogodišnjim istraživanjem, radom, čak i savetovanjem drugih preduzeća. Kao što smo već napomenuli, položaj konsultanta kao spoljnog saradnika bez izvršne funkcije u preduzeću, pruža mnoge prednosti u odnosu na menadžere u preduzeću. Konsultant može biti sasvim objektivan i nepristrasan.

Konsultant, obično, nije opterećen ličnim interesima ili ambicijama vezanim za dotično preduzeće, što je veoma važno. Konsultant je obično u poziciji da daje predloge, odnosno ocenjuje postojeće stanje u segmentima organizacije preduzeća ili postojećeg metoda rada, što može uraditi mnogo objektivnije nego bilo ko od zaposlenih u preduzeću. Sa druge strane zaposleni u preduzeću, bez obzira na radno mesto i funkciju, sa konsultantom mogu razgovarati mnogo slobodnije i otvorenije nego sa kolegama ili pretpostavljenima.

Osim stručnih saveta, konsultanti su u mogućnosti da svoju stručnu pažnju usmere na probleme jedne organizacije, a da pri tom nisu opterećeni svakodnevnim rutinskim poslovima.

Za razliku od menadžera koji, kad bi svu svoju pažnju usmerili samo na jedan problem, zanemarili bi ostale poslove za koje su odgovorni.

Uvođenje novih metoda, tehnika i postupaka nije stalan proces u radu konsultanata. Oni često rešavaju probleme iste ili slične vrste u više različitih preduzeća, pa im ranije stečeno iskustvo olakšava rad na novim zadacima tog tipa.

Konsultant je obavezan da uradi dijagnozu stanja, preporuči odgovarajuće aktivnosti, razradi predlog procesa implementacije, pomogne i nadgleda implementaciju... ali samo izvršenje je isključivo stvar menadžmenta u preduzeću, koje je odgovorno za sprovođenje i rukovođenje predloženih i dogovorenih aktivnosti.

U Srbiji, kao i u svetu, postoje menadžeri-vlasnici koji znaju koliko može doprineti dobar konsultant i da je svaki uloženi dinar investicija koja će sačuvati ili unaprediti poslovanje, a ima i onih menadžera-vlasnika koji takve usluge smatraju "skupim nepotrebnim troškom" ili promašenom investicijom.

## 6. POSLOVNI MENTORING

Iako mentorstvo nije nov pojam, teško ga je definisati (Daloz, 1999). Termin "mentora" potiče iz grčke mitologije. Mentorska praksa datira iz ranijeg perioda. U proteklih nekoliko godina je došlo do ponovnog porasta interesovanja za mentoringom kao strategijom uspešnog poslovanja. Mentoring je postao jedan od ključnih alata za stvaranje nove vrednosti kroz dugoročni lični razvoj u poslovnom okruženju. Mentorstvo je kompleksan, interaktivan proces koji obuhvata prenos znanja i iskustva sa stručnije i iskusnije osobe (mentora) na manje iskusnu osobu (mentija). Cilj mentorstva je da otvori mogućnost za stalno unapređenje veština i znanja, lični razvoj i napredovanje u karijeri. Može da se opiše i kao unutrašnje i spoljašnje putovanje, zajednički poduhvat mentora i mentija na određeno vreme tokom kojeg mentor ima ulogu usmerivača, lidera i pratioca. Mentorstvo je neodvojivo od coachinga. Poslovni coaching se u velikoj meri oslanja na teoriju mentorstva. (Griffiths, 2005).

Mentor je neko ko je dostupan mentiju da od NJE/NJEGA uči. Uloga mentora je da upravlja odnosom, da sasluša i da, kroz postavljanje odgovarajućih, a za odnos značajnih pitanja, otvara prostor za novi pravac razmišljanja ili, jednostavno, da podstiče inovativan i kreativan pristup radu i svakodnevnom životu.

Mentorstvo može da se definiše i kao međusobni odnos dve osobe koji za cilj prvenstveno ima učenje i razvoj. (Megginson et al., 2006). Prema rečniku, *menti* je odabrani učenik. U praksi, *menti* je osoba koja ima potrebu za podrškom koju će joj pružiti mentor i koja želi da unapredi znanja koja je stekao, lično se razvija, nauči nešto novo, ali i da dobije konkretan savet. Uloga *mentija* zahteva i neke predispozicije: da bude otvoren za nove načine rada i komunikacije, da ima volju da istražuje, da je spreman za izazove i promene. *Mentiji* su lično odgovorni za svoje učenje i razvoj. Mentorstvo uz osnovne elemente edukacije i razvoja *mentija*, takođe može da sadrži i elemente coachinga. (Caruso, 1992).

Sastanci sa mentorom su definisani potrebama *mentija* i njegovim interesima, međutim, *menti* nije uvek u stanju da identifikuje svoje potrebe ili razvojni potencijal. Upravo zato, mentor ima ključnu ulogu da pomogne *mentiju* da ih definiše što bolje. *Menti*, ipak, treba lično da identifikuje svoje ciljeve i svrhu mentorskog odnosa, a oni se obično menjaju tokom vremena. Konačno, važno je da *menti* dolazi pripremljen na sastanke, da zna precizno o čemu želi da diskutuje sa mentorom. Neophodno je da *menti* bude osoba otvorena za predloge.

Ono što menti može da dobije kroz mentorski odnos jeste da dodatno razvije osećaj samopouzdanja, napravi bolji lični i profesionalni plan razvoja, unapredi sopstvene kapacitete, i proširi postojeću mrežu kontakata. Takođe možemo da zaključimo da između coachinga i mentorisanja postoji međusobno preklapanje uloga. (WABC, 2006).

Mentorski odnos znači uspostavljanje istinske interakcije između osobe koja ima znanje i iskustvo i želi da ga podeli sa manje iskusnom osobom u jasno defnisanom vremenskom okviru, unapred utvrđenom. U mentorskim odnosima jasno razumevanje uloge kod obe strane ima veliki uticaj na uspeh ili neuspeh celokupnog procesa. Veoma je važno da se jasno i precizno defnišu očekivanja koja se imaju od ovog odnosa, kako bi se izbegla razočarenja. Proces može da se organizuje precizno, da se mentor i mentiji viđaju jednom nedeljno ili jednom mesečno, ili spontano, kada se ukaže potreba. Važno je shvatiti da je mentorstvo jedan kontinuirani proces u kojem se pretpostavljeni ili željeni efekti, ne mogu dogoditi odmah nakon inicijalnog susreta.

Za kvalitetan mentorski odnos bitno je da su mentor i menti posvećeni i aktivni u svojoj relaciji na način koji je njima najprihvatljiviji. Veoma je važno da uvek postoji svest o široj slici jer promene koje pravimo u jednoj sferi našeg života neminovno utiču i na druge oblasti u životu. Kako bi se tokom mentorskog odnosa postigao cilj i ostvario rezultat, neophodno je da se izgradi i razvije poverenje.

Ono što ovaj odnos čini jedinstvenim, u poređenju sa mnogim drugim međuljudskim vezama, je potpuno neizbalansiran odnos između mentora i mentija, koji je stalno usmeravan potrebama, očekivanjima i ciljevima mentija. Mentorova uloga je da bude sagovornik i ispitivač, ali isto tako i podrška u teškim situacijama ne tražeći ništa za uzvrat. Konačno, mentor je vođen željom da podeli svoje znanje, a ne da samopromoviše sebe. Dakle mentorstvo podrazumeva proces profesionalnog i ličnog razvoja gde osoba sa više znanja i iskustva podučava osobu koja ima manje znanja i iskustva iz mentorisane oblasti. (Roberts, 2000). Motivacija mentora treba da proizilazi iz zadovoljstva posmatranja kako drugi rastu i lično se razvijaju.

Faze mentorskog odnosa su:

- **Zbližavanje:** očigledno je da, ako mentor i menti imaju slabo izgrađen odnos, neće se mnogo toga postići. S druge strane, ako imaju međusobno poverenje, poštovanje i istinsko interesovanje za međusobne živote, ishodi mentorskog odnosa će biti veoma pozitivni.
- **Formulisanje ciljeva:** na početku samog procesa će verovatno biti nejasan osećaj cilja i to za obe strane, što u praksi i treba tako da bude. Postavljanje ciljeva može postati precizno tek kada obe strane imaju jasnu sliku o mestu polaska. U ovoj fazi treba da se obe strane slože o strukturi sastanaka mentorstva. Sama struktura može biti kao i gore predstavljenih sedam koraka, ili svaki par može kreirati za sebe posebnu strukturu.
- **Procenjivanja “ovde i sada”:** trenutni nivo ostvarenja samog mentija – polazna tačka – treba da bude objektivno procenjena i treba dogovoriti koje su stvarne dimenzije za tu poziciju.
- **Odlučivanje o “tamo i onda”:** neophodno je da obe strane otvoreno prodiskutuju i dogovore se šta žele da ostvare, kako po pitanju rezultata tako i vremena u kome će se ti rezultati ostvariti. Pod pojmom “diskutovati” se misli da će mentor pomoći mentiju da odluči šta želi.



- **Izabрати most između “ovde i sada” i “tamo i onda”:** menti treba da razmotri raskorak između trenutne i željene situacije i na osnovu vlastite procene odluči koje opcije su moguće za mentija kako bi se postigla željena situacija. Najpodesnije opcije će se onda uzeti u razmatranje i kombinovanjem tih rešenja može da se oblikuje optimalan plan aktivnosti.
- **Izgradnja mosta:** menti se brine o implementaciji plana aktivnosti. Mentorovi inputi u ovoj fazi bi trebali da budu minimalni. Ukoliko menti posustane u ovoj fazi, kasnija pomoć od mentora je obično u postavljanju pitanja koja potiču celokupno sagledavanje relevantnih faktora, a istovremeno fokusiraju mentija na krajnji cilj.
- **Procena napretka na drugu stranu mosta:** uloga mentora u ovoj fazi je da mentiju a) pomogne da se suoči i prevaziđe neizbežne prepreke ka uspehu, b) pomogne da menti odluči da li ciljevi treba da se no podese ili bi metod za njihovo ostvarivanje trebalo poboljšati ili promeniti, c) pomogne u osnaživanju osećaja vlasništva nad ciljevima, d) da podstakne istrajnost i ojača otpornost mentija na iskušenja.

## 5. ZAKLJUČAK

Osnovna svrha svake kompanije, pa i malih i srednjih preduzeća je stvaranje nove vrednosti. Industrijsko društvo se povlači pred novim digitalnim društvom koje je orijentisano na umrežavanju i upravljanju znanjem. Jednostavno rečeno, sve dublje ulazimo u doba znanja i radi toga je neophodno primenjivati nove savremene pristupe, trendove, vizije, strategije kao i nove strategije stavljanja u funkciju I upravljanja neopipljivim resursima, intelektualnog kapitala. Inovativna rešenja u oblasti informatičkih tehnologija, oblasti komunikacija, biotehnologije, pronalaženje novih industrijskih materijala, novih proizvodno tehnoloških procesa, dizajna, stvorila su proizvode koji su samo pre nekoliko godina bili nezamislivi. Ubrzani razvoj informatičke i telekomunikacione tehnologije obezbeđuje veći, brži i precizniji protok i obradu informacija. Sve je to rezultiralo povećanju uloge znanja u novonastalim vrednostima proizvoda. Novonastalo doba znanja, podrazumeva i ekonomiju znanja. Informacije, znanje, brzina i tačnost postaju presudni elemenat u sve surovijoj borbi za opstanak na sve zahtevnijem tržištu. Znati šta, znati gde, znati kada, kako i to sve; brže, bolje i više od konkurencije je formula koja sve više uzima maha u strategijama razvoja uspešnih malih i srednjih preduzeća. Ključni izazov novonastalog doba je definisanje, upravljanje, merenje, unapređivanje i vrednovanje neopipljivih vrednosti i znanja. Upravljanje neopipljivim vrednostima i potencijalima malih i srednjih preduzeća ne može biti svha za sebe. Upravljanje neopipljivim vrednostima uvek mora biti u funkciji uvećanja postojećih i stvaranja novih vrednosti u kompanijama. Da bi se moglo uspešno upravljati neopipljivim vrednostima i potencijalima u malim i srednjim preduzećima, neophodno je koristiti savremene metode kao što su koučing, konsalting, mentoring radi bržeg i efikasnijeg upravljanja intelektualnim potencijalom zaposlenih, saradnika u cilju stvaranja veće vrednosti. Ovaj rad je ukazao značaj istraživanja strategija i alata za adekvatno upravljanje i maksimalizaciju neopipljivih resursa u cilju stvaranja veće vrednosti. Intelektualni resurs je ključni resurs 21.veka, a poslovni konsalting, poslovni koučing i poslovni mentoring igraju sve značajniju ulogu u strategiji upravljanja intelektualnim kapitalom.

## REFERENCE

- [1] Bonti N., Keow W.,C., Richardson S., (2000), Intellectual capital and business performance in Malaysian industries , *Journal of intellectual Capital*. Vol.1, No. 1, p. 85-100.
- [2] Байбурина Э.Р., Головки Т.В., (2008), Эмпирическое исследование интеллектуальной стоимости крупных российских компаний и факторов ее роста, *Корпоративные финансы*. No. 2 (6). p. 5-19.
- [3] Быкова А.А., Молодчик М.А., (2011), Влияние интеллектуального капитала на результаты деятельности компании, *Вестник Санкт-Петербургского университета, Серия Менеджмент*. Вып. 1. p. 27-55.
- [4] Firer S., Williams S. M., (2003), Intellectual capital and traditional measures of corporate performance *Journal of Intellectual Capital*. Vol. 4. No. 3. p. 348–360.
- [5] Giuliani, M., (2005), Rome wasn't built in a day... reflecting on time, intellectual capital and intellectual liabilities, *Journal of Intellectual Capital*, Volume 16, Issue 1, Emerald, UK.
- [6] Гаранина Т.А., (2008), Структура интеллектуального капитала: вопросы оценки и эмпирического анализа, *Вестник Санкт-Петербургского университета*. Сер. 8. Вып. 1. p. 96–118.
- [7] Huang C.J., Liu C.J., (2005), Exploration for the relationship between innovation, IT and performance *Journal of Intellectual Capital*, Vol. 6. No. 2. p. 237–252.
- [8] Jelčić, K., *Priručnik za upravljanje intelektualnim kapitalom u tvrtkama*, GIPA, Zagreb, 2003. p. 11.
- [9] Kremp E., Mairesse J., (2002), Knowledge management in the manufacturing industry. Les 4 Pages des statistiques industrielles, SESSI, Ministère de l'Économie, des Finances et de l'Industrie. Paris, No. 169.
- [10] Low, M. Samkin, G. Li, Y., (2015), Voluntary reporting of intellectual capital: Comparing the quality of disclosures from New Zealand, Australian and United Kingdom universities, *Journal of Intellectual Capital*, Volume 16, Issue, 4, Emerald, UK.
- [11] Pulić A., VAIC—an accounting tool for IC management.URL: <http://www.vaic-on.net/start.html>
- [12] Попов Е.В., Власов М.В., (2006), Миниэкономические институты производства новых знаний. ИЭ УрО РАН. – Екатеринбург.
- [13] Stahle, P. Stahle, S. Lin, C.Y.Y., (2015), Intangibles and national economic wealth – a new perspective on how they are linked, *Journal of Intellectual Capital*, Volume 16, Issue 1, Emerald, UK.
- [14] Shiu H., (2006), The Application of the Value Added Intellectual Coefficient to Measure Corporate Performance: Evidence from Technological Firms, *International Journal of Management*. Vol. 23. No. 2. p. 356–365.

- [15] Subramaniam M., Youndt M. A., (2005), The influence of intellectual capital on the types of innovative capabilities, *Academy of Management Journal*. No. 48. p. 450-463.
- [16] Wang W.-Y., Chang C., (2005), Intellectual capital and performance in causal models: Evidence from *the information technology industry in Taiwan*. *Journal of Intellectual Capital*.. Vol. 6. No. 2. p. 222-236.
- [17] Bontis, N., (1996), There's a Price on Your Head: Managing Intellectual Capital Strategically, *Business Quarterly*; Vol. 60 Issue 4, pp 187.
- [18] Orem, S., Blinkert, J. & Clancy, A.L. (2007), *Appreciative coaching: A positive process for change*. San Francisco: Jossey-Bass.
- [19] Downey, M., (1999), *Effective coaching*. London: Orion Business Books.
- [20] Hudson, F. M., (1999), *The handbook of coaching: a comprehensive resource guide for managers, executives, consultants, and human resource professionals*. San Francisco: Jossey-Bass Publishers.
- [21] Liljenstrand, A. M., (2003), *A comparison of practices and approaches to coaching based on academic background*. Thesis (Ph.D.), Alliant International University, California School of Professional Psychology, San Diego.
- [22] Daloz, L. A., (1999), *Mentor: Guiding the Journey of Adult Learners*. San Francisco, Jossey-Bass Publishers.
- [23] Griffiths, K., (2005), Personal coaching: a model for effective learning. *Journal of Learning Design*, 1(2), 55-65.
- [24] Jackson, P., (2004), Understanding the experience of experience: A practical model of reflective practice for coaching. *International Journal of Evidence-based Coaching and Mentoring* 2(1), 57-67.
- [25] WABC, (2006), (Worldwide Association of Business Coaches): [www.wabccoaches.com](http://www.wabccoaches.com). Retrieved from the internet August 2006.
- [26] Nepoznati autori (2012), *Upravljanje ljudskim potencijalima u malom i srednjem poduzetništvu*, Program Europske unije za Hrvatsku IPA Komponenta IV – Razvoj ljudskih potencijala, Projekt „Umrežavanje, obrazovanje i podizanje konkurentnosti za više boljih poslova – NEC“, Osijek, str. 86
- [27] Megginson, D., Clutterbuck, D. & Garvey, B., (2006), *Mentoring in action: A practical guide*. London: Kogan Page.
- [28] Roberts, A., (2000), *Mentoring Revisited: A phenomenological reading of the literature*. *Mentoring & Tutoring: Partnership in Learning* 8 (2), 145-170.
- [29] Caruso, R., (1992), *Mentoring and the business environment: Asset or liability?* Brookfield, VT: Dartmouth Publishing.

## **WITH NEW CLIMATE POLICIES AND ACTIONS TOWARDS A MORE SUSTAINABLE AND LOW - CARBON DEVELOPMENT IN REPUBLIC OF MACEDONIA**

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**Abstract:** At the Conference of Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, the Climate Agreement was adopted. All the countries submitted their “Intended nationally determined contributions“(INDCs), which with the adoption of the Agreement became “Nationally Determined Contributions“(NDCs). This legally binding Agreement of all the United Nations Member States will come into force after 2020. That Agreement will have quantitative commitments to reduce emissions of greenhouse gases in order to transition countries to a sustainable and low carbon societies and climate-resilient economies.

The biggest challenge to the countries will be, by creating new climate policies and actions through the use of new technologies and innovations, to make a major step towards sustainable and green economic growth, which will improve the economic, social and community aspect in societies. Republic of Macedonia is committed to reduce emissions of carbon dioxide from 30% to 36%, with a higher level of ambition by 2030, relative to the reference scenario, and thus make the transition to a low-carbon economy, with the potential for creating new green jobs.

**Keywords:** COP21, NDCs, low-carbon economy, green jobs

## **CHANGES IN CONSUMER BEHAVIOR IN THE RETAIL TRADE UNDER THE INFLUENCE OF MODERN TECHNOLOGY**

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### **Abstract:**

#### **Introduction:**

Over the past 10-15 years there has been strong growth in technology, implemented in the daily life of each of us. For example, the appearance of compact laptops, smartphones, tablets, allowing us at any time to go to the network and obtain the necessary information about the product, service or company. We see a fundamental change in how people now interact with modern devices, radically changing the well-established model of consumer behavior in the decision-making process.

Today the use of devices, such as smartphones, to get more information about the product or service, learn something or to make a purchase, are fixed at the person on the reflex level, which is expressed in constant contact with the device. Moreover, in the daily work with smart devices, a person has formed not only new reflex action, but also a new perspective on their usual consumption even in the process of making a purchase. Now he puts such notions as "I want..." (I want to learn something, to buy something or to do something) - which is actually significantly different from the progress of human thought until the device came in our everyday life. Today we can talk about the consumer, equipped with knowledge and high requirements for the product (service), the seller, and the way to make a purchase.

This changes the existing rules of the game, both for consumers and for businesses. A recent study by Google showed how dependent from modern technology becomes a consumer when making purchasing decisions.

#### **Methods:**

The following methods were chosen for this study - a survey and an experiment. The survey was attended by 200 people, supported by 11 retailers selling jewelry. An experiment was carried out in one of the shops to change consumer behavior. We can see how the consumers act before and after the introduction of new technologies. The changes are described in the paper.

#### **Results:**

The study proved the hypothesis raised:

- More than half of the retail jewelry store customers use mobile internet to search for information about the product, but make the final purchase in a traditional store.
- The user who receives the ability to use virtually extended range of products agree to use the online store for the purchase and obtain the desired product in the traditional store.
- After the introduction of tablets with extended range, the ability to connect smartphones to the site at the entrance to the private office of the store, the consumer is able to get goods in

the shop of the city, free shipping to the store, an expanded assortment, which changes the usual before- purchasing process and the process of making a purchase by the consumer.

- Despite the fact that the role of traditional retail stores is also in the process of change for the consumer it remains an important thing to have an opportunity to go to a real offline shop to get familiar with the product.

**Conclusions:**

Formulated recommendations allow to accumulate the results of research to improve the efficiency of the introduction of modern technologies to retailers, considering the emerging trends in the behavior of modern consumers.

**Keywords:** consumer behavior, retail store, new technology, digital influence, mobile devices.

## **MEASURING THE IMPACT OF SOCIO - DEMOGRAPHIC CHARACTERISTICS OF THE PROJECT TEAM MEMBERS ON THE FORMATION OF TEAM ROLES (ON THE EXAMPLE OF THE CONCEPT R. BELBIN)**

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**Abstract:** One of the most important objectives in the current economic conditions is forming an efficient team to solve business - tasks. According to R. Belbin concept, the team is effective if each of eight (nine) roles and functions are presented in it.

The aim of the social experiment is the collection and analysis of empirical data on the impact of individual personal qualities of the team members on the outcome of the team.

The objective of the first phase of the study is to measure the manifestation degree of respondent's socio - demographic characteristics and its relation to his functional role in the team.

The experiment was conducted on ISM RANEPA master programs. Formation of teams takes place on the basis of testing results of personality characteristics of students to determine their propensity to command roles according to the method described by R. Belbin.

On a representative statistical material hypothesis was tested by regression and correlation analysis. The results allow to come to conclusion that there is no connection between the objective socio - demographic characteristics of the individual and the manifestation degree of his command role.

At the second stage of the study individual and team profiles will be constructed in order to solve the project management problems.

**Keywords:** project management, team role, R. Belbin test, statistical analysis, the correlation coefficient.

## **THE ROLE OF PUBLIC-PRIVATE PARTNERSHIPS IN THE RENOVATION OF HOUSING AND INFRASTRUCTURE**

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**Abstract:** In recent years the world can observe a tendency of strengthening cooperation between the State and private business. This trend manifests itself in such socially significant sectors of the economy, such as electricity, transport, health, education, housing and communal services in General. In the Russian Federation enterprises operating in these areas are of strategic significance, but may not always be fully privatized because of political considerations. Their activity inhibits the fact that the State does not always have sufficient funds and management expertise needed to support and development of such enterprises. Reconstruction, repair and renewal of the electrical conducting networks requires enormous and long-term investment. In the midst of what is a privately owned housing, the budget may not be to the financing of energy efficiency projects, and private investors are not willing to invest in long-term projects with low profitability. Generic organizational and financial mechanism in this case in the world practice is a public private partnership. Public-private partnership is one of the most important instruments in implementing energy efficiency policies, one of the five priority areas of technological development of the country, but because the topic is relevant today. And the State as the holder of a huge amount of resources and opportunities, and private businesses, has high-quality human resources and competences in areas where it operates, must find each other. As a result of enhanced investment attractiveness of Russia, that will create new jobs, expand regional businesses, increase the welfare of citizens and regions in General. Constructive interaction between the State and business came to be regarded as the only possible an adequate response to the challenges of the new times.

**Keywords:** renovation, housing and utilities, energy efficiency



## **CHANGES IN CONSUMER BEHAVIOR IN THE RETAIL TRADE UNDER THE INFLUENCE OF MODERN TECHNOLOGY**

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**Abstract:** The article aims at detecting specific changes in retail consumer behavior due to modern technologies and identifying possible leverages on consumer's purchasing decisions. The following methods were used: a poll and an experiment. A practical implication is a possibility to apply the developed recommendations to wholesale and retail shops.

**Keywords:** consumer behavior, retail trade, modern technologies, mobile devices, customer journey.

### **1. INTRODUCTION**

Consumer survey in marketing aims at defining the whole complex of incentives that guide a customer while making a purchasing decision. Understanding of needs and motivation of consumers in target market segments as well as detection of behavioral patterns is a sine qua non for developing an efficient business strategy. Success of strategic development of a company depends on understanding of potential customers' motives and analytical skill in terms of decision-making process in purchasing goods and services.

In the USA and Western Europe producers became interested in the psychology of consumers' behavior, their product evaluation methods and choice procedures when the competition started to escalate and markets got saturated with similar goods as a result of a widespread mass marketing. This caused a demand for research in consumer behavior, possible leverages or at least taking into account its features in business activities due to understanding of external and internal factors which create behavioral response of customers.

Russia became engaged in the study of consumer behavior later. Only recent years have seen large-scale applied research on this subject. Developing technologies and globalization of market space, which is definitely consumer-centered, make the importance of consumer behavior survey obvious, including in the retail trade due to modern technologies. The following Russian authors study consumer behavior: I. V. Alyoshina, E. A. Boychenko, E. P. Golubkov, V. I. Ilyin, R. H. Ivanova, A. V. Prokopenko, A. M. Sergeyev, I. A. Strelets, M. Yu. Troyan. These problems are reflected in a number of works by foreign scholars: D. Jobber, P. Kotler, J. Lambin, M. Solomon, A. Ries, J. Trout., J. Engel.

The understanding of how the modern customer thinks and acts gives an opportunity to be one step ahead. That is especially relevant and important for the development and efficient simulation of a company's business model.

Thanks to modern technologies that are an indispensable part of human life, the customer now us more informed about the goods and services that are of interest to him.

Moreover, e-commerce has considerably increased the competition and saturation of the product range.

## 2. PREREQUISITES

Going through numerous definitions of consumer behavior both in Western and Russian scientific economic literature and comparing those definitions makes it possible to draw conclusions that in the most common representation, consumer behavior is the activity directly aimed at obtaining, consuming and commanding products and services including decision-making processes which precede, accompany and follow those actions [4].

The understanding and knowledge of consumer behavior provides the enterprises with the information concerning behavioral patterns and sequence of actions, and enables them to define the moments and components within which an enterprises's intervention becomes not only possible, but efficient. Thus, the consumer behavior changing due to modern technologies forces entrepreneurs to pay attention to new directions in business models. Today the consumer is more autonomous, obtaining information on the company and its products and setting a trend for companies to provide accurate, accessible information, to offer competitive prices, to improve the quality of products, delivery and payment. All these components are important for the pre-shopping process of decision-making. Immediate availability of information on the Internet and reviews of the product can influence the consumer. Retail shops may offer tablets with detailed information on the product or the expanded range to the consumer.

The consumer is not always independent when forming opinion on a product, as no matter how thoroughly he or she approaches the analysis of prices and quality, in the end of the day the emotional background influences the rational choice. However, access to the information on the Internet makes difference. Today the consumer is still guided by emotions, but now he or she owns powerful analytical and data devices — smartphones which, in their turn, protect many consumers from unnecessary or low-quality purchases.

Consumer survey is a foundation for efficient administrative decisions in marketing. Not knowing the consumer behavior it is impossible to operate efficiently at the market with competitors which produce goods with a high level of similarity in terms of objective characteristics. The analysis of external and internal influences on consumer behavior, understanding of the formation of behavioral response allow modeling and using marketing tools to create influence.

Global changes in the last 20 years indicate that now the customer has become an active participant of business processes thanks to modern devices. Knowing the product (the service), the market, systems of influence and promotion, the consumer is better equipped for processing the extensive amount of information. It is largely related to an active use of different technologies in everyday life.

Modern information and smart technologies (gadgets, applications, processors, smartphones, tablets with an extensive functional range and an instant access to the Internet) are becoming an integral part of everyday life, seriously influencing both the consumers and many companies. Now that purchases are possible not only in a traditional retail shop, but also in an online retail shop, the customer should explore more options, comparing goods, prices and shopping methods. Modern technologies also deform the

purchasing process, presenting the customer with alternatives not only in terms of a wide range of goods (services), but also in terms of shopping methods.

With customer surveys conducted and earlier market dynamics being significantly different from an actual customer's behavior, it has become more difficult for marketing specialists to predict consumer behavior today. Therefore, the scientific community and marketing specialists are searching for new concepts and methods of studying consumer behavior. In many respects that is related to a sharp increase in the quantity of goods (services) offered in the market, changing business environment, amplifying information pressure and economic instability.

The analysis of the Russian and foreign literature highlights several main trends in terms of methodology of research methods and the subject, i.e., the customer:

- Expansion of research due to interdisciplinary approaches;
- Implementation of new methods of study and mechanisms of consumer behavior control;
- Transformation of the consumer. A modern consumer is influenced by rapidly modifying technologies, social changes, accelerated pace of life and interaction with companies, altogether resulting in new requirements to goods (services) and development of appropriate methods of interaction of a company with a customer.

Russian and foreign sociologists and economists have noted another important trend in consumer behavior. They argue that the world of consumption is growingly more differentiated, and the modern consumer is increasingly more informed [14]. Consumer's desire to have maximum information on a product (service) raises the question of competences of the modern consumer, encourages him or her to take part in defining the quality of a product (service). Thus ratings produced not only by special companies, but by consumers themselves become an important tool of defining the characteristics of goods.

Those trends change the research methods of consumer behavior, identifying several directions. Development of the technologies influencing consumer behavior makes companies use not only more frequent research by means of standard methods such as an interview or a poll, monitoring and comparison of data for different periods, but also introduce more functionally equipped technologies in everyday life. At the same time it is necessary to expand the number of research methods by means of integration of sciences and introduction of modern technologies into business with a following review of existing business models.

Let us highlight several trends in terms of modern smart technologies changing consumer behavior. Extensive access to information provides the modern consumer with new opportunities which are deformed from a steady concept of the Theory of consumer choice (according to which the consumer aims at maximizing utility, at that, the balance is ensured) and lead to a higher level of maximized utility at a higher level of its satisfaction. This trend in consumer behavior can be described as the process of rationalization of the consumer choice. In turn, the process has led to market changes. The market is obviously more focused on the client, making the consumer the priority. Decision-making of the modern consumer is also changing. Modern technologies provide for more flexible and moment-oriented decisions, which is important to bear in mind for research, analysis and further prediction of consumer behavior.

Another trend in consumer behavior is the deviation from the existing consumer

behavior models as modern smart technologies substantially simplify the process and the way of making decision on purchase. However, having developed under technological influence and access to information, consumer's actions today are the result of a more complex, than it may seem at first sight, and multi-alternative choice. Knowledge becomes the prevailing resource for the consumer that forms a new economy of abundance of information and ways of its transfer, forcing out economic activity based on limited resources. Despite the availability of one-click shopping, the same modern technologies make it typical of consumers to select only required information. Therefore, it is possible to say that the abundant information increases the probability of finding the desirable results. However, the consumer should simplify the choosing process given the existing variety of alternative goods (services), changing the focus from the specific benefits to groups of goods with similar characteristics.

Thus, modern technologies change consumer's attitude, expanding information space with information, available for the analysis of goods (services), and offering new ways of shopping with various groups of goods present at the market today. The context of the theory of consumer choice is changing as well. So, from the perspective of neoclassical theory, the modern consumer still seeks to maximize utility, but, nowadays, the understanding of utility is broader and the number of options in decision-making is larger.

Today technologies ensure greater openness, accessibility of information, in turn, increasing flexibility of consumer's decision, thereby boosting competition for business and forming new requirements to its development. Internet connection in modern smart technologies allows obtaining required information in a couple of minutes. The global network can oversaturate a customer with information in a short period of time, changing the attitude towards these or those goods (services) as of specific moment, forcing to reflexively look for alternatives of an already developed image of the product. The technologies, being an integral part of our life, make us look for and analyze alternatives on a daily basis. Customers get operational data for this unintentional analysis from reading news on a smartphone, tablet or PC, omnipresent advertising, especially on devices where advertising can be personalized through social media, demos, etc. Moreover, the very use of technologies in everyday life changes consumers, dividing them into two categories important for marketing specialists: those who use multifunctional smartphones and those who do not.

The smartphone boom which began several years ago changed not only the appearance of mobile phones, replacing buttons with touch screens. Evolutionary change in species affected the customer. By now technologies have considerably improved, mobile devices have become compact, powerful and functional. Over the past few years, mobile technologies have been actively entering all spheres of human activity, their role still continues to increase. Availability of these devices actually creates a new society, a new attitude towards consumption.

Smartphones have sharply increased the use of the Internet. Almost everyone uses the Internet at least once a day, be it information search or checking an account in a social network. The reviews and search for specific information on the product exert enormous impact on consumer behavior in making a purchasing decision. Ratings and expert reviews become an important source influencing the customer's decision. Personal advice moves to the third place, and consultants have the least significant influence, the consumer seriously doubts that they can provide reliable data on the product.

The circumstances of purchasing matter as well. Situations can be categorized based on the number of solutions, time needed to evaluate the options, and also the degree of consumer's interest in purchasing the product. If the options are equivalent from the consumer's point of view, decision-making time decreases. If the options are rather different, uncertainty and time for evaluation and choice sharply increase.

Psychological factors, i.e., motivation, emotions and feelings in the process and after the purchase, are important determinants of consumer behavior. It is important to know and understand motives that guide consumers as they define criteria of choice. Latest technologies show to the consumers the new boundaries they can explore by means of smartphones. Modern technologies affect three stages of shopping: information search, pre-shopping evaluation of alternatives, purchase. It is absolutely normal for the majority of people to look for any information immediately using their smartphones or tablets. Devices and information technologies today can analyze user's queries and direct him or her, offering information which might spark the interest. Information and smart technologies have brought all of this to our lives, transformed and expanded the existing purchasing processes. Smartphones have considerably changed the view of how functional a phone can be. The approach to use of phones has also changed.

Up to 40% of people using smartphones in a shop carry out transactions literally on the run, more than half of users look for information on specific goods in the shop, half of respondents compare prices. In Russia the attitude towards using smartphones is similar to developed countries, consumers consider them to be the main means of pre-shopping analysis and further shopping. For example, 67% of buyers search for information via smartphone prior to purchasing the required product in a traditional shop; 23% of buyers search for information via smartphone, use a shop as a "showroom", and then buy online [15].

However, despite high rates of using smartphones, tablets and PCs that continue to demonstrate a dynamic growth, common infrastructure still poses certain problems. For a rather long period of time, mobile technologies could not offer a fast Internet connection which is a major functional factor for phones. Quality of mobile Internet was poor, however, now large companies are actively working to improve it. Retail shops have to adapt to new trends in consumer behavior, constantly introducing technological developments to attract and retain clients. Better technologies, new design and technical parameters aimed at greater automation and mobility of gadgets have had a great impact on the consumer, that has in turn influenced sellers.

One cannot deny the role of modern technologies in our lives. On the downside, the growing number of smartphone users may backfire on retail sellers. Those sellers who will not pay attention to changes and requirements of the market now, might not survive in the future, giving way to more advanced companies. A growing role of smart devices creates a most interesting niche full of opportunities for retails, symbiosis of existing foundations of sales and a new trend in consumer behavior is worth special attention.

### **3. METHODOLOGY**

Emerging choice alternatives force the consumer to sort all information single-handed which requires simplification of pre-shopping process. Almost every existing process can be made simpler if retail companies develop together with consumers. Taking

into account the requirements of the latter, the companies will be able to improve their business models, producing a well-structured flow of information on goods and the company for consumers.

There are three directions of technological impact: technologies change business from within, that is automate internal business processes; technologies offer new opportunities for extension of external communications of business with customers; technologies change the essence of business, that is now, regardless of what you are dealing with, you have to take into account the developing technological reality and the changes in consumer behavior.

The modern consumer is a person who has undergone the evolution of technological opportunities, who is informed prior to purchasing, thanks to Internet services and companies that try to provide maximum information on the product, the competitive advantages. He or she can choose: where to buy, what to buy, and how to buy. Today 84% of buyers use smartphones at least at one purchasing stage: 69% before purchasing, 36% during purchasing and 14% after it [15]. Attracting the modern consumer's attention is costly, forces shops to adapt to new shopping conditions and incites massive creation of online services. Today, the modern business is hardly possible to imagine without symbiosis of traditional retail shops and information available on the Internet. This symbiosis is driven by the desire of customers to utilize the most convenient purchasing method, still having high expectations related to all sales channels. However, business will have to invest heavily in order to maintain the integration of offline and online channels. For example, such retailers as *Azbuka vkusa*, *Magnit*, *Lenta* have taken into consideration the recent changes in consumers, having noted the importance of technologies in their lives, and designed websites with virtual storefronts which allow the following:

- To see the available range and prices for products;
- To make a shopping list;
- To locate the nearest shop.

It is important to mention that economic situation in the country has a strong impact. Over the last 15 years it has significantly changed not only the customers, but also the retail sellers. During this period, all consumer markets started to grow, mobile communication and penetration of the Internet approached the global level.

Russia is experiencing a notable shift of retails towards e-commerce. Retail shops are facing total sales decrease due to overall decline in household disposable income. Owing to an active growth of Internet sales and the crisis, many retailers note decreasing sales. Taking into account the current economic environment, it is impossible to state a considerable improvement due to a trend of less frequent visits to retail shops resulting in unprofitability and losses.

The current situation signifies that the Russian customer has an opportunity to use modern multifunctional technologies, approximating the level of developed countries. However, Russian infrastructure does not provide for a process as quick as, for example, in the US or EU. Technological equipment of retail shops and many websites does not match the capabilities of devices, so the process of transition, mastering new gadgets, becomes longer. Moreover, just like the customer, the retail seller gradually follows trends in the new consumer behavior, trying to satisfy the growing needs.

Recent trends demonstrate that traditional retail shops have begun to lose their value for the modern customers. Every year, the Internet becomes more and more important for business processes, occupying a more and more significant place. Initially companies used the global network only for marketing, then for communication with a customer and collection of personal data. Now it comes to light that traditional retail shops need to review their activities and use the Internet as a virtual extension of the existing outlets.

It is possible to call a traditional retail shop one of the steadiest institutes. Just like the modern technologies, cemented into our lives, retail shops affect our behavior. Therefore, there is a series of advantages typical of a conventional shop:

- A consumer can see and touch the product before buying it (70%);
- A consumer can get goods immediately (64%);
- Authenticity of the product is guaranteed.

There is no clear division today what the customer buys in a conventional shop and what on the Internet. So far there are mixing trends, i.e., the customer may select a product on the Internet and buy it in a conventional shop and vice versa. Both online stores and traditional shops face a greater risk of non-purchasing. For example, a consumer may reserve a product in an online store, and then go and buy it in a shop or, on the contrary, try on a product in a shop, put it aside, and then purchase it on the Internet.

In order to achieve strategic goals companies should reasonably and systematically use information resources, in other words "information profitability" of the company. The understanding of reasons for transition to the Internet can help retail sellers optimize their strategy.

Today there are several important transition points for retail sellers: continuing evolution of modern personal technologies which the customer uses throughout purchasing process; pursuit of innovative novelties in retail trade by means of the global network; client confidentiality and competent use of data aimed at maintenance of maximum loyalty to the brand and framing an individual approach to the customer. In this regard retail shops should develop concepts integrating advantages of traditional and online stores. Therefore, now we should not consider an active development of the Internet sales to be a replacement for conventional shops, but rather an add-on to traditional sales.

In 2015 the crisis hit hard on retail trade. *Piccina opt LLC*, a dot com company engaged in wholesale of fashion jewelry through a website, recorded the lowering of sales. The analysis showed that retail shops of fashion jewelry which were clients of *Piccina opt LLC* were having troubles and could not find a solution how to retain buyers on their own. A new strategy focused on partnership with retail shops was developed in order to support clients of the wholesale company in a difficult time and, consequently, to maintain sales. The company sent e-mails, proposing new conditions of interaction and encouraged everyone to discuss details of further cooperation together.

*Piccina opt* always sold the products via the website both to individuals and legal entities, the principal condition for cooperation was an order for the minimum amount. The company also has a retail shop in the city of Syktyvkar. The company has an international trademark and is called *Piccina Bella*. In 2016 the clients working under the logo of this company were offered to become partners, integrating possibilities of both sides. The website of *Piccina Bella* wholesale online store showed wholesale prices to

everyone, without registration. To hide the markup from retail buyers, wholesale prices on the website were replaced with retail prices (this area has a standard average markup). Wholesale prices were visible only to legal entities, individual entrepreneurs and wholesale private buyers after logging in.

Thus, partners could sell goods to the buyers directly from the website of *Piccina Bella* online store. A special button was developed so that partners could see wholesale prices and is private buyers — retail prices. Therefore, a partner could open the *Piccina Bella* website to a buyer on a smartphone, tablet or computer and place an order, the buyer paid to the partner, and the goods were received in the next delivery. For retail sellers it is an opportunity to multiply their range without any additional investments, and for buyers it is a chance to order a wide range of goods with free delivery.

Several assumptions were brought forward:

1. More than half of respondents use mobile Internet to search information on goods (fashion jewelry), however, finally make the purchase in a traditional shop.
2. The consumer offered an opportunity of using a virtually expanded range agrees to shop in an online store and to receive the product in a traditional shop in their city.
3. Tablets with an expanded range and smartphones with log-in to the personal account of the shop enable the consumer to receive goods in a shop in his or her city, free delivery to the shop, the expanded range. This changes the usual pre-shopping and purchasing processes.

150 people from 11 shops have taken part in the poll.

Table 1. The cities-participants of the poll

City:	Respondents, N
Ulan-Ude	10
Kazan	10
Samara	10
Chita	10
Yakutsk	10
Kaliningrad	10
Tomsk	10
Kyzyl	10
Neryungri	10
Salehard	10
Syktyvkar	50
Total:	150



#### 4. RESULTS

The first poll has resulted in the following important data: 103 of 150 respondents (67%) did not use to buy from these shops, however used to buy similar goods from other shops. Only 62 respondents (41%) used the Internet to search information about the product (fashion jewelry), 88 (59%) preferred traditional shopping, comparing goods in different shops. Therefore, the assumption that more than half of respondents use mobile Internet to search information on goods (fashion jewelry), however, finally make the purchase in a traditional shop, was confirmed.

It has been revealed that 95 respondents (63%) used mobile Internet, 43 respondents of them (45%) looked for similar goods being out of the shop, 22 respondents (23%) used the Internet being in the shop (considering other options), 30 respondents (32%) used mobile Internet to locate the shop. According to the poll, 129 respondents (86%) had never purchased fashion jewelry on the Internet before. The consumers, in their turn, have named a number of obstacles to purchasing on the Internet:

- If the retail online store is in a different city, the delivery cost can consist up to half of the product value;
- The goods can differ from the photo or not satisfy consumer's expectations, initial examination or fitting are very important;
- Difficulties with ordering on the websites of the companies;
- Internet sales are generally wholesale, the minimum cost is required.

The consumer uses the Internet at a pre-shopping stage, comparing options, however, finally comes back to a traditional shop. Fitting is important, 87% of respondents have noted that it is crucial for them to see the product before buying it.

The second assumption was confirmed as well. The consumer offered an opportunity of using a virtually expanded range agrees to shop in an online store and to receive the product in a traditional shop in the city.

The range is a key factor in this area. 150 respondents (100%) have noted that they would like to see the range expanded. And 137 respondents (91%) would use online store by means of tablets or smartphones for shopping and receiving goods in a shop in their city.

The polls have demonstrated that several consumers consider it necessary to introduce tablets in shops that would present the whole range, perceiving this as a tool to simplify the choice by reducing time of searching for the product in the shop (this statement applies to large outlets). Others suggested that shops create websites where it would be possible to find information on goods in advance being at home and, for example, to reserve it.

The experiment has confirmed the third assumption. Tablets with an expanded range and smartphones with log-in to the personal account of the shop enable the consumer to receive goods in a shop in his or her city, free delivery to the shop, the expanded range. This changes the usual pre-shopping and purchasing processes.

The customer journey prior to the experiment is presented schematically on Diagram 1.

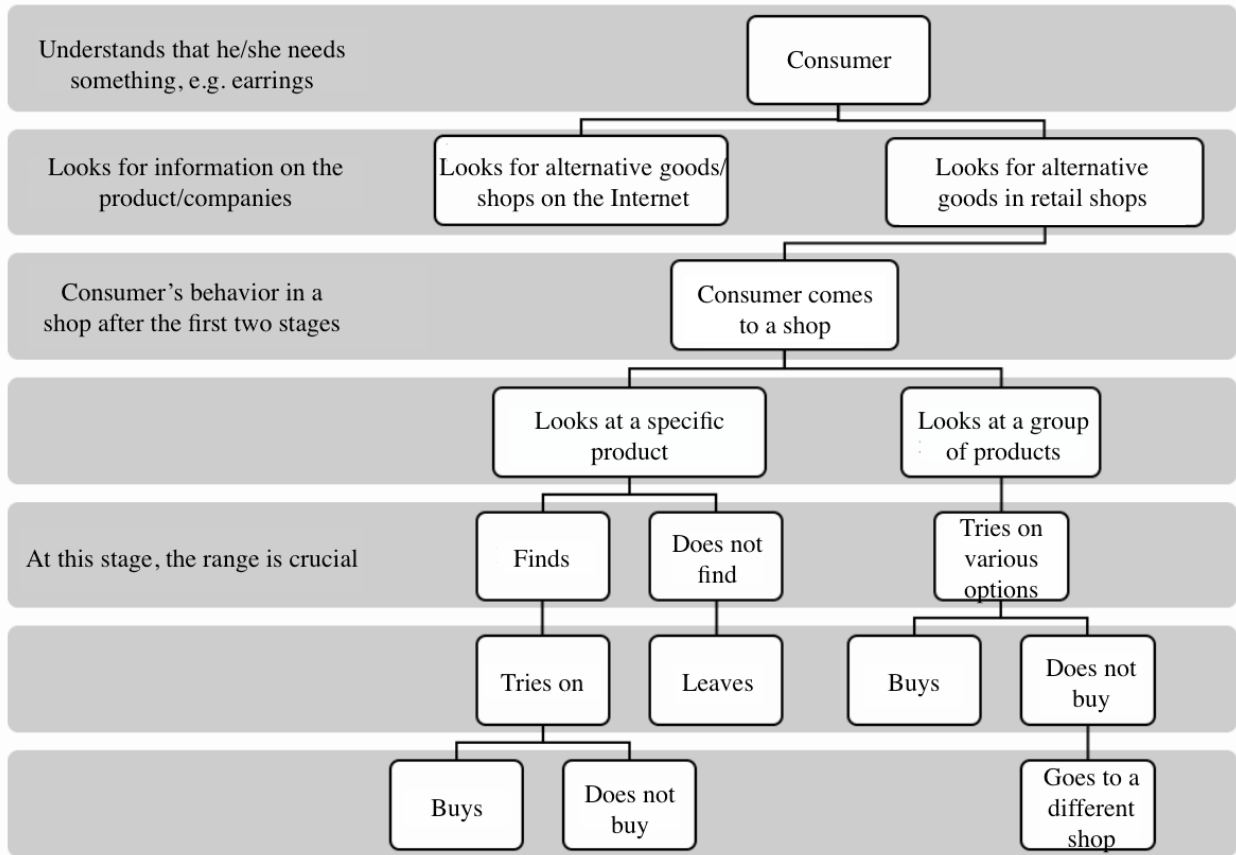


Diagram 1. Customer journey (search and purchase) prior to the experiment

After the experiment, the consumer gets an alternative in the shop (see Diagram 2).

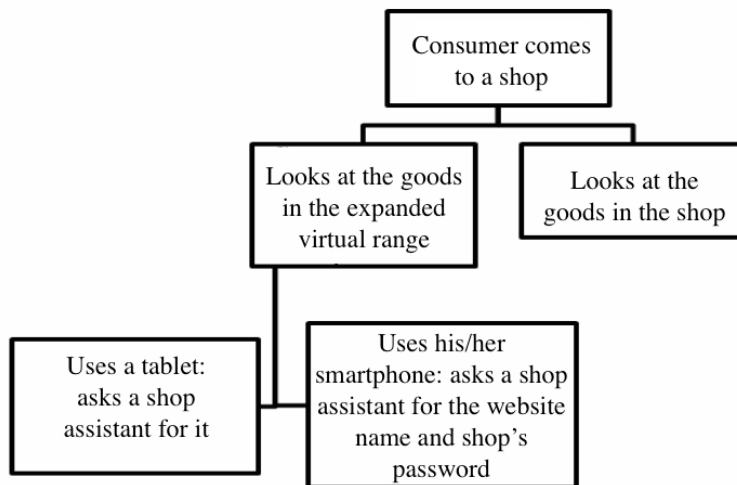


Diagram 2. Changes in consumer behavior in a shop during the experiment

The experiment resulted in the following recommendations aimed at greater efficiency of using modern technologies influencing the purchasing decisions in retail trade:

1. It is necessary to develop a system approach to studying consumer behavior based on emerging trends in consumer behavior affected by modern technologies both at the level of specific companies and at a higher level in order to ensure constant and increasing retail sales in Russia.
2. New models of interaction between retail and wholesale online stores, providing for new opportunities for interaction and overall increase in sales, create synergetic effect of the two areas.
3. According to the survey the modern consumer is more dependent on smartphones, tablets and other devices providing an instant access to Internet. As a result, the consumer has more information to analyze, that increases variability of pre-shopping processes. Retail sellers need to accumulate consumer experience, creating a well-structured, simplified journey towards purchasing.
4. Introducing modern technologies and further strategic planning at enterprises operating in different Russian cities and towns, it is important for planning to take into account the development of technological infrastructure of the specific city due to region-specific features of technology penetration.

These recommendations are applicable not only to retail shops of fashion jewelry, but also to other areas of wholesale and retail sales, such as clothes, footwear, goods for kids.

## 5. CONCLUSION

Modern business today needs a symbiosis of traditional retail shops and information on the Internet. The development is driven by the desire of customers to utilize the most convenient purchasing method, still having high expectations related to all sales channels.

As a result of the analysis of changes in consumer behavior in retail trade due to modern technologies providing instant access to the Internet and identification of possible leverages on purchasing decisions with a case study of retail shops of fashion jewelry by means of introduction of modern technologies such as the tablet and the smartphone, the conclusion is drawn that a modern Russian consumer is at a stage of getting acquainted with new opportunities offered by multifunctional modern technologies which affects the purchasing process. In particular, this expands alternative ways of obtaining information on goods at pre-shopping stage and at the final stage of purchasing. New trends in consumer behavior are developing due to the changing role of mobile devices, which become a powerful information tool in the consumer's hands, making his or her final choice more rational, and the changing role of traditional retail shops which wish to satisfy the consumers, offering new purchasing opportunities by means of modern technologies. At the same time, some problems have been detected — a high-quality foreign technology (multifunctional smartphones) is not always most efficiently applied by consumers in

small Russian towns because of an insufficiently developed technological infrastructure and poor quality of mobile Internet in Russian regions.

Consumer behavior surveys may become a major competitive advantage of the company. Digital technologies, cemented into consumer's life, set a vector of development both for the consumer, and for the companies in general. Since the development of new technologies available to the consumer accelerates every day, retail companies need to regularly monitor the impact of new technologies on the consumer, maintaining the current sales level and developing in new directions, attractive to the consumer.

## REFERENCES

1. Alyoshina I. V., Consumer behavior, Ekonomist, Moscow, 2006. – 525 p. (in Russian)
2. Blackwell R., Engel J., Miniard P., Consumer Behavior 10th edition / Trans. from English, Piter, St. Petersburg, 2007. – 944 p. (in Russian)
3. Boychenko E. A., Sergeyev A. M., Consumer behavior: Textbook, EKSMO, Moscow, 2006. – 320 p. (in Russian)
4. Golubkov E.P., Marketing research: theory, methodology, and practice, FIN press, Moscow, 2013. – 240 p. (in Russian)
5. Ilyin V. N., Consumer behavior, Piter, St. Petersburg, 2009. – 224 p. (in Russian)
6. Ivanova R.H., Consumer behavior: Textbook, Kharkiv National University of Economics, Kharkiv, 2003. – 120 p. (in Russian)
7. Jobber D., Lancaster G., Selling and sales management: Textbook for higher education, UNITI-DANA, Moscow, 2002. – 622 p. (in Russian)
8. Kotler P., How to create, win and dominate markets / Trans. from English by V.A. Goldich and A.I. Oganosova, AST, Moscow, 2013. – 670 p. (in Russian)
9. Lambin J., Market-driven management: strategic and operational marketing / Trans. from English, Piter, St. Petersburg, 2007. - 800 p. (in Russian)
10. Prokopenko A.V., Consumer behavior: Textbook. / A.V. Prokopenko, M.Yu. Troyan – Educational literature center, Kiev, 2008. – 176 p. (in Russian)
11. Ries A., Trout J., Positioning: The Battle for Your Mind, Piter, St. Petersburg, 2001. – 256 p. (in Russian)
12. Sergeyev A. M., Consumer behavior, INFRA-M, Moscow, 2006. – 310 p. (in Russian)

13. Solomon M., Consumer Behavior. Buying, Having, and Being, 2003. – 784 p. (in Russian)
14. Strelets I. A., Influence of new technologies on economic behavior of consumers and companies, 8 (2008). pp. 63-72. (in Russian)
15. New opportunities: online buyers. [Online source]  
[https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/consumer-business/russian/ECR\\_Forum\\_presentation.pdf](https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/consumer-business/russian/ECR_Forum_presentation.pdf) - 06.2017.

**STUDENTS SYMPOSIUM ON  
STRATEGIC MANAGEMENT**

## UPRAVLJANJE ELEKTRONSKIM OTPADOM I NJEGOV UTICAJ NA ŽIVOTNU SREDINU URBANIH NASELJA

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**Apstrakt:** Veliki ekološki problem u Republici Srbiji predstavlja neodgovarajuće postupanje sa otpadom čiju značajnu količinu čini otpad od elektronskih i električnih uređaja. Cilj ovog rada je da ukaže na problem otpada od elektronskih i električnih uređaja, kako u svetu, tako i u Republici Srbiji, prvenstveno u urbanim aglomeracijama, koje su posebno osetljive na zagađenja bilo koje vrste, naročito na savremeno masovno zagađenje životne sredine rezidualima savremenih civilizacijskih tekovina, jer je to ekološki opasan otpad kome bi trebalo da se pristupi na veoma ozbiljan način od momenta prikupljanja pa sve do konačnog zbrinjavanja. Posebna pažnja u radu posvećena je otpadu koji nastaje od starih mobilnih telefona. Izloženi su problemi koji postoje pri upravljanju ovom vrstom otpada, kao i moguća rešenja. Doprinos ovog rada ogleda se u povećanju ekološke svesti svih učesnika u lancu životnog ciklusa mobilnog telefona tj. elektronske i električne opreme.

**Ključne reči:** životna sredina, urbana naselja, elektronski otpad

### 1. UVOD

Stalni razvoj industrije elektronske i električne opreme, kao i pojava novih tehnologija, dovode do ubrzanog rasta proizvodnje uređaja bez kojih je teško da se zamisli svakodnevni život. Mobilni telefoni postali su neodvojivi deo naše svakodnevnice. Prema podacima Regulatorne agencije za elektronske komunikacije i poštanske usluge broj mobilnih korisnika u Republici Srbiji na kraju 2014. godine iznosio je 9.344.977 [1]. Broj korisnika mobilne mreže u 2014. godini prevazilazi ukupan broj stanovnika. Penetracija u posmatranoj godini iznosi 130.76%.

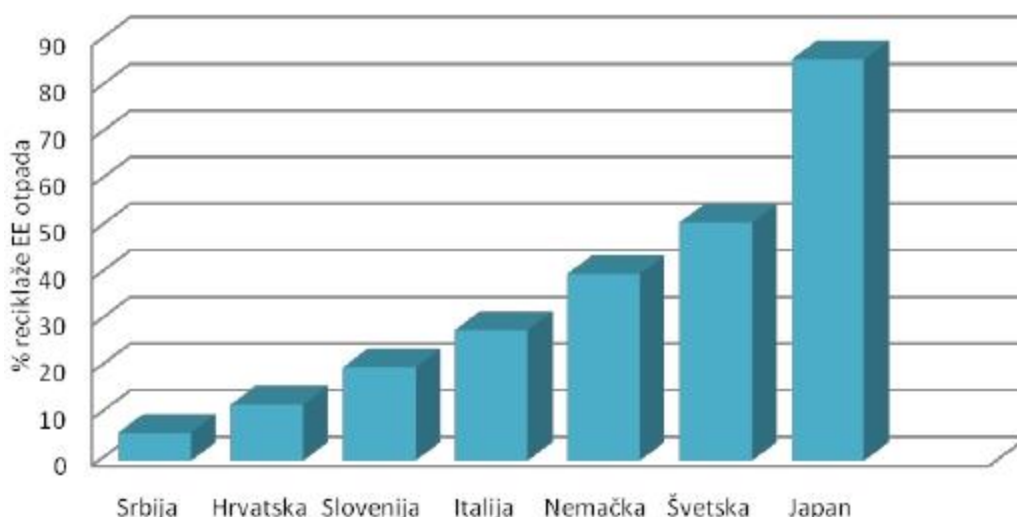
Porast proizvodnje električne i elektronske opreme dovodi i do ubrzanog porasta količine otpada. Otpad od električne i elektronske opreme (u nastavku: EE otpad) akumulira se skoro tri puta brže od običnog komunalnog otpada. Stopa rasta EE otpada kreće se od 5% do 10% [2]. EE otpad kao jedan od najbrže rastućih tokova otpada na svetu sa 20 do 50 miliona tona godišnje postao je svetski problem i jedan od prioriteta za rešavanje [3].

Procenjuje se da čak 90% EE otpada završava na deponijama ili postrojenjima za insineraciju. Sadržaj opasnih materija u EE opremi predstavlja glavni problem tokom faza upravljanja i reciklaže EE otpada.

Iako je najzastupljenije sakupljanje otpadne računarske opreme nikako ne sme da se stavi u drugi plan sakupljanje i tretman starih mobilnih telefona. Prema podacima Telenora, jednog od tri mobilna operatora u Republici Srbiji, većina korisnika mobilne telefonije kupuje nove aparate na svake dve godine. Procenjeno je da će do 2020. godine 3.2 milijarde starih telefona da završi na otpadu [4]. Specifičnost otpada od mobilnih telefona potiče zbog njihove

izuzetne složenosti, kao i brzine kojom ovi uređaji zastarevaju i bivaju zamenjeni novim uređajima.

Na slici 1. prikazano je poređenje stepena reciklaže EE opreme u Republici Srbiji, sa stepenom reciklaže EE opreme u drugim zemljama. Nažalost, U Republici Srbiji stepen reciklaže EE opreme iznosi samo 6%, što je izuzetno malo u poređenju sa zemljama u regionu, a pogotovo u poređenju sa Japanom gde se ostvaruje 86% reciklaže EE opreme.



Slika 1. Poređenje stepena reciklaže EE otpada u nekoliko država [5]

U Republici Srbiji recikliraju se jednostavnije komponente EE uređaja, kao što su plastika, metal i staklo, a ostaju komponente koje u sebi sadrže primese opasnih materija, čiju finalnu preradu obavlja mali broj kompanija u svetu. Ovaj rad predstavlja pokušaj da se ukaže na štetan uticaj EE otpada na životnu sredinu. Cilj rada je da se podigne društvena svest o važnosti uštedede energije, optimizaciji korišćenja EE opreme, kao i pravilnom recikliranju EE otpada. Poseban akcenat stavljen je na analizu štetnih uticaja mobilnih telefona kao jedne kategorije EE otpada.

## 2. UTICAJ OPASNOG OTPADA NA ŽIVOTNU SREDINU

Prema Zakonu o upravljanju otpadom („Sl. Glasnik RS“, br. 36/2009, 88/2010) opasan otpad predstavlja otpad koji po svom poreklu, sastavu ili koncentraciji opasnih materija može da prouzrokuje opasnost po životnu sredinu i zdravlje ljudi i ima najmanje jednu od opasnih karakteristika utvrđenih posebnim propisima, uključujući i ambalažu u koju je opasan otpad bio ili jeste upakovan [6]. Opasan otpad sadrži materije koje mogu da budu toksične, kancerogene, mutagene, infektivne, zapaljive, a koje kroz zemljište i vode ulaze u biološki lanac i mogu da uzrokuju obolevanje ljudi i štetno da deluju na ostali živi svet. Opasan otpad može da ima kratkoročne i dugoročne posledice na kvalitet i dužinu života, kao i na kvalitet vazduha, hrane i pića.

Elektronski i električni otpad je otpadna električna i elektronska oprema uključujući sklopove i sastavne delove, zatim otpadna električna i elektronska oprema nastala u domaćinstvima ili u proizvodnim i/ili uslužnim delatnostima kada je po vrsti i količini slična EE otpadu iz domaćinstva. EE otpad ima karakter opasnog otpada i prema Zakonu o



upravljanju otpadom („Sl. Glasnik RS“, br. 36/2009, 88/2010) ne može da se meša sa drugim vrstama otpada. Zbog toga je potrebno da se sa EE otpadom radi veoma pažljivo i da se njegova reciklaža obavi uz apsolutno poštovanje zakona.

EE otpad sadrži veliki broj plemenitih i teških metala, radioaktivne materijale, plastiku, staklo i čitav niz drugih materijala koji mogu da se recikliraju. Takođe, ova vrsta otpada sadrži veliki broj otrovnih i štetnih supstanci (olovo, kadmijum, živa, heksovalentni hrom, plastika uključujući PVC, bromirani inhibitori grejanja (BFR), barijum, berilijum, fosfor i dr.) koje mogu da prodru u vodu i tlo što dovodi do kontaminacije životne sredine i kontaminacije hrane u lancu proizvodnje. Pri tome, kontaminacija zemljišta je trajna, što nanosi veliku štetu okruženju i ljudskom zdravlju i istovremeno smanjuje resurse za proizvodnju hrane. Iako EE otpad pripada kategoriji opasnog otpada, ova vrsta otpada predstavlja izvor vrednih materijala kao što su zlato, platina, srebro, kao i mnogi drugi metali i metaloidi.

Upravo zbog navedenih razloga važna je efikasna reciklaža EE opreme. Postupkom reciklaže čuvaju se siromašni resursi mnogih elemenata. Zbog stalnog porasta količine EE otpada mnoge razvijene zemlje uspostavile su različite kontrolne mehanizme za upravljanje otpadnim materijalima. Takođe, uspostavljena je hijerarhija upravljanja otpadom koja predstavlja strategiju upravljanja otpadom i klasifikuje pojedine operacije u upravljanju otpadom prema njihovoj ekološkoj korisnosti. Na samom vrhu hijerarhije prikazane na slici 2. nalazi se prevencija stvaranja EE otpada kao i redukcija.

Vrh piramide predstavljaju radnje kojima treba da se teži pri upravljanju štetnim otpadom.

Na trećem stepenu hijerarhije upravljanja otpadom nalazi se ponovna upotreba proizvoda za istu ili drugu namenu. Na kraju, postupak reciklaže uvek ima prednost u odnosu na odlaganje otpada deponovanjem ili spaljivanjem bez iskorišćenja energije. Odlaganje EE otpada na deponije je najmanje poželjno rešenje iz razloga što nijedno tlo nije nepropusno pa može da dođe do curenja kao i isticanja opasnih materija u zemljište i podzemne vode.



Slika 2. Hijerarhija upravljanja EE otpadom

Pored procesa reciklaže EE opreme, koncept ekološki održivog razvoja ostvaruje se i kroz smanjenje štetene emisije ugljen-dioksida. Veoma alarmantni podaci dolaze iz evropskog

istraživačkog centra Joint Research Center (JRC) prema kojima se godišnja emisija ugljen dioksida u svetu povećala za 45% između 1990. god. i 2010. god. i dostigla rekordnih 33 milijardi tona. SAD emituju 16.9 tona ugljen-dioksida po stanovniku godišnje, što je dva puta više nego u EU u kojoj se godišnje emituje 8.1 tona po stanovniku [7].

## 2.2. ŠTETAN UTICAJ MOBILNIH TELEFONA NA ŽIVOTNU SREDINU

Pri analiziranju uticaja EE otpada na životnu sredinu trebalo bi da se posmatra celokupan ciklus opreme koji obuvata proizvodnju materijala, ceo životni vek uređaja i njegovu reciklažu. Prema tome, EE oprema može da ima direktan i indirektan uticaj na životnu sredinu, a takođe i na zdravlje i bezbednost korisnika.

Ako se posmatra celokupan ciklus mobilnog telefona može da se uoči da on vrši direktan uticaj na životnu sredinu u samom postupku proizvodnje, zatim pri potrošnji energije tokom njegovog korišćenja, kao i na kraju životnog ciklusa, u smislu veoma složenog postupka reciklaže.

Indirektan uticaj mobilnog telefona ogleda se u uticaju na zdravlje i bezbednost korisnika. U tom smislu može da dođe do oštećenja vida kod korisnika (nepravilna upotreba blica mobilnog telefona, prekomerna izloženost treperavom svetlu ekrana telefona), oštećenja sluha (prevelika izloženost ušiju jakom zvuku sa slušalica mobilnog telefona), ugrožavanja bezbednosti (pri preuzimanju nepoznatih Internet aplikacija, itd.), kao i do mnogobrojnih zdravstvenih problema usled štetnog uticaja elektromagnetnog zračenja.

Indirektan uticaj ostvaruje se i pri samoj proizvodnji mobilnih telefona u smislu dugoročnog uticaja toksičnih materijala na zdravlje radnika, kao i zagađenja okoline u kojoj se nalaze fabrike. Takođe, pravljenje kartonske ambalaže i korisničkih uputstava uslovljava veliku potrošnju papira (indirektno ugrožavanje šuma kao ograničenog prirodnog resursa). Na kraju, odlaganje starih mobilnih telefona utiče na povećanje deponija otpada koje trajno zagađuju zemljište, kao i površinske i podzemne vode.

## 3. REGULATORNI OKVIR UPRAVLJANJA EE OTPADOM

### 3.1. BAZELSKA KONVENCIJA

Bazelska konvencija je međunarodni multilateralni ugovor sačinjen u Bazelu, marta 1989. god., kojim se regulišu norme postupanja, odnosno kriterijumi za upravljanje otpadom na način usaglašen sa zahtevima zaštite i unapređenja životne sredine i postupci kod prekograničnog kretanja opasnih i drugih otpada.

Prema Bazelskoj konvenciji, upravljanje otpadom postavljeno je na bazi integralnog pristupa koji podrazumeva kontrolu stvaranja i upravljanja opasnog i drugog otpada, skladištenje, transport, tretman, ponovno korišćenje, reciklažu, obnavljanje i finalno odlaganje. Bazelskim amandmanom je od 1995. god. zabranjen izvoz opasnog otpada u zemlje koje nemaju odobrene kapacitete za postupanje sa ovom vrstom otpada, tj. u zemlje izvan EU. Srbija je potpisala Bazelsku konvenciju 1989. god., a ratifikovala je i postala član 2000. god.

U mnogim zemljama doneti su zakonski propisi kojima se reguliše oblast upravljanja EE otpadom, kao i dizajn i proizvodnja električnih i elektronskih proizvoda.

### 3.2. WEEE DIREKTIVA 2012/19/EU

Evropska Unija je 13.02.2003. godine usvojila WEEE Direktivu 2002/96/EC tj. Direktivu o električnom i elektronskom otpadu (Waste of Electrical and Electronic Equipment). Od 2012. godine stupila je na snagu nova verzija WEEE Direktive pod oznakom 2012/19/EU. WEEE direktiva teži da poboljša upravljanje EE otpadom i da podstakne proizvođače da proizvode uređaje imajući u planu njihovu reciklažu. Ključni deo ove Direktive jeste da su proizvođači odgovorni za troškove vezane za sakupljanje, obnavljanje, reciklažu i tretman EE otpada tj. WEEE direktiva koristi princip koji se zaniva na odgovornosti svakog pojedinačnog proizvođača tzv. IPR (Individual Producer Responsibility).

Svrha ove direktive jeste prevencija nastanka EE otpada kao i promocija ponovne upotrebe, reciklaže i ostalih oblika obnavljanja ovakvog otpada kako bi se redukovala količina ovog otpada i poboljšale performanse životne sredine. Ova direktiva nastoji da poboljša ekološke performanse svih učesnika u životnom ciklusu proizvoda (proizvođača, distributera, potrošača i ostalih koji su direktno uključeni u tretman EE otpada).

WEEE 2012/19/EU direktiva teži da poboljša performanse upravljanja otpadom kroz [8]:

1. Selektivno prikupljanje EE otpada pomoću odgovarajućih sistema koji čuvaju integritet uređaja i njihove potencijale za obnavljanje;
2. Stopu sakupljanja koju mora da ispuni svaka članica, a koja iznosi 4kg EE otpada po stanovniku godišnje;
3. Individualnu odgovornost proizvođača;
4. Stope ponovne upotrebe, reciklaže i obnove koje se kreću od 50% do 80% u zavisnosti od razmatrane kategorije uređaja (član 7. WEEE Direktive 2012/19/EU);
5. Odredbu pružanja informacija krajnjim korisnicima čije je učešće esencijalno za visoke stope sakupljanja i reciklaže, kroz obeležavanje pakovanja, kao pružanje informacije postrojenjima za tretman

### 3.3. ROHS DIREKTIVA 2011/65/EU

Uprkos merama koje propisuje WEEE direktiva 2012/19/EU veliki deo EE otpada ipak završava u komunalnim tokovima otpada. Čak iako je posebno prikupljen i podvrgnut procesima reciklaže, EE otpad i dalje sadrži opasne materije poput žive, kadmijuma, olova, PCB, a koji predstavljaju rizik po okolinu i zdravlje ljudi.

Upravo zbog navedenih razloga neophodna je primena Direktive o ograničenjima za upotrebu opasnih materija sadržanih u EE opremi tj. RoHS Direktive 2011/65/EU (Restriction of the use of hazardous substances). Ova direktiva odnosi se na EE uređaje obuhvaćene Aneksom I WEEE 2012/19/EU direktive sa izuzetkom kategorija 8 i 9. RoHS Direktiva u svojim specifikacijama tačno određuje koliki procentualni udeo teških metala i kontrolisanih supstanci u odnosu na masu svaka komponenta može da sadrži. Tako je prema Aneksu II, RoHS Direktive propisana maksimalna koncentracija olova, žive, šestovalentnog hroma,

polibromiranih bifenila PBB po 0.1%, dok je maksimalni udeo kadmijuma u masi komponente 0.01% [9].

#### 4. RECIKLAŽA EE OTPADA

Prema Zakonu o upravljanju otpadom („Sl. Glasnik RS“, br. 36/2009, 88/2010) reciklaža se definiše kao ponovna prerada otpadnih materijala u proizvodnom procesu za prvobitnu ili drugu namenu, osim u energetske svrhe.

Pozitivne osobine reciklaže EE otpada su:

1. Dovodi do manjeg korišćenja sirovina, čime se štite neobnovljivi ili teško obnovljivi prirodni resursi od nekontrolisane potrošnje;
2. Smanjuje uticaj otpada na zagađenje životne sredine jer ušteda energije doprinosi smanjenom emitovanju gasova izazivača efekata staklene bašte;
3. Doprinosi smanjenju deponija i degradacije tla;
4. Ušteda energije jer je potrebna mnogo veća potrošnja energije pri pravljenju novih sirovina nego pri procesu reciklaže.
5. Ušteda materijalnih sredstava.

Pre samog postupka reciklaže javljaju se problemi sakupljanja, selekcije i demontaže EE- otpada. Ovi problemi potiču od raznovrsnosti proizvoda na tržištu, kao i od mnoštva varijanti istovrsnih proizvoda, ali i nepogodnosti proizvoda za recikliranje.

Kada je reč o starim mobilnim telefonima oni se tretiraju kao sitan EE otpad, kategorije 3 prema Aneksu I WEEE direktive 2012/19/EU. Upravo sakupljanje sitnog otpada predstavlja veliki problem. Nažalost, ne postoji svest korisnika o važnosti reciklaže. Praksa je pokazala da zanemarljiv broj korisnika posebno odvaja sitan EE otpad. Čak i kada bi mobilni telefoni bili propisno odloženi zajedno sa ostalim sitnim otpadom postavlja se pitanje ko bi u daljem procesu vršio selekciju tako sitnih predmeta. Nažalost, i ovako mali EE uređaji, kao što su mobilni telefoni, predstavljaju velike zagađivače životne sredine.

Selekciju EE otpada dodatno otežava i činjenica da proizvođači opreme ne obeležavaju proizvode koji sadrže kadmijum, živu, i sl. pa jedino na osnovu proizvodne i konstruktivne

dokumentacije može da se utvrdi sastav i količina materijala u konkretnom uređaju.

Demontaža EE opreme veoma je važna zbog izdvajanja komponenti sa toksičnim materijalima i supstancama, ali takođe i zbog izdvajanja komponenti koje sadrže plemenite i retke materijale kao što su: srebro, zlato, platina, paladijum, germanijum, cirkonijum, volfram, itd. Postoji mogućnost da se EE otpad drobi bez demontaže ili da se demontira do određenog nivoa, izvrši selekcija po sadržanim materijalima i tek onda da se šalje u centre za reciklažu. Drugi postupak je mnogo bolji, ali je zato prvi postupak ekonomski isplativiji. Pa ipak, oba postupka zahtevaju veoma složene tehnologije, kao i količine otpada da bi se obezbedila ekonomičnost reciklaže. U slučaju kada se EE otpad drobi veoma je teško da se izvrši reciklaža korisnih materijala.

## 5. RECIKLAŽA MOBILNIH TELEFONA

Mobilni telefoni (uključujući i smart uređaje) predstavljaju skup dragocenih i retkih metala u malim količinama. Visoke performanse mobilnih telefona direktno su povezane sa sadržajem dragocenih metala u samim uređajima.

Bacanje mobilnog telefona istovremeno predstavlja i bacanje vrednih metala (paladijuma i zlata). Otpad od mobilnih telefona svakako zagađuje životnu sredinu jer se vremenom oslobađaju toksične materije poput litijuma i kadmijuma. Značajan podatak je da čak 90% mase materijala mobilnog telefona može da se obnovi i ponovo upotrebi. Baterije mobilnih telefona u proseku predstavljaju 30% mase celog uređaja i značajno mogu da naškode životnoj sredini. Interesantno je da je za reciklažu baterije mobilnog telefona potrebno 90%

manje energije nego za njenu proizvodnju.

Tipičan mobilni telefon, bez baterije i pratećih dodataka, sadrži 43% plastike, 14% stakla, 13% bakra, 7% čelika, 5% aluminijuma, 3% magnezijuma i 0.35% srebra. Nikal, kalaj i olovo zajedno čine približno 1% mase mobilnog telefona, dok je sadržaj zlata manji od 0.04%. Posmatranjem materijalnog sastava mobilnog telefona očigledno je zašto je neophodna prethodna demontaža komponenata i njihova selekcija na samom početku postupka reciklaže. Kako se veliki broj metala u mobilnom telefonu nalazi u izuzetno malim količinama neophodne su značajne količine unapred selektovanog otpada da bi se izvršio postupak reciklaže.

Prema podacima Telenora, procenjeno je da će do 2020. godine 3.2 milijarde starih telefona da završi na otpadu [4]. Ako se uzme u obzir podatak da se reciklažom 1000 mobilnih telefona uštedi 16kg bakra, 342g srebra, 34g zlata i 15g paladijuma, očigledna je važnost postupka reciklaže ove vrste EE opreme [3].

Postupak reciklaže započinje njihovim sakupljanjem. Iako sakupljanje mobilnih telefona deluje kao veoma jednostavan korak u postupku reciklaže, obično predstavlja veliki problem. Mobilni telefoni često završavaju zajedno sa komunalnim otpadom. Dva najčešća razloga ovoj pojavi su veoma mala dimenzija uređaja, kao i nedovoljna informisanost korisnika o postupku i važnosti reciklaže, kao i štetnom uticaju EE otpada na životnu sredinu. Jednu od mogućih zaštitnih mera počeli su da sprovedu operatori mobilne telefonije tako što preuzimaju mobilne telefone uz odgovarajuću nadoknadu i time sprečavaju povećanje EE otpada.

Drugi korak u postupku reciklaže mobilnih telefona predstavlja rastavljanje uređaja na kućište, bateriju, štampano kolo, zvučnike, žice, staklo, itd. Plastika, staklo i baterije se odvojeno tretiraju. Iz žica se dobija bakar, dok se u zvučnicima nalaze retki metali neodijum i praseodijum.

Topljenjem i reakcijama elektrolize, kao i drugim fizičko-hemijskim metodama izdavaju se svi metali sadržani u mobilnom telefonu. Potrebno je da se sve opasne materije pravilno uklone iz uređaja. Pojedini elementi koji se izdavaju tretmanom se neutrališu (hlor, brom,...) ili bezbedno skladište (živa, kadmijum, olovo). U slučaju kada se opasne materije ne bi pravilno uklonile one bi mogle ponovo da budu prisutne u obnovljenim metalima kao i u uništenom otpadu.

Kada se ne bi obavljala reciklaža mobilnih telefona u životnu sredinu bi svakako dospele mnoge štetne materije, ali bi takođe bile bačene i vredne sirovine.

## 6. MOGUĆE MERE ZAŠTITE ŽIVOTNE SREDINE

Koncept ekološki održivog razvoja podrazumeva smanjenje potrošnje električne energije, smanjenje emisije ugljen-dioksida i reciklažu EE otpada.

Mnogobrojna istraživanja pokazuju da je najzastupljenije sakupljanje računarskog otpada. Dodatno, na polju informaciono-komunikacionih tehnologija doneta su neka od rešenja za uštedu električne energije i ostvarenje maksimalne energetske efikasnosti kao što su virtuelizacija, cloud computing, power management i reciklaža stare opreme [7]. Takođe, jedno od novijih rešenja predstavlja i upotreba Open source Linux operativnog sistema koji

omogućava rad na „starim“ računarima tj. računarima koji više ne mogu da se koriste sa Microsoft Windows softverskim rešenjima [10].

Količina otpada koji nastaje nagomilavanjem starih i odbačenih mobilnih telefona stvara se u alarmantnim količinama. Ova pojava ima niz negativnih posledica na očuvanje životne sredine i ostvarenje koncepta ekološki održivog razvoja. Da bi se izvršio i minimalni pomak u ovoj oblasti doprinos očuvanju životne sredine trebalo bi da daju proizvođači mobilnih telefona, korisnici, država i mnogobrojne institucije.

Osnovni problem koji postoji kod korisnika EE opreme jeste nizak nivo ekološke svesti. U Srbiji je neophodno da se obezbedi bolja informisanost korisnika o važnosti kao i načinu ostvarivanja koncepta ekološki održivog razvoja. Takođe, neophodno je da se korisnicima daju detaljne informacije zašto i na koji način je neophodno da se razdvaja otpad, kao i da se razvije svest o značaju reciklaže. Neophodno je da se obezbedi da korisnici mogu na jednostavan način da odlože staru opremu na određena mesta (npr. namenski kontejneri u prodavnicama EE opreme, kod mobilnih operatora, u opštinama, itd.) i da odatle oprema bude isporučena u postrojenja koja omogućavaju ponovnu upotrebu, demontažu i reciklažu.

## 7. ZAKLJUČAK

Nivo svesti o značaju reciklaže i njenoj primeni u svakodnevnom životu, u Republici Srbiji je na veoma niskom nivou. Predstoji dugotrajan rad na formiranju stava prema problemu nepravilnog odlaganja štetnog otpada i obrazovanju populacije o velikim uštedama koje donosi postupak reciklaže.

EE otpad trebalo bi da se tretira kao veoma važan resurs jer su mnogi metali i materijali koji se u njemu nalaze veoma ograničeni u prirodi (zlato, platina, germanijum, cirkonijum, itd.). Da bi se ispunili zahtevi evropskih direktiva iz oblasti upravljanja otpadom neophodno je da se uspostave efikasni organizacioni i logistički povratni sistemi. Sakupljanje i transport moraju da budu izvedeni tako da optimiziraju ponovnu upotrebu i reciklažu onih komponenti ili celih uređaja pogodnih za reciklažu odnosno ponovnu upotrebu.

Postoje mnogi ograničavajući faktori pri prikupljanju starih mobilnih telefona kao što su nerazvijena prikupljačka mreža i nedovoljna informisanost korisnika o važnosti reciklaže.

Pravi izazov za lokalne vlasti predstavlja organizovanje prikupljanja mobilnih telefona kao i ostale EE opreme odvojeno od ostalog otpada. Ovaj problem ne može da se reši samo zakonskim normama već izgradnjom neophodne infrastrukture i neprekidnim obrazovanjem svih učesnika u lancu životnog ciklusa EE opreme.

## 8. REFERENCE

- [1] „Pregled tržišta telekomunikacija i poštanskih usluga u Republici Srbiji u 2014. god.“, Regulatorna agencija za elektronske komunikacije i poštanske usluge, 2015. god., ISSN: 1820-8738
- [2] Milivojević J., Kokić Arsić A., Savović I., Stojanović S.: „Sistem održive reciklaže električnog i elektronskog otpada“, 40. Nacionalna konferencija o kvalitetu, Kragujevac, 2013., str. 408-416
- [3] [www.recikliraj.rs](http://www.recikliraj.rs) (pristup sajtu 03.08.2015.)
- [4] [www.telenor.rs](http://www.telenor.rs) (pristup sajtu 03.08.2015.)
- [5] Milenković N.: „Reciklaža u Srbiji“, pp. prezentacija, ECO EXPO 2015, <http://www.ecoexpo.rs/wp-content/uploads/Recikla%C5%BEa-u-Srbiji-ECO-EXPO-2015.pdf>
- [6] Zakon o upravljanju otpadom („Sl. Glasnik RS“, br. 36/2009, 88/2010)
- [7] Grahovac D., Egić B.: „Informaciono-komunikacione tehnologije kao izvor problema u zaštiti životne sredine i moguće mere zaštite“, 8. MeĐunarodno savetovanje: Rizik i bezbednosni inženjering, Kopaonik, 2013, str. 73-80
- [8] DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, of 4 July 2012 on waste electrical and electronic equipment (WEEE), Official Journal of the European Union, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32012L0019>
- [9] DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, of 8 June 2011 on restriction of the use of certain hazardous substances in electrical and electronic equipment, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32011L0065>
- [10] Viduka D., Bašić A.: „Impact of Open Source software on the environmental protection“, Computation Ecology and Software, 2015, 5(1), str. 113-118
- [11] Pravilnik o listi električnih i elektronskih proizvoda, merama zabrane i ograničenja korišćenja električne i elektronske opreme koja sadrži opasne materije, načinu i postupku upravljanja otpadom od električnih i elektronskih proizvoda („Sl. glasnik RS“, br.99/2010)

## THE IMPACT OF DIFFERENT TYPES OF INCENTIVES OF EMPLOYEES OF TECHNICAL FACULTY IN BOR ON THEIR WORK MOTIVATION LEVEL: A CASE STUDY

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**Abstract:** The impact of different types of incentives for employees on growth or decrease of their motivation and, also, their productivity, has been a subject of a large number of theorists and practitioners of management for ages. Facing with this issue, managers of successful companies said that they spend a lot of their time on resolving conflicts and motivating employees for the sake of higher productivity and better results. Therefore, a special emphasis was put on the ways through which the quality results can be achieved. The aim of this study was to examine which types of incentives are more dominant in terms of motivation of teaching and non-teaching staff at Technical Faculty in Bor and to research whether there is a difference in thinking between the respondents in relation to socio-demographic parameters and belonging to an appropriate department of the faculty.

**Keywords:** socio-demographic parameters, motivation, stimulating, employees, Technical Faculty in Bor

### 1. UVOD

Veoma visoka povezanost između sistema podsticaja zaposlenih i stepena motivacije datih radnika za kvalitetno obavljanje posla, predmet je istraživanja mnogih teoretičara, na čijim postavkama je bazirana i trenutna studija. S obzirom da je cilj ovog rada da se ukaže na vezu između stimulacije i motivacije, tj. da se na osnovu njihove korelacije predoči koji su vidovi eventualnih podsticaja na Tehničkom fakultetu u Boru najinteresantiji radnicima, sprovedeno je istraživanje na datu temu i uz odgovarajuću metodologiju obrazloženi su dobijeni rezultati.

U *prvom delu rada* obrađeni su osnovni teorijski pojmovi motivacije i nagrađivanja sa jasno istaknutim podoblastima koje su relevantne za ovo istraživanje. Takođe, u ovom segmentu predstavljen je VEI model teorije očekivanja, prikazan kroz odgovarajuće matematičke formule.

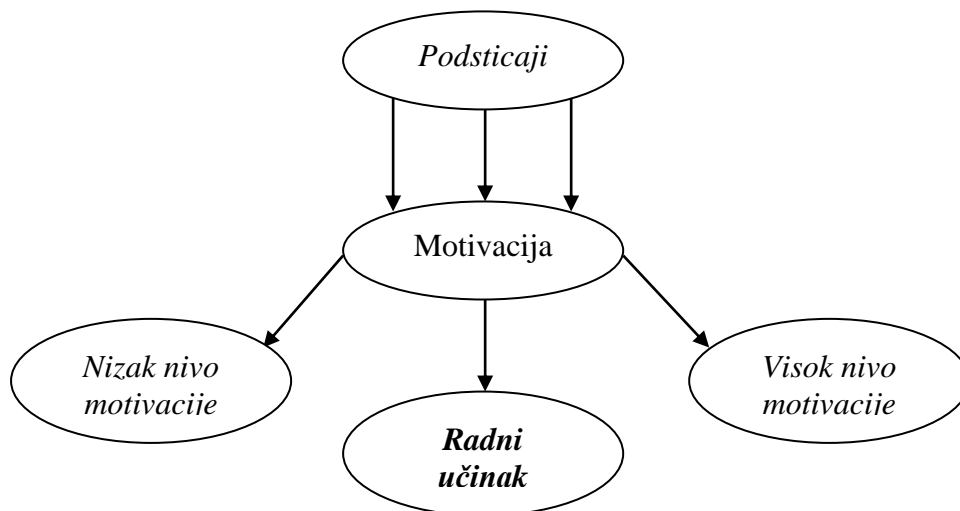
*Drugi deo rada* podražava sam tok, odnosno metodologiju istraživanja, potom rezultate istraživanja, diskusiju <sup>datih</sup> rezultata i njihovo tumačenje. Istraživačkim delom rešava se problematika predstavljena u ovom uvodu, a diskusijom daju konkretna rešenja, odnosno konsekvence vezane za sam problem izučavanja.

### 2. POJAM MOTIVACIJE

Motivacija je, moglo bi se reći, jedna od najvažnijih oblasti menadžmenta. Sposobnost zaposlenih da ostvare odgovarajuće učinke i da pritom budu nagrađeni, osobenost je koja



može veoma pozitivno uticati na prag motivacije, tj. na njenu visinu kod svakog čoveka ponaosob. Dakle, zaključujemo da je viši stepen motivacije prouzrokovan određenom vrstom stimulacije ključna determinanta boljeg radnog učinka.



Slika 1. Determinante učinka zaposlenih s aspekta motivacije i nagrade

Motivacija se može definisati kao *proces pokretanja, usmeravanja i održavanja ljudskog ponašanja ka određenom cilju*. Osnovni proces motivacije bazira se na tri elementa: *potreba, pokret* i *nagrada*. *Potreba* predstavlja osećaj nelagodnosti vezana uz svest da postoji sredstvo kojim se ta nelagodnost može otkloniti. Dakle, to neka vrsta stanja nedostatka, odnosno psihološkog ili fiziološkog debalansa. Takav nedostatak stvara tenziju koja je neprijatna i koju pojedinac nastoji da otkloni. *Pokret* predstavlja akciju koju čovek preduzima da bi otklonio taj nedostatak. Najzad, *nagrada* stiže kada se postigne ono čime se mogu otkloniti nedostatak i tenzija [1].

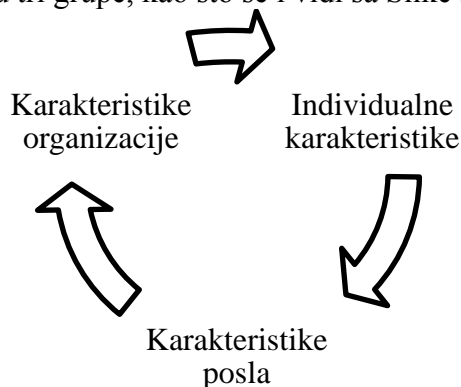


Slika 2. Proces motivacije [2]

Za menadžment preduzeća izuzetno je važno da poznaje profil motivacije svojih zaposlenih. Produktivnost rada i radni učinak, kao što je i prikazano na slici 1, direktno zavise od stepena motivisanosti zaposlenih. Da bi ostvarili maksimalan stepen motivacije, menadžeri moraju poznavati potrebe i motive ljudi kojima rukovode i znati kako da obezbede njihovo zadovoljenje [1]. Jedan od načina jesu i određene stimulacije, ili podsticaji, kojima rukovodioci jasno stavljaju do znanja svojim podređenima da vode računa i o njihovim interesima.

Motivacija se odnosi na niz ponašanja usmerenih ka određenom cilju. Stoga, motivaciju možemo posmatrati sa dva aspekta. S aspekta *zaposlenog* motivacija podrazumeva prethodnu težnju samog radnika da će njegova očekivanja biti ispunjena i ta očekivanja mogu biti sagledana iz dva igla: (1) iz ugla novog očekivanja starih radnika i (2) iz ugla prethodnog očekivanja novozaposlenih radnika. S aspekta *menadžera* motivacija je aktivnost koja

obezbeđuje da ljudi teže postavljenim ciljevima organizacije i tako motivisani doprinose stvaranju viška vrednosti i konkurentnosti na tržištu [3]. Na samu motivaciju utiču brojni faktori, a mogu se podeliti u tri grupe, kao što se i vidi sa Slike 3.



Slika 3. Faktori koji utiču na motivaciju zaposlenih [4]

*Individualne karakteristike* podrazumevaju potrebe, stavove, vrednosti i interese koje poseduju pojedinci. Ove karakteristike su različite shodno ljudskoj različitosti, pa tako neki ljudi bivaju više motivisani novcem, neki sigurnošću posla, neki izazovnošću zadatka i sl. *Karakteristike posla* odnose se na složenost i odgovornost izvršenja zadataka u okviru postavljenog posla, pri čemu je bitno obezbediti sklad između individualni osobina pojedinca i samih specifičnosti posla. *Karakteristike organizacije* odnose se na njena pravila i procedure, strategije, sisteme nagrađivanja i stimulacija zaposlenih i slično, a čime se doprinosi efikasnosti date organizacije [4].

*Motivacija za rad*, na osnovu svega navedenog, predstavlja sistem metoda, postupaka i radnji kojima se podstiče određeno ponašanje zaposlenih u procesu rada. Dve grupe teorija motivacije: *teorije sadržaja* i *procesne teorije motivacije* nastoje da dublje proniknu u srž radne motivacije, dajući joj tako više različitih, specifičnih pristupa [4].

## 2.1. TEORIJE SADRŽAJA MOTIVACIJE

Teorije sadržaja motivacije nastoje da otkriju koje su to grupe potreba ili motiva koje ljudi nastoje da ostvare u organizacijama. Do sada se u literaturi izdvojilo nekoliko ključnih teorija sadržaja koje teže rasvetljavanju ovog pitanja, i to: *Maslovljeva hijerarhija potreba i motiva*, *Aldefrerov ERG model*, *Meklilendova teorija potreba* i *Hercbergova teorija dva faktora*. U nastavku navedene su i obrazložene neke od datih teorija.

### 2.1.1. Teorija hijerarhije potreba i motiva

Abraham Maslov (A. Maslow) otkrio je da ljude u organizacijama pokreće pet grupa potreba koje su hijerarhijski uređene. Tih pet grupa potreba su: (1) fiziološke potrebe, (2) potrebe sigurnosti, (3) potrebe za ljubavlju i pripadnošću, (4) potrebe za poštovanjem i (5) potrebe za samorealizacijom.

Profesor Janićijević date grupe objašnjava na sledeći način [1]:

(1) *Fiziološke potrebe* podrazumevaju normalno funkcionisanje organizma i njegovu potrebu za hranom, vodom, spavanjem, seksualnim zadovoljstvom i sličnim zadovoljstvima, koje će zaposleni ostvariti uz pomoć zarade koju dobijaju za svoj rad.

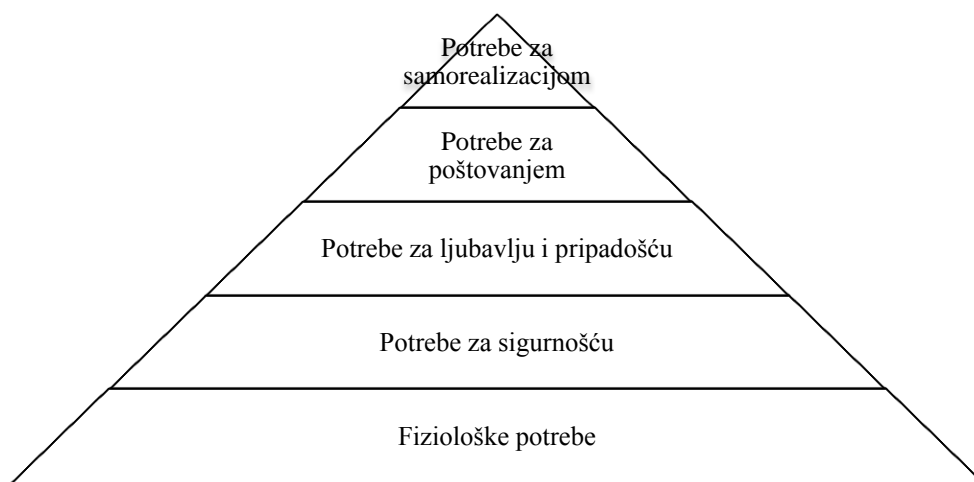
(2) *Potrebe za sigurnošću* podražavaju fizičku sigurnost, sigurnost na radnom mestu, ekonomsku sigurnost, ali i psihološku bezbednost od stresa, frustracije, verbalnih napada i sl.

(3) *Potrebe za ljubavlju i pripadnošću* ogledaju se u želji pojedinca da bude deo društva, odnosno prihvaćen od strane svoje organizacije i voljen od strane kolektiva – da se oseća punopravnim članom.

Naredne dve vrste potreba Maslov definiše kao potrebe *višeg reda*, koje ne mogu biti ostvarene bez zadovoljenja prvih dveju *osnovnih potreba*.

(4) *Potrebe za poštovanjem*, stoga, predstavljaju težnju pojedinca da bude poštovan i cenjen od strane drugih ljudi, ali i od samog sebe (samopoštovanje). Maslov kod ove grupe potreba posebno naglašava da je ona vezana i za prestiž, odnosno status i moć kome svako ljudsko biće permanentno teži.

(5) *Potrebe za samorealizacijom*, prema mišljenju tvorca ove teorije, mogu biti zadovoljene jedino kada se zadovolje sve ostale vrste potreba. One se odnose na čovekovu težnju da postigne uspeh onim čime se bavi, da ostvari svoje sposobnosti, talente, ciljeve i pokaže sva svoja znanja. Skup ovakvih vrsta potreba možemo imenovati i potrebama za *samopotvrđivanjem*.



Slika 4. Faktori koji utiču na motivaciju zaposlenih [5]

Iako na prvi pogled ovakva hijerarhija deluje sasvim logično, ona je podvrgnuta brojnim kritikama zbog vrlo malo empirijskih potvrda. Dakle, kruta hijerarhijska uređenost nije dokazana u praksi, s obzirom da postoji mnogo primera da su zaposleni bili usmereni na zadovoljenje potreba višeg reda, iako njihove potrebe nižeg reda nisu bile zadovoljene. Međutim, ovakva teorija predstavljala je početak i izvrsnu šansu mnogim teoretičarima i naučnicima za dalju nadgradnju i usavršavanje oblasti koje se odnose na potrebe i motive, ali i na motivaciju uopšteno gledano.

### 2.1.2. ERG model motivacije

Aldefrerov ERG model ne bazira se na pretpostavci o hijerarhijskom odnosu ljudskih potreba. Njime se tvrdi da ljude u organizacijama pokreću tri osnovne kategorije potreba [6]:

- Egzistencijalne potrebe (**E**xistence),
- Potrebe povezivanja (**R**elatedness) i
- Potrebe razvoja (**G**rowth).

ERG model motivacije sličan je Maslovljevoj teoriji, ali se razlikuje od nje po tome što je Aldefrer jasno uočio da ljudi ponekad kreću u zadovoljavanje potreba višeg reda, a da prethodno nisu zadovoljili osnovne potrebe, te da kretanje unutar hijerarhije ljudskih potreba nije uvek uzlazno. Ovde egzistencijalne potrebe odgovaraju Maslovljevim fiziološkim potrebama, potrebe povezivanja su isto što i potrebe za ljubavlju i pripadnošću, dok se razvojne potrebe odnose na težnju ljudi da razvijaju svoje veštine, konstantno uče i postižu odgovarajuće rezultate [1].

Iako je ERG model svakako manje restriktivan od modela hijerarhije potreba i motiva i ima značajne implikacije za menadžere, kao i Maslovljeva teorija, nije dobio mnogo potvrda u empirijskim istraživanjima uprkos svojoj očiglednoj logičnosti [1].

### 2.1.3. Teorija dva faktora

Hercbergova teorija sadržaja motivacije kaže da motivaciju zaposlenih regulišu dve grupe faktora [7]:

- higijenski i
- motivacioni.

Sušтина doprinosa ove teorije jeste u otkriću da zadovoljstvo i nezadovoljstvo ljudi na poslu određuju različiti faktori. Prisustvo ili odsustvo nezadovoljstva određuju *higijenski faktori*, dok prisustvo ili odsustvo zadovoljstva određuju *motivacioni faktori* ili *motivatori*. Implikacija je da umesto jedne skale sa dva stanja: *zadovoljstvo* i *nezadovoljstvo*, postoje dve skale sa 4 stanja: skala nezadovoljstva zaposlenih, čiji su polovi *nezadovoljstvo* i *odsustvo nezadovoljstva*, i skala zadovoljstva zaposlenih čiji su polovi *zadovoljstvo* i *odsustvo zadovoljstva*. Tako, prema mišljenju Herberga, ako neko ima visoku platu (higijenski faktor), to ne znači da je zadovoljan već samo da nije nezadovoljan. Nasuprot tome, ako je plata mala zaposleni će biti nezadovoljan i demotivisan. Ako posao nije izazovan (motivator), to ne znači da će radnik biti nezadovoljan, već samo da neće biti zadovoljan. Ako posao pruža mogućnosti za učenje i razvoj, ako je izazovan i dinamičan, ljudi će biti zadovoljni [1].

U higijenske faktore Hercberg je svrstao uglavnom one koje Maslov smatra osnovnim i, delimičn, potrebe pripadanja. Motivatori su, za Hercberga, oni faktori koji kod Maslova zadovoljavaju potrebe poštovanja i samorealizacije. To znači da u higijenske faktore spadaju plata, uslovi rada, poslovna politika, organizacija preduzeća, odnosi sa šefom i slično, dok u motivatore spadaju izazovnost posla, mogućnost učenja novih stvari, napredovanje na poslu, priznanja i drugo. Hercbergova teorija dva faktora ostavila je značajan uticaj u akademskim i

poslovnim krugovima. Međutim, i ona je kritikovana jer je suviše pojednostavila motivaciju. Plata je, na primer, higijenski faktor, ali je pitanje može li ona imati i ulogu motivatora kada znači nešto više od pukog novca – potvrdu i priznanje nečije vrednosti [1].

		ZADOVOLJSTVO POSLOM	
		NISKO	VISOKO
NEZADOVOLJSTVO POSLOM	V I S O K O	Zaposleni ima malu platu, slabe pogodnosti, loše uslove rada, loše odnose sa kolegama, organizacija je loša, posao je monoton, nema mogućnost za razvoj i napredovanje, nema samostalnosti i odgovornosti.	Zaposleni ima malu platu, loše uslove rada i pogodnosti, kao i lošu organizaciju, ali ima samostalnu poziciju i odgovornost, mogućnosti za učenje, napredovanje i razvoj.
	N I S K O	Zaposleni ima dobru platu i uslove rada, dobru organizaciju i odnose sa kolegama, ali ima monoton posao koji ne pruža mogućnost za napredovanje i razvoj, nema samostalnost i odgovornost na poslu.	Zaposleni je dobro plaćen, ima dobre uslove rada, dobre odnose sa kolegama, organizacija je sređena, posao je izazovan, ima mogućnost napredovanja i razvoja i visoku samostalnost i odgovornost.

Slika 5. Tipovi radnih mesta prema zadovoljenju higijenskih i motivacionih faktora [4]

## 2.2. TEORIJE PROCESA MOTIVACIJE

Među teorijama procesa motivacije najznačajnije su: *teorija postavljanja ciljeva*, *teorija očekivanja*, *teorija pojačanja ili podrške* i *teorija jednakosti ili pravičnosti*. U ovom radu obrađene i predstavljene su neke od navedenih teorija.

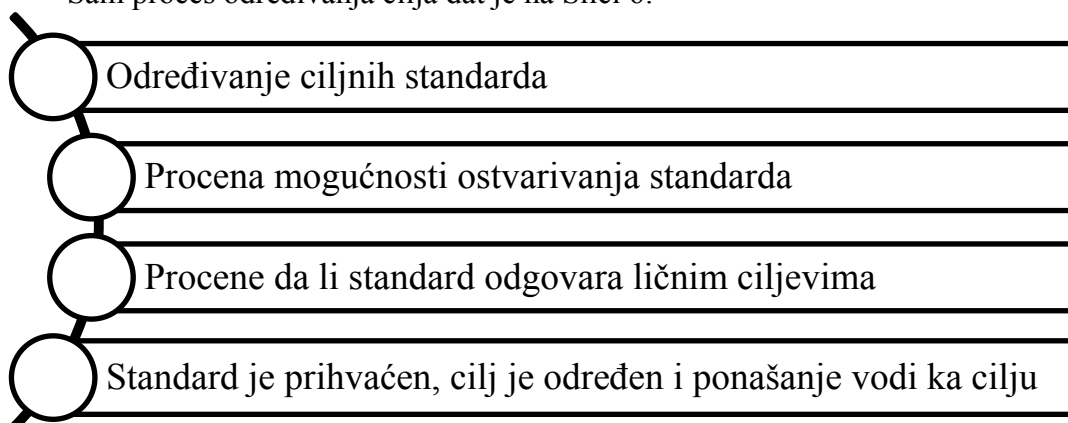
### 2.2.1. Teorija postavljanja ciljeva

Teorija postavljanja ciljeva (goal setting theory) ukazuje da se motivacija za rad prevashodno bazira na definisanju odgovarajućih ciljeva, koji moraju biti: jasni, izazovni i dostižni. Motivacionu teoriju postavljanja ciljeva razvili su Lok (Locke) i Latum (Latham) i kao takva predstavlja praktično najupotrebljiviji, empirijski temeljno verifikovan model motivisanja zaposlenih u organizacijama [6]. Osnovna ideja teorije jeste sam cilj kao motivator, jer pokreće ljude da porede trenutne sposobnosti da nešto urade sa sposobnostima potrebnim za uspešno ostvarenje cilja. Ciljevi određuju potreban učinak i pružaju informacije koje vrste i nivoi ponašanja se očekuju od radnika. Ova teorija tvrdi da će zadati ciljevi biti prihvaćeni kao lični ciljevi, te da će ih ljudi lakše usvojiti ako veruju da postoje razumne mogućnosti da se oni i ostvare. Tri mehanizma koja prema Loku motivišu zaposlene su sledeći [3]:

- Specifičan i jasno postavljen cilj,
- Povratna informacija o tome da li je postavljeni cilj ostvaren i
- Učestvovanje svih zaposlenih u postavljanju ciljeva.

U teoriji se ističe da su teži, a ostvarljivi ciljevi poželjniji, s obzirom da bi kao takvi doveli do većih rezultata. Kada je već reč o rezultatima, tri bitna faktora koja utiču na odnos postavljenih ciljeva i rezultata jesu: (1) privrženost cilju, (2) nacionalna kultura i (3) adekvatna efikasnost.

Sam proces određivanja cilja dat je na Slici 6:



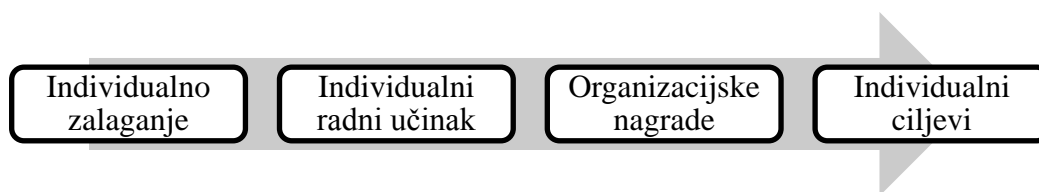
Slika 6. Proces određivanja cilja [4]

### 2.2.2. Teorija očekivanja (Expectancy Theory)

Najcelovitije objašnjenje daje upravo teorija očekivanja. Mada i ona ima svoje kritičare, veliki broj teoretičara svoje radove bazira upravo na njoj. Naime, teorija očekivanja dokazuje kako jačina nastojanja da se nešto uradi na odgovarajući način zavisi od snage očekivanja da će dati rad doneti rezultat, i to rezultat zanimljiv sa stanovišta pojedinca. Upravo zato, ova teorija uključuje sledeće tri varijable [2]:

1. *Privlačnost* – značenje koje pojedinac pridaje mogućem ishodu ili nagradi koja se može postići na poslu.
2. *Povezivanje učinka sa nagradom* – stepen do koga pojedinac veruje da će ga određeni nivo učinka dovesti do postizanja željenog ishoda.
3. *Povezivanje zalaganja sa učinkom* – verovatnoća kojom je pojedinac predvideo da njegova količina zalaganja dovesti do učinka.

Na Slici 7 prikazan je poprilično pojednostavljen model teorije očekivanja, sa posebnim akcentom na njenim glavnim tvrdnjama.



Slika 7. Pojednostavljeni model teorije očekivanja [2]

Prema autoru ove teorije, Vrumu (Vroom), da bi se razumeo njen koncept potrebno je definisati tri osnovna pojma: (1) instrumentalnost, (2) valencu i (3) očekivanje [8].

*Instrumentalnost* predstavlja percepciju verovatnoće da će rezultati prvog reda dovesti do rezultata drugog reda. Na primer, kada radnik u fabrici radi za mašinom, on ostvaruje određeni radni učinak meren brojem proizvedenih komada. To je rezultat prvog reda. Taj rezultat zatim vodi ka nagradama za radnika u vidu bonusa za prebačenu normu i on se naziva rezultatom ili posledicom drugog reda. Instrumentalnost je, dakle, percepcija radnika da će njegovi rezultati prvog reda dovesti do rezultata drugog reda, odnosno da će zahvaljujući prebačaju norme dobiti bonus [1].

*Valenca* je preferencija koju pojedinac ima prema određenoj vrsti nagrade. Ukoliko je valenca neke nagrade visoka i pozitivna, to znači da pojedinac toj nagradi daje prednost u odnosu na druge nagrade. U datom primeru, ukoliko je novčani bonus za radnika u proizvodnji poželjan, on će imati pozitivnu visoku valencu za njega i obratno [1].

*Očekivanje* je verovanje pojedinca da će određeno ponašanje, tj. ulaganje napora dovesti do rezultata prvog reda. Stoga, ukoliko pomenuti radnik procenjuje da ima šanse 75% da prebaci normu, onda je njegovo očekivanje 0,75 [1].

Svoj model po kome se motivaciona snaga usmerava na odgovarajuća zalaganja i ciljeve na osnovu dinamike očekivanja, valenci i instrumentalnosti, Vrum je izrazio *matematičkim formulama*, iako se s aspekta sve te tri mentalne komponente radi samo o subjektivnim verovatnoćama [9]:

$$F_1 = \oint \sum_{i=1}^n (E_{ij} V_j), \quad (1)$$

gde je:

$F_1$  – motivaciona snaga da se izvede jedna aktivnost „i“;

$E_{ij}$  – jačina očekivanja da će tu aktivnost slediti ishod „j“;

$V_j$  – valenca pojedinačnog ishoda „j“.

$$V_j = \oint \left[ \sum_{k=1}^n I_{jk} V_k \right], \quad (2)$$

gde je:

$V_j$  – valenca pojedinačnog ishoda „j“;

$I_{jk}$  – instrumentalnost ishoda „j“ u pogledu postizanja ishoda „k“ drugog reda;

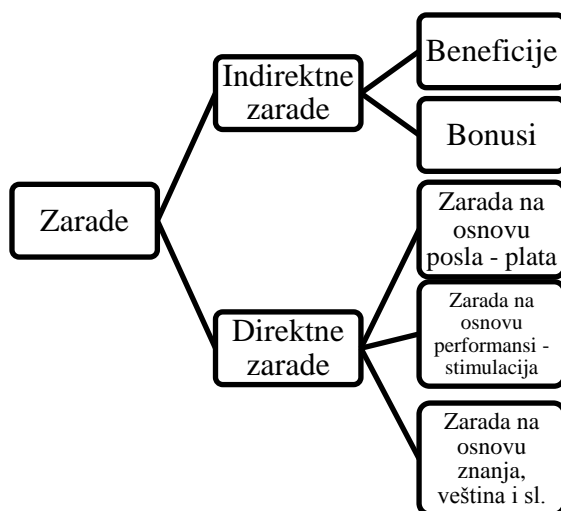
$V_k$  – valenca ishoda „ $k$ “ drugog reda.

### 3. PODSTICAJI I NAGRAĐIVANJE ZAPOSLENIH

Izgradnja sistema stimulisanja i nagrađivanja zaposlenih složen je proces koji mora da zadovolji više ciljeva istovremeno: (1) da *motivise zaposlene* na veće zalaganje i bolje rezultate, (2) da *usmerava ponašanje zaposlenih* u pravcu koji obezbeđuje ostvarivanje kako organizacionih, tako i individualnih ciljeva, (3) da *održava konkurentnost preduzeća* na tržištu rada, (4) da *poštuje budžetska ograničenja* u pogledu troškova rada i (5) da poštuje zakonske propise i kolektivne ugovore u oblasti rada i radnih odnosa [1].

Kada je reč o osnovnim vidovima podsticaja i nagrada zaposlenih, mogu se izdvojiti dve velike celine koje svaki sistem nagrađivanja treba da uzme u obzir, a to su: *materijalne* i *nematerijalne nagrade* [10].

Mnogi mladi ljudi odlaze iz preduzeća koje im daju visoke plate, ali ne i mogućnost da uče, napreduju i usavršavaju se, gradeći tako svoju karijeru. Upravo zato, menadžeri moraju da planiraju i način na koji će zaposlenima obezbediti i nematerijalne nagrade, a posebno onima kojima takve nagrade znače više od novčanih. Ipak, i pored važnosti nematerijalnih nagrada, formalni sistemi nagrađivanja u preduzećima u Srbiji najčešće predviđaju materijalne nagrade. Sistemi kompenzacije se u pogledu *materijalnih nagrada* sastoje od dve ključne komponente: *direktne* i *indirektne zarade* [9].



Slika 8. Materijalni oblici nagrada u preduzeću – zarade [11]

Kao što je već napomenuto, ponekad *nematerijalni vidovi* stimulisanja i nagrađivanja zaposlenih, s ciljem da se oni motivišu i ostvare što bolje rezultate u radu, imaju daleko veći efekat od onih materijalnih, a povrh svega novčanih. Zato menadžeri u zapadnim zemljama daleko češće pribegavaju ovakvim metodama motivacije, što se puno puta pozitivno odrazi na ciljne rezultate.

Neki od najčešćih načina za tzv. nematerijalno motivisanje radnika u kompanijama su sledeći: (1) fleksibilno radno vreme; (2) samostalno dizajniranje posla od strane radnika; (3)



deljenje posla, gde jedan posao koji zahtijeva puno radno vreme odrađuju dva ili više zaposlenih, koji tada rade skraćeno; (4) rad na daljinu (telework); (5) participacija zaposlenih u odlučivanju; (6) delegiranje ovlašćenja radnicima – empowerment; (7) povratne informacije o radu i interesovanje rukovodstva za rad samog zaposlenog – feedback; (8) priznavanje uspeha i ostvarenog radnog učinka; (9) napredovanje itd. [12]

Na sve ove načine menadžeri pokušavaju da podstaknu svoje podređene na rad. U zavisnosti od toga kakav je stil rukovođenja primenjen u odgovarajućoj kompaniji, zavisice i odnos samog posloводства prema radnicima u pogledu motivacije. Upravo zato i stoji hipoteza, koja će kroz ovaj rad biti posebno ispitana, a odnosi se na činjenicu da se u kompanijama u Srbiji o nagradama i podsticajima govori isključivo kroz prizmu novca i drugih materijalnih stvari.

## 4. ISTRAŽIVAČKI DEO

### 4.1. METODOLOGIJA ISTRAŽIVANJA

S obzirom na visoku međuzavisnost motivacije i sistema nagrađivanja i stimulisanja zaposlenih, došlo se na ideju da se sagledaju osnovni pokazatelji date međuzavisnosti, kako bi se odatle mogli izvući određeni zaključci sumirani u delu diskusije rezultata. Glavni cilj ovog istraživanja jeste težnja da se ukaže na zavisnost između različitih tipova materijalnih i nematerijalnih podsticaja radnika i njihove motivacije, tj. da se na osnovu date korelacije predoči koji vidovi nagrada danas imaju veliki značaj za zaposlene na Tehničkom fakultetu u Boru.

Istraživanje je sprovedeno u periodu od sredine januara do početka marta 2017. godine na teritoriji opštine Bor, gde je i locirano sedište ove visokoškolske institucije. U istraživanju je učestvovalo 110 ispitanika različitih starosnih dobi, podeljenih u relevantne starosne grupe, čime se želelo da se što realnije dođe do konkretnih rezultata posmatranog problema.

Tom prilikom, anketni listić činila su dva dela: socio-demografski deo ankete i upitnik za određivanje ličnog pristupa motivaciji na radnom mestu i njenim uzročnicima. Anketni listić baziran je na upitniku korišćenom pri sličnoj studiji sprovedenoj na Fakultetu tehničkih nauka u Novom Sadu i specijalno je prilagođen potrebama ovog istraživanja, s obzirom na neophodnost da pitanja budu korektno definisana zarad adekvatne kasnije obrade.

Za gradaciju dobijenih odgovora korišćena je Likertova petostepena skala gde 1 označava „u potpunosti se ne slažem”, 2 označava „ne slažem se“, broj 3 predstavlja odgovor „nemam mišljenje“, broj 4 „slažem se“, dok bi zaokruživanjem broja 5 ispitanici odgovorili „u potpunosti se slažem“ sa predočenom tvrdnjom.

#### 4.1.1. Demografske karakteristike ispitanika

Kao što je već rečeno, istraživanje je obuhvatilo 110 ispitanika i svih sto deset anketnih listića ispravno je popunjeno, a osnovni demografski i opšti podaci o učesnicima ankete prikazani u Tabeli 1.

Tabela 1. Demografska struktura ispitanika

Demografska karakteristika		Broj anketiranih
Pol	muški	63
	ženski	47
Starost	do 30 godina	22
	od 31 do 45	45
	od 46 do 55	25
	56 i više godina	18
Zaposlen/a sam pri:	Odseku za tehnološko inženjerstvo	18
	Odseku za rudarsko inženjerstvo	17
	Odseku za inženjerski menadžment	34
	Odseku za metalurško inženjerstvo	16
	Sekretarijatu (biblioteka, računovodstvo, informatika, studentska služba i sl.)	14
	Službi održavanja	10
Radni staž	do 2 godine	14
	od 3 do 5 godine	24
	od 6 do 15 godina	31
	od 16 do 25 godina	15
	više od 25 godina	26

## 4.2. REZULTATI ISTRAŽIVANJA

### 4.2.1. Rezultati deskriptivne statistike

Za obradu podataka korišćena je deskriptivna statistika koja uključuje *aritmetičku sredinu, varijansu, standardnu devijaciju i frekvenciju* [13]. Ona sadrži statističke postupke za redukovanje sirovih podataka na oblike kojima se lakše manipuliše i koji se efikasnije mogu analizirati [14]. Rezultati deskriptivne statistike za grupu pitanja iz ankete date u prilogu predstavljeni su u sledećoj tabeli.

Tabela 2. Rezultati deskriptivne statistike

Pitanja	Ocena					Srednja vrednost	Standardna devijacija	Varijansa
	1	2	3	4	5			
Q1	8	8	12	17	65	4,11	1,28314	1,64646
Q2	21	14	20	49	6	3,05	1,25169	1,56672
Q3	13	20	31	39	7	3,06	1,12745	1,71143
Q4	16	18	26	41	9	3,08	1,20497	1,45196
Q5	7	5	14	17	67	4,20	1,21005	1,46422
Q6	12	7	18	49	24	3,60	1,21308	1,47156
Q7	35	17	22	26	10	2,63	1,38046	1,90567
Q8	11	13	18	49	19	3,47	1,20175	1,44420
Q9	12	9	33	40	16	3,35	1,16198	1,35021
Q10	8	11	21	29	41	3,76	1,25565	1,57665

Rezultati deskriptivne statistike pokazali su da je na pitanje Q8 najveći broj ispitanika, njih 68 odgovorilo da se slaže, ili u potpunosti slaže sa tvrdnjom: „Kreativan posao je moj najveći motivator u firmi u kojoj radim“. Takođe, za ovo istraživanje veoma interesantan podatak dobijen deskriptivnom statistikom jeste i odgovor na pitanje Q9, na koje je čak 56 ispitanika odgovorilo da se slaže, ili u potpunosti slaže sa tvrdnjom: „Dodelom odgovornijih zadataka, rukovodstvo mi stavlja do znanja da vredim i na taj način povećava moju motivaciju“. Od svih tvrdnji izdvaja se i tvrdnja Q10: „Uzimajući u obzir sve navedene stavke, mogu reći da sam zadovoljan/a poslom koji radim, jer me moja kompanija dovoljno motiviše“, na koju je 70 ispitanika odgovorilo zaokruživši opcije pod 4 ili 5 na Likertovoj skali, dok je 40 učesnika ankete ili bez mišljenja na ovu temu, ili se ne slaže, odnosno u potpunosti ne slaže sa datom tvrdnjom.

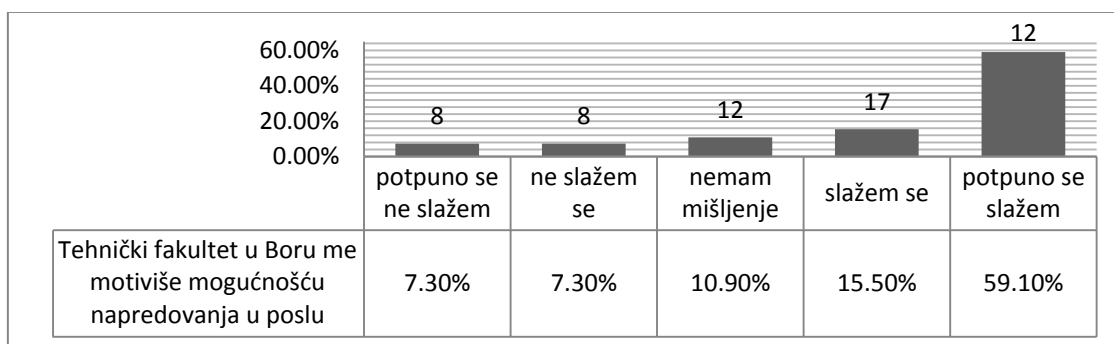
Tabela 3. Preraspodela frekvencija na tvrdnju Q10 u odnosu odsek pri kome su ispitanici zaposleni

Tvrđnja:	Odsek na Tehničkom fakultetu u Boru	Ocena				
		1	2	3	4	5
Uzimajući u obzir sve navedene tvrdnje, mogu reći da sam zadovoljan poslom koji radim, jer me moja kompanija dovoljno motiviše	Odsek za tehnološko inženjerstvo	1	0	4	3	10
	Odsek za rudarsko inženjerstvo	0	3	0	4	10
	Odsek za inženjerski menadžment	0	3	5	13	13
	Odsek za metalurško inženjerstvo	2	0	2	6	6
	Sekretarijat (biblioteka, računovodstvo, informatika, studentska služba i sl.)	2	3	6	2	1
	Služba održavanja	3	2	4	1	1

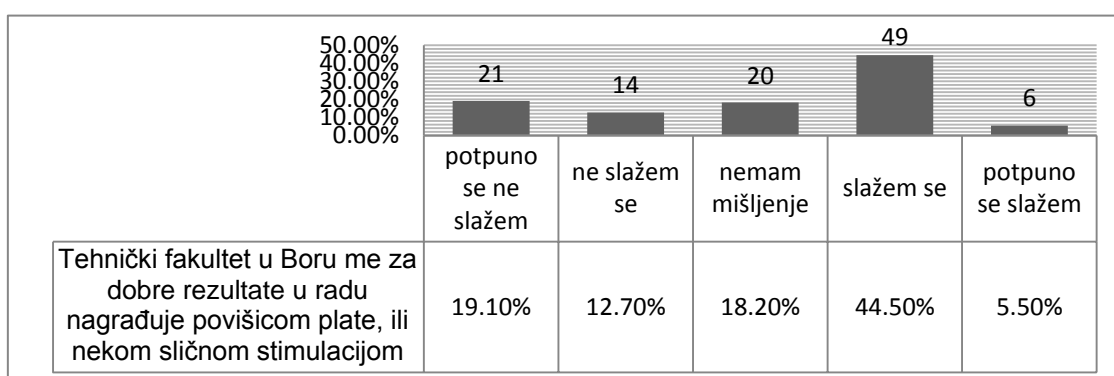
Na osnovu dobijenih rezultata može se zaključiti da je broj onih koji su zaokružili da se sa gore navedenom tvrdnjom o zadovoljstvu poslom slažu, ili se u potpunosti slažu, procentualno najveći kod zaposlenog nastavnog osoblja (na 85 anketiranih, njih 76.47%), mada je broj anketiranog nenastavnog osoblja bio znatno manji (na 24 anketiranih osoba, njih 20,83% se sa tvrdnjom o zadovoljstvu poslom slaže, ili se u potpunosti slaže).

#### 4.2.2. Grafički prikaz rezultata deskriptivne statistike po tvrdnjama

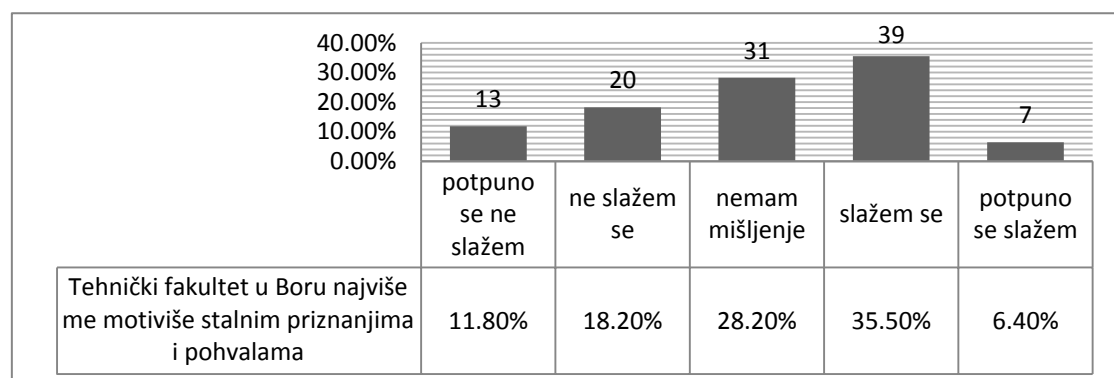
U sledećem odeljku prikazana je raspodela odgovora po tvrdnjama, prikazana grafičkim putem preko odgovarajućih histograma [15].



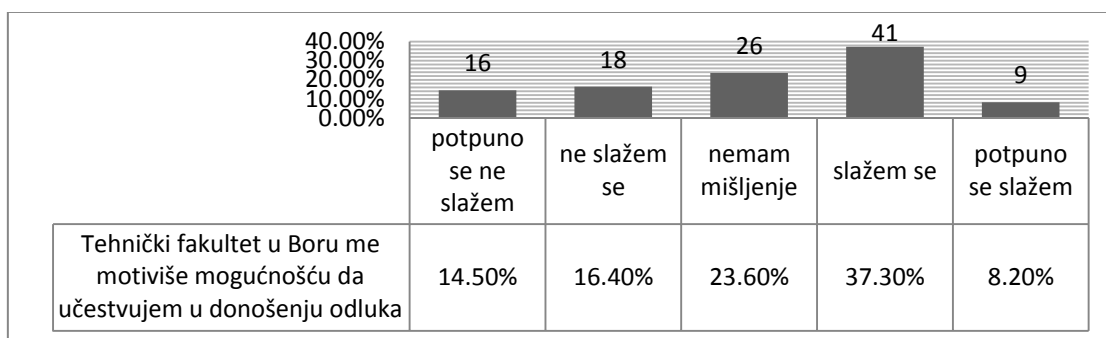
Slika 9. Histogram odgovora na tvrdnju Q1



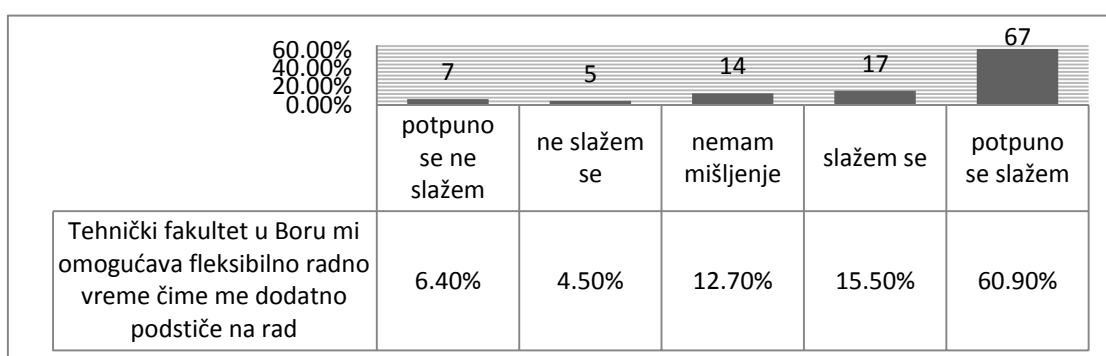
Slika 10. Histogram odgovora na tvrdnju Q2



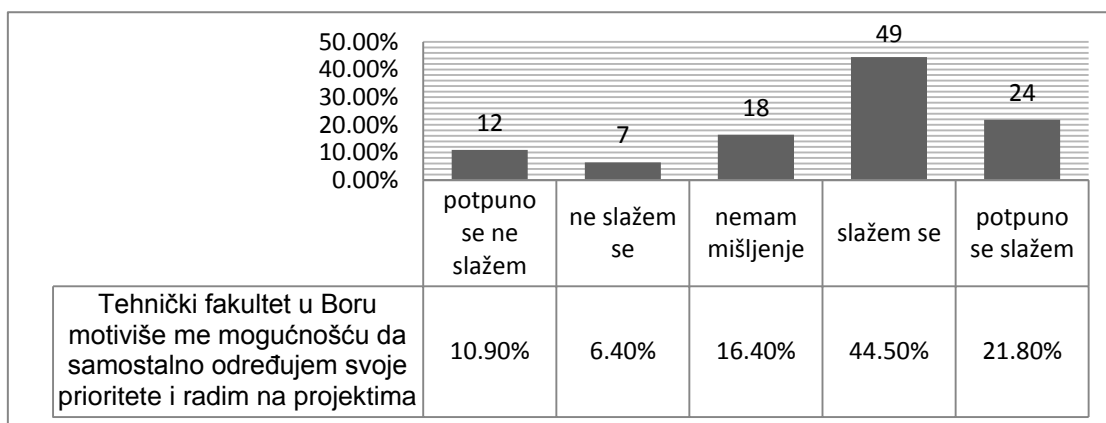
Slika 11. Histogram odgovora na tvrdnju Q3



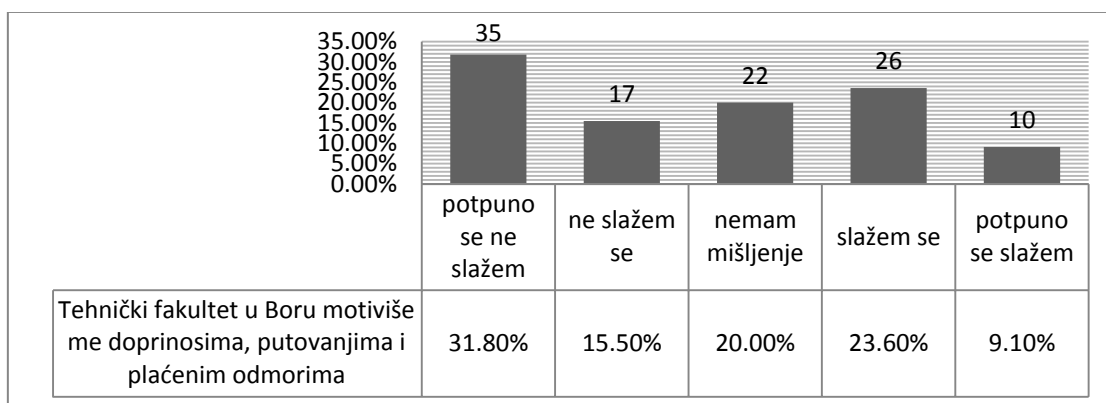
Slika 12. Histogram odgovora na tvrdnju Q4



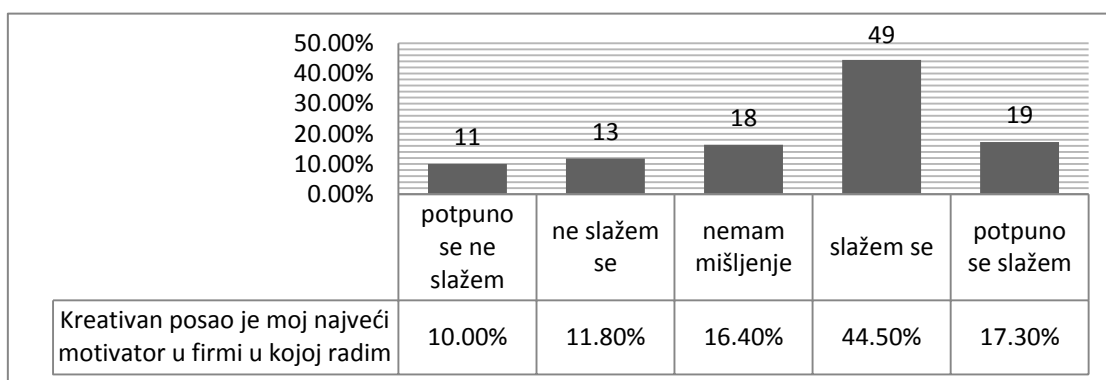
Slika 13. Histogram odgovora na tvrdnju Q5



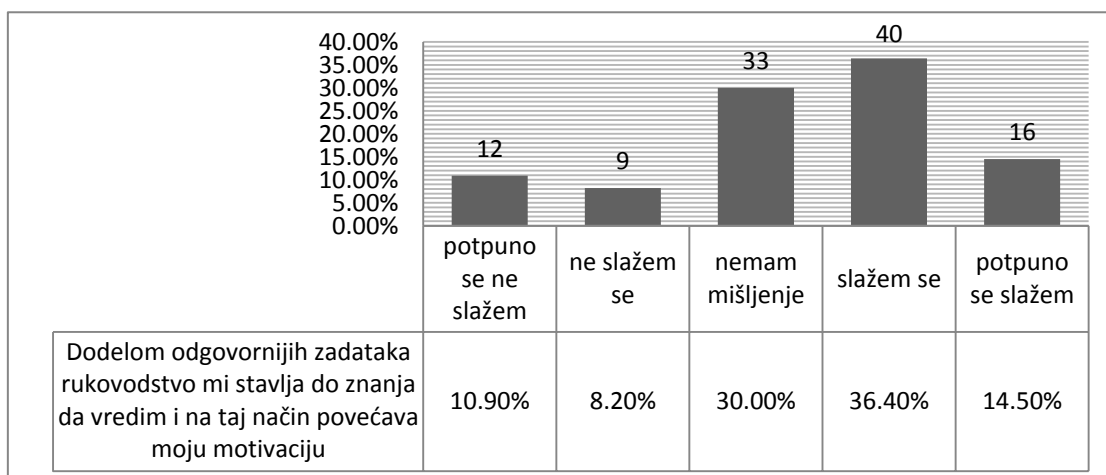
Slika 14. Histogram odgovora na tvrdnju Q6



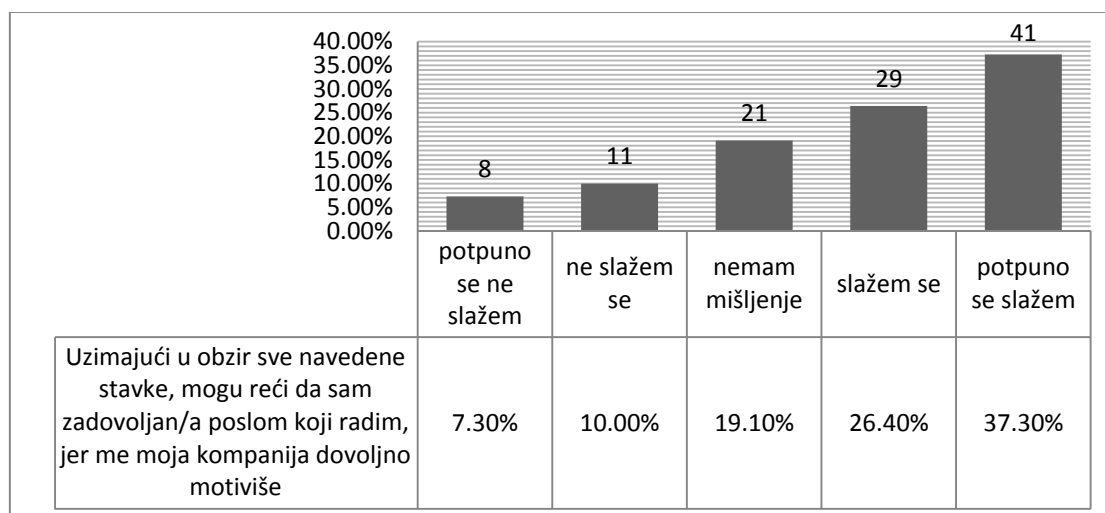
Slika 15. Histogram odgovora na tvrdnju Q7



Slika 16. Histogram odgovora na tvrdnju Q8



Slika 17. Histogram odgovora na tvrdnju Q9



Slika 18. Histogram odgovora na tvrdnju Q10

#### 4.3. DISKUSIJA REZULTATA ISTRAŽIVANJA

Rezultatima ovog istraživanja može se reći da se došlo do odgovora koji su relevantni ciljevima definisanim datom tematikom rada. Naime, ispitivanjem koje je obuhvatilo 110 zaposlenih osoba na Tehničkom fakultetu u Boru, uočena je očita međuzavisnost različitih tipova stimulacija i nagrađivanja radnika u obrazovnim ustanovama i stepena njihove motivacije za obavljanje poslovnih zadataka.

Analizirajući odgovore ispitanika, koji se odnose na njihove stavove u pogledu različitih načina motivacije i stepena javljanja datih motivatora, što je i predočeno kroz 10 tvrdnji, može se zaključiti da je veliki broj njih ocenio trenutni posao kreativnim i ujedno i najvećim motivatorom u firmi u kojoj rade. Većina ispitanika izjasnila se i da je spremna da prihvati odgovornije zadatke, s obzirom da na iste gleda kao na motivišući faktor rasta svoje produktivnosti i zadovoljstva poslom, te da im na taj način Tehnički fakultet u Boru, Univerziteta u Beogradu, stavlja do znanja da vrede. Sumiranjem svih odgovora kroz poslednje pitanje u upitniku, došlo se do rezultata da među zaposlenima preovladava mišljenje da ih matična firma motiviše dovoljno dobro, te je stoga stepen njihovog zadovoljstva trenutnim radnim mestom i zadacima visok.

Ispitivanjem je opovrgnut tradicionalni stav da su povišice plata i druge novčane naknade najrelevantnije za domaću radnu snagu i dokazano da, pre svega, obrazovne institucije, kao što je Tehnički fakultet u Boru, na našem tržištu prate svetske trendove u oblasti motivacije svojih zaposlenih, posebno kada je reč o fleksibilnosti radnog vremena. Ovakav pristup potvrđen je tvrdnjom Q5: „Tehnički fakultet u Boru mi omogućava fleksibilno radno vreme čime me dodatno podstiče na rad“, gde je 76,4% ispitanika odgovorilo da se u potpunosti slaže, ili se slaže sa datim iskazima.

Takođe, može se reći da su i zaključci vezani za napredovanje u poslu, kao motivatora i pokretača zaposlenih u potpunosti opravdani, što je i iskazano rezultatom od 74,6% onih koji su se složili ili su se u potpunosti složili sa datom tvrdnjom.



## 5. ZAKLJUČAK

Istraživanje sprovedeno od sredine januara do početka marta meseca i pretočeno u ovaj rad u mnogome je pomoglo boljem sagledavanju važnosti motivacije, naročito u obrazovnim institucijama, ali i nadovezalo se na rezultate ranijih istraživanja sprovedenih na polju zavisnosti motivacije i odgovarajućih sistema podsticaja zaposlenih. Na osnovu pređašnje diskusije, mogla se jasno uvideti zastupljenost predočenih motivatora na Tehničkom fakultetu u Boru, Univerziteta u Beogradu. Proces anketiranja sproveden je na uzorku od 110 ispitanika od ukupno 135 zaposlenih na Tehničkom fakultetu u Boru. Naime, na reprezentativnosti rada dobilo bi se eventualnim dužim vremenskim periodom istraživanja, tokom koga bi se podaci prikupili i od onih zaposlenih koji nisu obuhvaćeni dotadašnjim ispitivanjem.

Razumljivo je da se složenost zadovoljstva poslom i motivacije percipira upravo na temelju iznesenih rezultata i zaključaka. U širem smislu, upravljanje ljudskim resursima, dostizanje određenog nivoa zadovoljstva i veća motivisanost radnika za ostvarivanje organizacionih, ali i onih ličnih ciljeva, nisu nimalo jednostavni zadaci [16]. Ipak, od tih zadataka zavisice uspešnost i konkurentnost gotovo svake kompanije na tržištu, a posebno domaćih visokoškolskih institucija u procesu privlačenja budućih studenata.

Ovim radom dat je doprinos izučavanju oblasti motivacije i sistema stimulacije radne snage, kroz studiju slučaja Tehničkog fakulteta u Boru, tako da se dobijeni rezultati mogu iskoristiti za dalja tumačenja i proučavanja, a prikupljeni podaci za još detaljniju obradu i izradu naučno-istraživačkih radova na ovu i slične teme. Kao eventualni problem u obradi podataka, može se izdvojiti nejednaka zastupljenost relevantnih grupa ispitanika, u pogledu odseka, sekretarijata, ili, pak, službi održavanja. Kao razlog tome izdvaja se veličina svakog od odseka, odnosno broj zaposlenih koji pri njima, tj. pri sekretarijatu i službama rade.

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## LITERATURA / REFERENCES

- [1] Janićijević, N. (2008): *Organizaciono ponašanje*, Data Status, Beograd, pp. 111-112, 116-117, 119-120, 126, 464-466
- [2] Robbins, P., S. (1992): *Essentials of organizational behavior*, Prentice-Hall Inc., New Jersey, pp. 45, 56-57
- [3] Awanis Muslim, N. Dean, D., Cohen, D. (2015): *Employee Job Search Motivation factors: An evidence from electricity provider company in Malaysia*, 7th International Economics & Business Management Conference, Procedia - Economics and Finance 35(2016), Elsevier, Amsterdam, pp. 532-540
- [4] Urošević, S., Sajfert, Z. (2012): *Menadžment ljudskih resursa*, Don Vas, Beograd, pp. 145-147, 155, 165-166

- [5] Salado, A., Roshanak, N. (2013): *Using Maslow's hierarchy of needs to define elegance in system architecture*, Conference on Systems Engineering Research CSER'13, Procedia - Computer Science 16(2013), Elsevier, Amsterdam, pp. 927-936
- [6] Vesić, D. (2010): *Uloga menadžmenta u motivaciji zaposlenih*, Zbornik radova naučnog skupa sa međunarodnim učešćem „Menadžment 2010”, Fakultet za poslovno-industrijski menadžment, Kruševac, p. 266
- [7] Yi-Shih Lo, L., Sheng-Wei, L., Li-Yi, H. (2016): Motivation for online impulse buying: A two-factor theory perspective, *International Journal of Information Management* 36(5), Elsevier Library, Amsterdam, pp. 759-772
- [8] Turabik, T., Gulsun Atanur, B. (2015): *The Importance of Motivation Theories in Terms Of Education Systems*, 5th World Conference on Learning, Teaching and Educational Leadership WCLTA'14, Procedia - Social and Behavioral Sciences 186(2015), Elsevier, Amsterdam, pp. 1055-1063
- [9] Čukić, B. (2004): *Integrativni menadžment ljudskih resursa*, Fakultet za poslovno-industrijski menadžment, Kruševac, pp. 112-113, 121
- [10] Bustamama Farah, L., Teng Sook, S., Abdullah Fakhrul, Z. (2014): *Reward management and job satisfaction among frontline employees in hotel industry in Malaysia*, 5th Asia Euro Conference 2014, Procedia - Social and Behavioral Sciences 144(2014), Elsevier, Amsterdam, pp. 392-402
- [11] Bogičević Milikić, B. (2003): *Menadžment ljudskih resursa*, Ekonomski fakultet, Beograd, p. 169
- [12] Vidaković, T. (2012): Nematerijalne nagrade i njihov uticaj na motivaciju zaposlenih, *Časopis za ekonomiju i tržišne komunikacije* 2(1), Panevropski univerzitet "Apeiron", Banja Luka, pp. 161-177
- [13] Čabarkapa, M., Dedić, G. (2002): Razvoj, osnovne karakteristike i empirijske norme psihološkog testa DSQ-40, *Vojnosanitetski pregled* 59(5), Vojnomedicinska akademija, Beograd, pp. 507-514
- [14] Bogdanović, D., Bogosavljević, D., Tomić, N., Blagojević, S. (2016): *The impact of personal characteristics of individuals on their tendency to conflicts*, Zbornik radova Internacionalne majske konferencije o strategijskom menadžmentu, Tehnički fakultet, Bor, p. 917
- [15] Bogdanović, D. (2016): Rezime odgovora iz Google upitnika, [Internet]. Dostupno na: [https://docs.google.com/forms/d/10cT5KvtzhmruCINXfeGyjve\\_dwb1L8V331AH4wM72SA/viewanalytics#responses](https://docs.google.com/forms/d/10cT5KvtzhmruCINXfeGyjve_dwb1L8V331AH4wM72SA/viewanalytics#responses), pristupljeno: 21.10.2016.
- [16] Urošević, S., Milijić, N. (2012): Influence of Demographic Factors on Employee Satisfaction and Motivation, *Organizacija* 45(4), Faculty of Organizational Sciences, Kranj, pp. 174-182

## CHANGE MANAGEMENT AND PROBLEM SOLVING IN “EAST STAR GROUP” COMPANY, KNJAZEVAC, USING AHP METHOD

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**Abstract:** In this paper is analyzed the company "East Star Group", Knjazevac, Eastern Serbia. This company is engaged in consulting activities since 2007, such as: web design, graphic design, video and photo production, design and implementation of advertising campaigns. The aim of this study is to point out the necessity to adapt to radical changes in the market, which is increasingly occurring due to the rapid progress of science, technique and technology. In the first part of this paper is given the basic information about the company, and also the life cycle from the start of business operations, until today. Then, a internal and external factors. The problem that most affect the business of the company is an inappropriate organizational structure and the not optimal number of employees. According to that, the paper analyzes the possible direction of organizational changes in the company. In the last part, the AHP method is used in order to solve the complex problems, i.e. to choose the best organizational model. This method allows to obtain the best solution and application of this method can help in solving the others problems in this company, too.

**Keywords:** consulting services; organizational life-cycle; change management; organizational structure; SWOT; AHP method.

### UVOD

Preduzeće “East Star Group” je osnovano 12.03.2007.god. Osnovna delatnost ovog preduzeća su konsultantske aktivnosti u vezi sa poslovanjem i ostalim upravljanjem, kao što su: web dizajn, grafički dizajn, video i foto produkcija, osmišljavanje i sprovođenje reklamnih kampanja.

Vlasnik ovog preduzeća sebe opisuje kao brzog, snalažljivog lidera koji je spreman na rizik. On je pouzdan i lojalan čovek na koga se ljudi mogu uvek osloniti. Zna da bude istrajan, trudi se da bude drugačiji i uspe u svemu što naumi. Posvećen je svom radu i poslu. Inovativan je i kreativan, što ovaj posao i zahteva.

Radnici su bliski i veoma dobro se međusobno poznaju. Vlasnik se trudi da vlada prijatna atmosfera i da ne dolazi do konflikta, a iako dođe do njih, on je tu da ih reši i da motiviše radnike na dalji rad.

### 1. ŽIVOTNI CIKLUS

Životni ciklus je put kojim se kreće određeni sistem, organizacija, menadžeri i zaposleni u određenom vremenskom period, a koji obuhvata faze: nastanak, rasta, starenje, umiranje. To je kontinuirani proces promena kroz koje prolaze organizacije. <sup>[1]</sup>

Na osnovu obavljenog istraživanja, korišćenjem upitnika, dobijene su informacije o stanju preduzeća i svim fazama životnog ciklusa kroz koje je preduzeće prošlo, počevši od samog osnivanja, pa sve do danas.

Vlasnik je na ideju, da osnuje svoje preduzeće, došao 2005. godine, kada je napustio posao snimatelja. Pre svega da bi ostvario svoje želje da bude sam svoj gazda, ali i da bi zaradio novac za život.

Preduzeće je osnovano 2007.godine u Knjaževcu. U početku su pružali samo usluge dizajna kampanje i štampu. Preduzeće se sporo i teško razvijalo. Tada je bio samo 1 zaposleni. Tek posle 2 godine, taj broj se povećao na 3. Kasnije, kako se povećavao broj usluga, samim tim došlo je i do povećanja broja zaposlenih. Danas su zaposlena 9 radnika u stalnom radnom odnosu. Njihove uloge u preduzeću su: direktor, glavni i odgovorni urednik, dva novinara, dizajner, web dizajner, šef tehnike, snimatelj, sekretarica.

Zbog razvoja tržišta i čestih promena u tehnologiji, svi zaposleni u preduzeću, uključujući i direktora, se trude da svakom poslu priđu sa posebnom pažnjom i da se tehnički i kadrovski konstantno osnažuju kako bi nivo kvaliteta usluga bio veći, a samim tim i broj zadovoljnih klijenata.

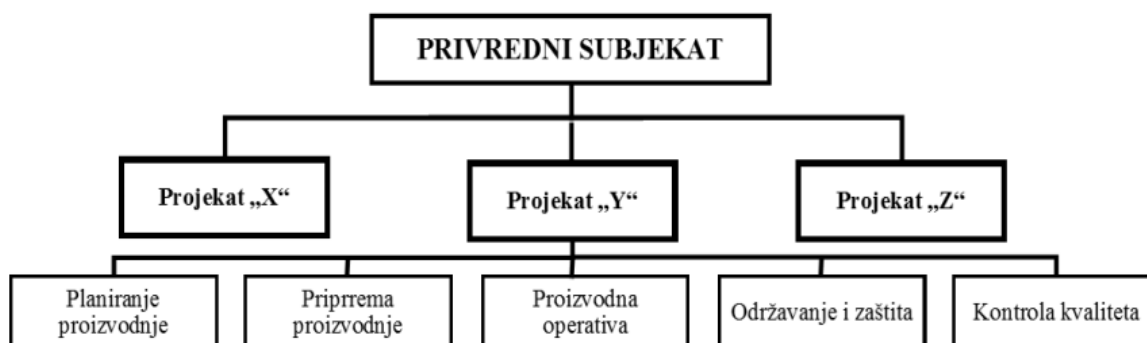
## **2. ORGANIZACIONA STRUKTURA**

Upravljanje preduzećem sastoji se u donošenju odluka kojima se usmerava tekuće poslovanje i dugoročni razvoj preduzeća. Struktura predstavlja sastavni i u isto vreme najvažniji deo svake organizacije, ona je svojom prirodom fleksibilna i dinamička, kao što je i sama organizacija, koju u najvećoj meri odražava i karakteriše.<sup>[2]</sup>

Organizaciona struktura ovog preduzeća je projektna organizaciona struktura. To je struktura koja je privremenog karaktera, formirana da postigne određene rezultate, koristeći timove eksperata iz različitih funkcionalnih područja unutar organizacije.

Prednosti projektne organizacione strukture su sledeće: projektni menadžer ima autoritet nad projektom i svi članovi tima su direktno odgovorni njemu; tim je orijentisan na projekat; članovi tima ne moraju tražiti odobrenja od rukovodioca za sve što rade; visoka je motivacija članova tima; brz protok informacija za potrebe i ciljeve projekta; autoritet je centralizovan, pa se odluke mogu donositi brzo i u kratkom roku se mora reagovati na promene okoline; prilagođavanje potražnjom na tržištu.<sup>[3]</sup>

Nedostaci projektne organizacione strukture: visoki administrativni troškovi; nesigurnost trajnog zaposlenja; projekat je teško prekinuti; neodređeni put u karijeri zaposlenih; ograničen broj sposobnih i kvalitetnih ljudi na projektu; nesporazumi i konflikti među zaposlenima.<sup>[3]</sup>



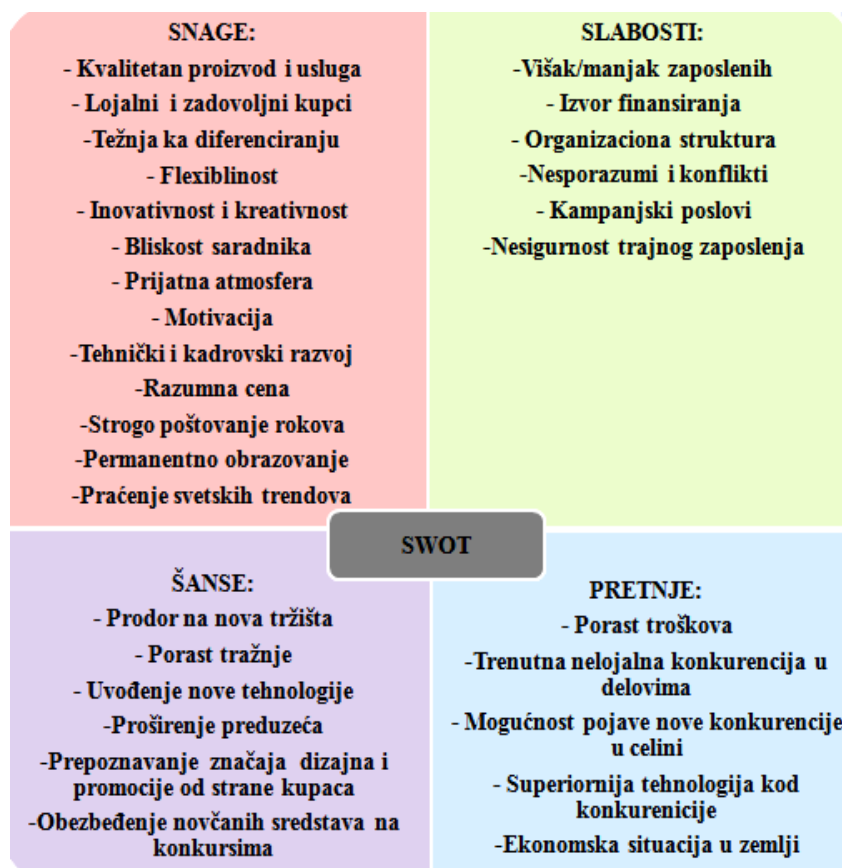
Slika 1. – Primer projektne organizacione structure <sup>[2]</sup>

### 3. SWOT ANALIZA

Swot analiza omogućava prezentovanje i analizu internih i eksternih faktora (snage, slabosti, šanse, pretnje). Efektivna strategija koristi šanse za preduzeće, upotrebljavajući svoju snagu i izbegavajući ili umanjujući pretnje korekcijom svojih slabosti. <sup>[4]</sup>

Odlučeno je da treba analizirati trenutno stanje ovog preduzeća primenom ove metode, zbog toga što ona omogućava prepoznavanje pozitivnih i negativnih faktora i daje mogućnost da se na njih blagovremeno utiče. Tačnije, SWOT analiza omogućava da se utvrdi gde se u sadašnjosti organizacija nalazi, koje su joj glavne prednosti i slabosti i kakve su joj šanse i koje su prepreke da se stigne do planiranih ciljeva u budućnosti.

Primena SWOT analize je veoma bitna kod upravljanja promenama, pogotovo rukovodstva, bilo da se radi o upravljačkom ili izvršnom, kako bi se obezbedio kontinuitet sa prethodnim godinama i ranijim uspesima. Zatim, kada uspeh u radu stagnira, treba uraditi SWOT analizu kao izvesnu vrstu inventara o tome šta treba menjati i odbaciti u radu, a šta zadržati i razvijati.



Slika 1. SWOT analiza

#### 4. PROBLEMI I PROMENE U PREDUZEĆU

Vlasnik je rešio da organizuje sastanak sa svojim saradnicima kako bi rešio probleme koji su se pojavili u njegovom preduzeću. Prvi problemi se javljaju 3 godine nakon osnivanja, tačnije 2010.god. U jednom trenutku se sufinansiranje medija promenilo, pa je se sa dogovornog, prešlo na projektno finansiranje, u kome se investitori, u pogledu otplate zajmova i prinosa na investicije, oslanjaju na gotovinske tokove koje stvara projekat koji se finansira. Od tada, preduzeće je ostalo bez izvesnih prihoda u periodu od 8 meseci. Došlo do nedostatka sopstvenog kapitala koji je koristio kao izvor finansiranja, ali je zahvaljujući poslovima iz drugih oblasti uspeo da obezbedi novčana sredstva i da nastavi sa poslovanjem. Na početku poslovanja je najteže bilo naći klijente i steći poverenje kupaca. Firma je u startu opredeljena da radi usluge za poznatog kupca, a bez reference, tj. sa malim brojem istih.

Još jedan problem sa kojim se susrelo ovo preduzeće je organizacija, raspodela zadataka i prilagođavanje na nov posao. Vlasnik smatra da je to slabost preduzeća i da je potrebno bolje upravljanje. Radnicima je bilo potrebno dosta vremena da se naviknu na nove zadatke i novu organizaciju rada na početku osnivanja preduzeća.

Zbog kampanjskih poslova dešava se da radne snage bude ili više ili manje. Teško je naći idealan broj. Ovaj problem manjka su uglavnom rešavali angažovanjem dodatnih lica po potrebi, a zbog brige o radnicima, kada je viška, ne šalju ih na "neplaćeno", tj. na "čekanje". Baš i zbog te brige o radnicima, preduzeće je ostajalo bez prihoda.

Vlasnik ima prijateljski odnos sa svim zaposlenima. Nije postavio autoritet u poslovanju, odnosno vertikalnu diferencijaciju. Vertikalna diferencijacija predstavlja način na koji se uspostavlja hijerarhijski odnosi u organizaciji. Ovaj oblik diferencijacije definiše razlike između zaposlenih prema autoritetu i rangu.<sup>[5]</sup>

Na osnovu svega izloženog, glavna dilema je da li da se promeni organizaciona struktura preduzeća i kako da se pronađe idealan broj radne snage, jer nekada postoji višak, nekada manjak radne snage.

Cilj preduzeća je da reši postojeće probleme, da nastavi sa radom i niže uspehe, kao i do sada. Vlasnik vodi računa o svojim zaposlenima i trudi se da oni budu zadovoljni na svojim radnim mestima.

## 5. IZBOR NAJBOLJEG REŠENJA POMOĆU AHP METODE

Analizirajući okruženje, preduzetnik treba da shvati potrebu za fleksibilnim prilagođavanjem svog organizacionog sistema novonastalim okolnostima, jer ona preduzeća koja ne prilagođavaju svoje poslovanje promenama u okruženju, povećavaju stepen entropije i dovode u pitanje svoj opstanak.<sup>[6]</sup>

Od svih metoda multikriterijumskog odlučivanja koje je moguće primeniti u cilju dobijanja najboljeg rešenja u ovom radu, odlučeno je da treba primeniti AHP metodu zbog sledećih razloga: vrlo je fleksibilna; primenjuje se hijerarhijska struktura za rešavanje složenijih problema; problem može biti razložen na manje elemente; upoređuju se 2 elemenata u isto vreme kako bi se odredio dominantni uticaj jednog elementa na drugi; jednostavna je za primenu; lako se mogu pronaći odnosi između alternativa i kriterijuma; može se prepoznati eksplicitni uticaji kriterijuma i alternativa, kao i njihov značaj u realnom okruženju.

Metod analitičkih hijerarhijskih procesa (AHP) se koristi za rešavanje kompleksnih problema odlučivanja u kojima učestvuje veći broj donosilaca odluke, veći broj kriterijuma i u višestrukim vremenskim periodima. Metod se zasniva konceptu balansa koji se koristi za određivanje sveukupne relativne značajnosti skupa kriterijuma analiziranog problema odlučivanja. To se postiže strukturiranjem bilo kog kompleksnog problema odlučivanja u veći broj hijerarhijskih nivoa, dodeljivanjem težina u obliku serije matrica poređenja parova.<sup>[7]</sup>

Ova metoda uzima u obzir činjenicu da se i najsloženiji problemi mogu razgraditi tako da se uključe i kvantitativni i kvalitativni aspekti problema. AHP povezuje i drži povezane sve delove hijerarhije, pa je lako uočiti na koji način promena jednog kriterijuma utiče na ostale kriterijume i alternative.

Metod AHP ima četiri faze:<sup>[7]</sup>

1. vrši strukturiranje problema,
2. prikupljanje podataka,
3. ocenjivanje relativnih težina,
4. određivanje rešenja problema.

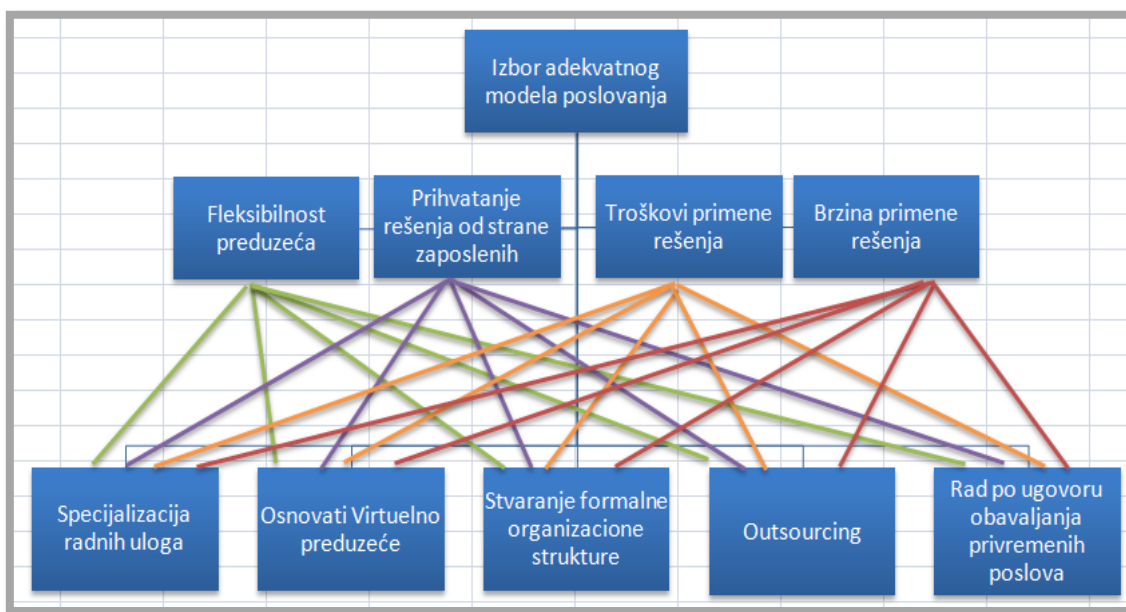
## 5.1. STRUKTURA PROBLEMA

U preduzeću “ESG” potrebno je rešiti problem organizacione strukture i adekvatnog broja radnika. Neka od mogućih rešenja ovog problema su sledeća:

1. B1: Specijalizacija radnih uloga ;
2. B2: Osnovati Virtuelno preduzeće;
3. B3: Stvaranje formalne organizacione strukture;
4. B4: Outsourcing;
5. B5: Rad po ugovoru obavljanja privremenih poslova.

Izbor će se vršiti koristeći sledeće kriterijume:

1. A1: Fleksibilnost preduzeća (koja se tiče tehnologije, opreme, predmeta rada);
2. A2: Prihvatanje rešenja od strane zaposlenih;
3. A3: Troškovi primene rešenja;
4. A4: Brzina primene rešenja.



Slika 2. Hijerarhijska struktura izbora adekvatnog modela poslovanja

## 5.2. PRIKUPLJANJE PODATAKA I OCENJIVANJE RELEVANTNIH TEŽINA

Izvršili smo upoređivanje značaja pojedinih atributa (kriterijuma) saglasno skali definisanoj u tabeli devet tačka.



Skala	Objašnjenje rangiranja
9	Apsolutno najznačajnije/najpoželjnije
8	Veoma snažno ka apsolutno najznačajnijem
7	Veoma snažno ka veoma značajnom/poželjnom
6	Snažno ka veoma snažnom
5	Snažnije više značajno/poželjno
4	Slabije ka više snažnijem
3	Slabije više značajno/poželjno
2	Podjednako ka slabije višem
1	Podjednako značajno/poželjno
0.50	Podjednako ka slabije manjem
0.33	Slabije manje značajno/poželjno
0.25	Slabije ka snažno manjem
0.20	Snažno manje značajno/poželjno
0.17	Snažno manje ka veoma snažno manjem
0.14	Izuzetno snažno manje značajno/poželjno
0.13	Veoma snažno ka apsolutno manjem
0.11	Apsolutno najmanje značajno/poželjno

Slika 3. Skala devet tačaka<sup>[7]</sup>

### 5.2.1. Nivo 1

Procene i prioriteti u cilju izbora modela poslovanja su dati u sledećoj matrici međusobnog upoređivanja kriterijuma svakog sa svakim:

Tabela 1. Ocene kriterijuma-Nivo 1

Nivo 1	A1	A2	A3	A4
A1		6	4	(2)
A2			8	3
A3				1
A4				

Odgovarajuće matrice upoređivanja u odnosu na attribute A1 – A4 su sledeće:

Tabela. 2. Ocene kriterijuma “Fleksibilnost preduzeća”

<b>A1: Fleksibilnost</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>
<b>B1</b>		(4)	(2)	1	2
<b>B2</b>			4	2	1
<b>B3</b>				1	2
<b>B4</b>					3
<b>B5</b>					

Tabela 3. Ocene kriterijuma “Prihvatanje rešenja od strane zaposlenih”

<b>A2: Prihvatanje</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>
<b>B1</b>		6	(2)	4	(3)
<b>B2</b>			7	5	4
<b>B3</b>				1	(2)
<b>B4</b>					3
<b>B5</b>					

Tabela 4. Ocene kriterijuma “Troškovi primene rešenja”

<b>A3: Troškovi</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>
<b>B1</b>		(3)	1	(3)	1
<b>B2</b>			(2)	(3)	3
<b>B3</b>				4	3
<b>B4</b>					5
<b>B5</b>					

Tabela 5. Ocene kriterijuma “Brzina primene rešenja

<b>A4: Brzina</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>
<b>B1</b>		4	5	3	2
<b>B2</b>			6	(2)	(3)
<b>B3</b>				2	4
<b>B4</b>					(3)
<b>B5</b>					

KORAK 1: Prerada matrice uporedivanja težina u parovima na osnovu početne matrice odlučivanja skale od devet tačaka. Vrednosti u zagradi predstavljaju invertovani odnos preferencija,. Za metodu AHP je pravilo da po dijagonali sve vrednosti budu jednake jedinici, vrednosti ispod dijagonale se dobijaju na sledeći način: ako tražmo atribut A21 onda je to jednako količniku jedinice sa atributom A12.

KORAK 2: Proračun sume elemenata kolone.

KORAK 3: Proračun količnika elemenata kolona sa sumom odgovarajuće kolone. Podeliti elemente svake kolone sa sumom vrednosti te kolone, koja je dobivena u prethodnom koraku.

KORAK 4: Proračun normalizovanog sopstvenog vektora, vrednosti u koloni  $\Sigma$  su sume elemenata po redovima, a u zadnjoj koloni  $t$  su odgovarajuće srednje vrednosti reda. Poslednja kolona je normalizovani sopstveni vektor.<sup>[7]</sup>

Tabela 6. Izračunavanje prioriteta za Nivo 1

Nivo 1	A1	A2	A3	A4	A1	A2	A3	A4	$\Sigma x_j$	$t = \Sigma x_j / n$
<b>A1</b>	1	6	4	0,50	0,29	0,80	0,29	0,09	<b>1,47</b>	<b>0,37</b>
<b>A2</b>	0,17	1	8	3	0,05	0,13	0,57	0,55	<b>1,30</b>	<b>0,32</b>
<b>A3</b>	0,25	0,13	1	1	0,07	0,02	0,07	0,18	<b>0,34</b>	<b>0,09</b>
<b>A4</b>	2	0,33	1	1	0,59	0,04	0,07	0,18	<b>0,88</b>	<b>0,22</b>
<b><math>\Sigma</math></b>	<b>3,42</b>	<b>7,46</b>	<b>14,00</b>	<b>5,50</b>						<b>1,00</b>

Konačni prioritet za Nivo 1 je:

1. A1 – 0,37
2. A2 – 0,32
3. A4 – 0,22
4. A3 – 0,09

#### 5.2.2. Nivo 2

Izračunava se učesće svake alternative pojedinačno u okviru posmatranog kriterijuma. Date su matrice upoređivanja težina sa parovima u odnosu na attribute i proračun sopstvenog vektora odgovarajućih sopstvenih vrednosti:

Tabela 7. Izračunavanje prioriteta za kriterijum A1

<b>A1: Fleksibilnost</b>	B1	B2	B3	B4	B5	B1	B2	B3	B4	B5	$\Sigma x_j$	$t = \Sigma x_j / n$
<b>B1</b>	1	0,25	0,25	1	2	0,10	0,08	0,04	0,19	0,22	<b>0,63</b>	<b>0,13</b>
<b>B2</b>	4	1	4	2	1	0,38	0,33	0,59	0,38	0,11	<b>1,79</b>	<b>0,36</b>
<b>B3</b>	4	0,25	1	1	2	0,38	0,08	0,15	0,19	0,22	<b>1,02</b>	<b>0,20</b>
<b>B4</b>	1	0,5	1	1	3	0,10	0,17	0,15	0,19	0,33	<b>0,93</b>	<b>0,19</b>
<b>B5</b>	0,5	1	0,5	0,33	1	0,05	0,33	0,07	0,06	0,11	<b>0,63</b>	<b>0,13</b>
<b><math>\Sigma</math></b>	<b>10,5</b>	<b>3</b>	<b>6,75</b>	<b>5,33</b>	<b>9</b>							<b>1,00</b>

Tabela 8. Izračunavanje prioriteta za kriterijum A2

<b>A2: Prihvatanje</b>	B1	B2	B3	B4	B5	B1	B2	B3	B4	B5	$\Sigma x_j$	$t = \Sigma x_j / n$
B1	1	6	0,5	4	0,33	0,16	0,79	0,04	0,33	0,04	<b>1,36</b>	<b>0,27</b>
B2	0,17	1	7	5	4	0,03	0,13	0,61	0,42	0,45	<b>1,64</b>	<b>0,33</b>
B3	2	0,15	1	1	0,5	0,31	0,02	0,09	0,08	0,06	<b>0,56</b>	<b>0,11</b>
B4	0,25	0,2	1	1	3	0,04	0,03	0,09	0,08	0,34	<b>0,58</b>	<b>0,12</b>
B5	3	0,25	2	1	1	0,47	0,03	0,17	0,08	0,11	<b>0,87</b>	<b>0,17</b>
<b><math>\Sigma</math></b>	<b>6,42</b>	<b>7,6</b>	<b>11,5</b>	<b>12</b>	<b>8,83</b>							<b>1,00</b>

Tabela 9. Izračunavanje prioriteta za kriterijum A3

<b>A3: Troškovi</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b><math>\epsilon_{xj}</math></b>	<b><math>t=\epsilon_{xj}/n</math></b>
<b>B1</b>	1	0,33	1	0,33	1	0,11	0,05	0,32	0,06	0,08	<b>0,62</b>	<b>0,12</b>
<b>B2</b>	3	1	0,5	0,33	3	0,33	0,15	0,16	0,06	0,23	<b>0,93</b>	<b>0,19</b>
<b>B3</b>	1	2	1	4	3	0,11	0,30	0,32	0,68	0,23	<b>1,65</b>	<b>0,33</b>
<b>B4</b>	3	3	0,25	1	5	0,33	0,45	0,08	0,17	0,38	<b>1,42</b>	<b>0,28</b>
<b>B5</b>	1	0,33	0,33	0,2	1	0,11	0,05	0,11	0,03	0,08	<b>0,38</b>	<b>0,08</b>
<b><math>\epsilon</math></b>	<b>9</b>	<b>6,66</b>	<b>3,08</b>	<b>5,86</b>	<b>13</b>							<b>1,00</b>

Tabela 10. Izračunavanje prioriteta za kriterijum A4

<b>A4: Brzina</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b><math>\epsilon_{xj}</math></b>	<b><math>t=\epsilon_{xj}/n</math></b>
<b>B1</b>	1	4	5	3	2	0,44	0,39	0,39	0,32	0,26	<b>1,80</b>	<b>0,36</b>
<b>B2</b>	0,25	1	6	0,5	0,33	0,11	0,10	0,47	0,05	0,04	<b>0,77</b>	<b>0,15</b>
<b>B3</b>	0,2	0,17	1	2	4	0,09	0,02	0,08	0,21	0,52	<b>0,92</b>	<b>0,18</b>
<b>B4</b>	0,33	2	0,5	1	0,33	0,14	0,20	0,04	0,11	0,04	<b>0,53</b>	<b>0,11</b>
<b>B5</b>	0,5	3	0,25	3	1	0,22	0,29	0,02	0,32	0,13	<b>0,98</b>	<b>0,20</b>
<b><math>\epsilon</math></b>	<b>2,28</b>	<b>10,17</b>	<b>12,75</b>	<b>9,5</b>	<b>7,66</b>							<b>1,00</b>

Konačni prioritet za atribut A1 je: Konačni prioritet za atribut A2:

- |                  |             |
|------------------|-------------|
| 1. B2 -0,36      | 1. B2 -0,33 |
| 2. B3 -0,20      | 2. B1 -0,27 |
| 3. B4 -0,19      | 3. B5 -0,17 |
| 4. B1 i B5 -0,13 | 4. B4 -0,12 |
|                  | 5. B3 -0,11 |

Konačni prioritet za atribut A3 je: Konačni prioritet za atribut A4 je:

- |             |             |
|-------------|-------------|
| 1. B3 -0,33 | 1. B1 -0,36 |
| 2. B4 -0,28 | 2. B5 -0,20 |
| 3. B2 -0,19 | 3. B3 -0,18 |
| 4. B1 -0,12 | 4. B2 -0,15 |
| 5. B5 -0,08 | 5. B4 -0,11 |

### 5.2.3. Nivo 3

Sveukupna sinteza problema izbora rešenja jednaka je zbiru proizvoda težine u okviru posmatranog kriterijuma, razmatrajući sve kriterijume.

Tabela 11. Sinteza problema izbora rešenja

Rešenja problema /Kriterijumi	A1	A2	A3	A4
<b>B1</b>	0,13	0,27	0,12	0,36
<b>B2</b>	0,36	0,33	0,19	0,15
<b>B3</b>	0,2	0,11	0,33	0,18
<b>B4</b>	0,19	0,12	0,28	0,11
<b>B5</b>	0,13	0,17	0,08	0,2
<b>tj</b>	<b>0,37</b>	<b>0,32</b>	<b>0,09</b>	<b>0,22</b>

Matematički proračun za sve alternative realizuje se na sledeći način:

$$\underline{T_{bi} = t_1 * A_1 + t_2 * A_2 + t_3 * A_3 + t_4 * A_4} \quad [7]$$

Ukupni prioriteti u odnosu na globalni cilj (kompozitni normalizovani vektor) dobijeni pomoću ovog matematičkog proračuna su sledeći:

Tabela 12. Ukupni prioriteti

<b>B1</b>	<b>0,22</b>
<b>B2</b>	<b>0,29</b>
<b>B3</b>	<b>0,18</b>
<b>B4</b>	<b>0,16</b>
<b>B5</b>	<b>0,15</b>

## 6. REŠENJE PROBLEMA

Tako da je sveukupna sinteza problema izbora rešenja problema u preduzeću:

- 1. B2 – 0,29**
2. B1 – 0,22
3. B3 – 0,18
4. B4 – 0,16
5. B5 – 0,15

$$B2 > B1 > B3 > B4 > B5$$

Na osnovu dobijenih rezultata, direktor preduzeća “East Star Group”, Knjaževac, izabraće, kao najpovoljniju metodu **B2 – Osnivanje virtuelnog preduzeća**, kako bi na taj način rešilo probleme u svom poslovanju.

Savremene digitalne tehnologije omogućavaju efikasnije poslovanje, bez korišćenja papirnih dokumenata i bez neposrednog kontakta između posrednika u procesu poslovanja. Virtualna organizacija nastaje i nestaje po potrebama pojedinaca koji je sačinjavaju - jedan te isti pojedinac može istovremeno biti zaposlen u više virtualnih organizacija.

Prednosti sa gledišta zaposlenih su:<sup>[3]</sup>

- ✓ omogućava angažovanje najboljih stručnjaka;
- ✓ zaposleni imaju fleksibilno radno vreme;
- ✓ smanjeno vreme i troškovi putovanja;
- ✓ bolja koncentrisanost na poslovne zadatke;
- ✓ sloboda u organizovanju radnog dana;
- ✓ povećana produktivnost;
- ✓ povećanje motivacije zaposlenih;
- ✓ slobodno i nezavisno vođstvo;
- ✓ omogućava globalnu ekspanziju i globalnu konkurentnost;
- ✓ prilagođavanje dinamičkoj okolini;
- ✓ nehijerarhijska organizacija nezavisnih preduzeća koja samostalno odlučuju o umrežavanju;
- ✓ smanjenje grešaka;
- ✓ smanjenje obima ljudskog rada;
- ✓ proširenje tržišta poslovanja;
- ✓ dostupniji proizvodi i usluge (24/7);
- ✓ praktičnija kupovina;
- ✓ smanjeni troškovi poslovnog prostora;
- ✓ smanjen broj izostanaka sa posla npr. usled bolesti;
- ✓ lakše regrutovanje stranih državljana;
- ✓ nove poslovne prilike i mogućnosti.

## 7. ZAKLJUČAK

Organizaciona struktura determiniše interne odnose unutar jednog preduzeća, autoritet odlučivanja i sistem koordinacije aktivnosti putem komunikacija. Ako ne postoji odgovarajuća organizaciona struktura i koordinacija, mogu se javiti konfliktne situacije, zbog različitog položaja organizacionih jedinica, različitim ciljevima, kao i neusaglašenosti u korišćenju izvora. Odnos takmičenja među zaposlenima može da postoji kada su ciljevi organizacionih jedinica neusaglašeni, a one nisu u vezi jedna sa drugom.

U malim i srednjim preduzećima, obično postoji lider koji može jasno da komunicira ciljeve i definiše ih u saradnji za zaposlenima, koji se na taj način lakše sprovode, jer postoji konsenzus o potrebi njihovog ispunjenja. Pošto ovo preduzeće spada u grupu malih preduzeća, jedna od prednosti je što se mala preduzeća efikasnije i brže prilagođavaju promenama.

Smisao ideje o virtualnosti ili konceptu organizacije bez mesta je konceptualizacija efikasnosti brzine i kvaliteta. Virtualno vođstvo je zasnovano na poverenju. To je model koji treba da razvije osećaj pripadanja i privrženosti organizaciji. Organizacija bazirana na poverenju, zahteva liderski tim. Zadaci vođstva ne mogu biti izvršeni od strane jednog čoveka bez obzira na njegove kapacitete. Za virtualno vođstvo ključno pitanje je kako zadržati

kvalitetne ljude, a odgovor se nalazi u promenama odnosa prema zaposlenima. Oni se moraju vrednovati kao aktiva, a ne kao trošak.<sup>[5]</sup>

#### REFERENCE:

- [1] Bogdanović, D., *Upravljanje promenama*, Bor 2013.
- [2] Stavrić B., Riznić D., *Osnovi teorije organizacije*, Beograd, 2007.
- [3] Jovanović, A., *Upravljanje projektom – metode planiranja i kontrole*, Bor, 2004.
- [4] Živković, Ž., Jelić, M., Popović, N., Muhić Š., *Strategijski menadžment*, Bor, 2004.
- [5] Jones, G., *Organisational Theory-Text and Cases*, Prentice Hall, 2000.
- [6] Jovanović, I., *Preduzetništvo u savremenim uslovima poslovanja*, Bor, 2015.
- [7] Čupić, M., Tummala, R.M., Suknović, M., *Odlučivanje - formalni pristup*, Beograd, 2003.
- [8] Prvulović, S., Manasijević, D., *Teorija odlučivanja sa primerima*, Bor, 2006.

## COMPANY'S COMPETITIVE ADVANTAGE AND NATIONAL ECONOMIES

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**Abstract:** The first decade of the twenty-first century, testified that he began a period of global competition, which is identified by the penetration of the standards of the world market and the international orientation of the company. There are industries in which competition has not disrupted the stability of a dominant market position. In the modern business environment, no company and no country can afford to neglect the need for competitive bidding or competition - existing and future. All companies, as well as the economy of the country of the modern world, they must attempt to understand the competition and her master. That the company realized market success you need to have a competitive advantage in the form of lower costs and product differentiation, with a long-term strategy of providing products and services of high quality, including continuous innovation. Companies must invest all significant efforts to meet the requirements of all educated and customers (consumers). In such conditions, the quality of the business is the elementary factor of competitiveness, which is based on continuous improvement of productivity and knowledge. Competitive advantage is the basis of business performance companies in competitive markets. Competitive advantages of individual countries are not inherited, but created strategic choices and their implementation, based on knowledge and developed infrastructure, high technology and innovation.

Innovation are the driving force in the development of the company, but also the development of the national economy. Therefore, it is important to point out the importance of firms with higher levels of technological intensity, with more conditions for innovation and win the market. Firms with higher levels of technological intensity have more conditions for innovation, winning new markets and productive use of available resources.

Creating business strategy and the quality of the business environment are essential prerequisites for improving the competitiveness of the economy. According to Porter, a combination of external stimulus (diamond) and corresponding strategies of companies - taking into account the specificities of each country - is the competitive potential of a country.

**Keywords:** competitive advantage, companies, national economies

### 1. PREDMET I POLAZIŠTA ISTRAŽIVANJA

Predmet ovog rada je istraživanje i proučavanje glavnih faktora i izvora stvaranja održive konkurentske prednosti u savremenim organizacijama. Postoje različiti teorijski izvori koji obrađuju ovu oblast, od uopštenih koji izvore konkurentnosti definišu kroz veličinu i ostvareni udeo na tržištu do posebnih koja istražuju različite izvore konkurentske prednosti, ali ih ne dovode u vezu sa trenutnim udelom na tržištu.



Istraživanja u ovom radu imaju okvir u radovima Portera o konkurentskoj prednosti i konkurentskim strategijama kao jedno šire teorijsko razmatranje.

Naučni cilj ovog istraživanja jeste naučni opis glavnih faktora i izvora stvaranja održive konkurentске prednosti u savremenim organizacijama, da se premosti jaz između često pojednostavljenih popularnih pristupa liderstvu i apstraktnih teorijskih pristupa, naučni opis liderstva i činioca strukture izvora konkurentnosti, naučni opis funkcija liderstva i naučni opis svih kvantitativnih i kvalitativnih svojstava izvora konkurencije u savremenim organizacijama.

Pored naučnog opisa naučni cilj je ostvarivanje i određenih nivoa naučne klasifikacije i tipologije. Ovo zbog toga što deskripciju nije moguće izvršiti bez analize, a analiza nužno koristi analogiju. Naime, da bi se utvrdilo, prilikom opisivanja, da određena svojstva, činioci, veze itd., postoje odnosno ne postoje, da su ispoljene ovde ili onde, neophodno je utvrditi kriterijume razlikovanja, odnosno istovetnosti, sličnosti i razlike.

Hipotetički okvir istraživanja sastoji se od sledećih pretpostavki:

Generalna hipoteza:

Konkurentске prednosti su rezultat kreativnosti u poslovnoj aktivnosti lidera, odnosno sposobnosti angažovanja široko shvaćene poslovne inteligencije;

Pojedinačna hipoteza:

Iako je danas konkurentska orijentacija imperativ, firme ne treba da budu previše usmerene na konkurente, one moraju biti izbalansirane u nastojanjima da stvore i zadrže potrošača i ograniče i anuliraju konkurenciju.

Faktori koji su bitne determinante sticanja, održavanja i poboljšavanja konkurentskih pozicija su dinamički, promenljivi, sa različitim značajem i uticajima u funkcionalnom, teritorijalnom i vremenskom kontekstu.

Metodološki pristup istraživanja koji će se primenjivati u izradi ovog rada postavljen je veoma

kompleksno i zahteva primenu:

- od analitičkih osnovnih metoda: metod analize, metod apstrakcije, metod specijalizacije i metod dedukcije;

- od sintetičkih osnovnih metoda: sintezu, konkretizaciju, generalizaciju i indukciju;

- od opštenaučnih metoda: hipotetičko

- deduktivnu, analitičko

Analiza će biti ostvarena na dva nivoa: na nivou izvornih podataka, na osnovu izvornih dokumenata, i na nivou sekundarne analize rezultata ranijih istraživanja i adekvatne literature.

## **2. IZVORI KONKURENTNOSTI U SAVREMENIM ORGANIZACIJAMA**

Tržište je stalno sučeljavanje odnosa ponude i potražnje. Ponuda i potražnja ispoljavaju svoje delovanje posredstvom konkurencije. U tom smislu konkurencija predstavlja unutrašnju motornu snagu koja pokreće tržišni mehanizam. Konkurentski odnosi među

učesnicima na tržištu mogu biti različite prirode i različitog uticaja. Najčešće zavise od broja i veličine učesnika na tržištu (kupaca i prodavaca), od veće ili manje mogućnosti pojave novih učesnika na tržištu (konkurenata), homogenosti ili heterogenosti roba, stepena elastičnosti ponude i tražnje i sl. Zapravo, sve su to karakteristike na osnovu kojih se obrazuju različite tržišne strukture i različita tržišna stanja.

Sve do 30-ih godina XX veka, do pojave nemačkog ekonomiste Štakelberga i njegove klasifikacije tržišnih stanja, morfologija tržišta se posmatrala vrlo pojednostavljeno. U ekonomskim analizama se polazilo od ekstremnih tržišnih stanja: potpune, neograničene (apsolutne, perfektno) konkurencije i potpunog monopola.

Odnosi potpune neograničene konkurencije u svom čistom obliku nisu nikad uspostavljene. Smatra se da je liberalni kapitalizam (period *laissez faire*) bio sistem sa najviše ekonomskih sloboda, ali se ne može tvrditi da je to bilo doba potpune konkurencije.

Potpuno suprotno stanje na tržištu od odnosa potpune konkurencije je stanje monopolske konkurencije. Zapravo, to je takvo tržišno stanje u kome se na strani ponude nalazi samo jedan prodavac (monopol), odnosno na strani tražnje samo jedan kupac (monopson). Tržišno stanje monopola i monopsona može nastati na različite načine: prirodnim putem, veštačkim putem – delovanjem ekonomskih zakona čime se obezbeđuje visoka koncentracija ponude i tražnje u rukama jednog proizvođača ili kupca, sporazumom ili dogovorom između jednog broja proizvođača ili kupaca.

Uglavnom, u savremenim ekonomskim analizama tržišnih struktura i oblika konkurencije, između ekstremnih tržišnih stanja (potpuna konkurencija i monopol), velika pažnja se pridaje oblicima ograničene i nepotpune konkurencije. Reč je o mešovitim oblicima konkurencije, koji su najbliži realnom privrednom životu. Ograničenu ili nepotpunu konkurenciju posebno obeležava: relativno mali broj prodavaca i kupaca (dva prodavca – duopol, dva kupca – duopsol, dva prodavca i dva kupca – bilateralni monopol), zbog velike ekonomske moći pojedinačnih prodavaca i kupaca postoji mogućnost uticaja na cene, ali ih ipak ne mogu u potpunosti kontrolisati, postojanje još uvek relativne homogenosti proizvoda i supstituta, niska mobilnost faktora proizvodnje, mogućnost dogovaranja u vezi sa nivoom cene, podelom tržišta, vrstom i kvalitetom proizvoda koji su predmet prodaje, mestom i vremenom prodaje i sl., što čini osnovni interes učesnika u razmeni.

### **3. KONKURENCIJA KAPITALA**

Konkurencija koja važi na tržištu proizvoda i usluga, na isti način deluje između samih kapitalista u oblasti proizvodnje, trgovine, bankarstva i manifestuje se u nastojanju svakog pojedinačnog kapitaliste da prisvoji što veći profit na tržištu. Svi kapitalisti se trude da ga plasiraju u one delatnosti u kojima će se on najbrže oploditi i ostvariti što veći višak vrednosti, sučeljavaju će se pri tom sa interesom drugih kapitalista. Svaki od njih pokušava da ponudi bolje uslove i tako istisne svog konkurenta. Izvesno je da oni vlasnici kapitala koji neprekidno usavršavaju sredstva za proizvodnju i povećavaju organski sastav kapitala (u

pravcu veće zastupljenosti minulog rada u njemu) mogu računati na veći uspeh u stalno rastućoj konkurenciji.<sup>34</sup>

I obrnuto, oni koji to ne mogu da postignu, moraće računati s tim da jednog dana budu istisnuti sa tržišta. Pravilo je da krupniji kapital istiskuje sitni tako što jedne uništava (gasi preduzeća) a druge tako što ih pripaja sebi, čime se njihova akumulativnost neprekidno uvećava.

Iz izloženog proističe da konkurencija kapitala neprekidno stimuliše povećanje kapitalističkih preduzeća. Dva su osnovna oblika koji vode ka tome; koncentracija i centralizacija kapitala. Nakon toga dolazi do pojave krupnih polumonopolističkih ili monopolističkih organizacija, što se odražava u promeni karakteristika konkurentne borbe među kapitalom. Tu se više ne radi o borbi jakih i slabih kao u doba liberalnog kapitalizma nego o borbi među jakima, uglavnom ravnopravnim. Tako nastaju novi oblici konkurencije kapitala koja se manje vodi čisto ekonomskim, a više političkim i drugim neekonomskim metodama. To ujedno dovodi do povećavanja protivurečnosti (deformisanja konkurencije) funkcionisanja privrednog mehanizma kapitalističke privrede. Otuda se u takvim situacijama nameće sve češća potreba za intervencijama države kako bi se izbegla recesija i veći poremećaji koji kulminiraju u nastanku opšteekonomske - krize.

#### **4. KONKURENTSKE PREDNOSTI SAVREMENIH ORGANIZACIJA**

U savremenoj, sve otvorenijoj i integrisanoj svetskoj ekonomiji, konkurentnost zauzima središnje mesto u ekonomskim strategijama, kako razvijenih tako i zemalja u razvoju. Konkurentnost je mera sposobnosti zemlje da u tržišnim uslovima proizvede robe i usluge koje prolaze test međunarodnog tržišta, uz istovremeno zadržavanje i dugoročno povećanje realnog dohotka stanovništva.

U studiji „Konkurentne prednosti država“, Majkl Porter je razvio novu teoriju konkurentnosti, prema kojoj prednosti pojedinih država nisu nasleđene, već stvorene strateškim izborima. Dok se u prošlosti razvitak zemlje zasnivao na komparativnim prednostima, poput jeftine radne snage i prirodnih resursa, u savremenom razdoblju se osnovom za ekonomski razvitak smatraju napredni faktorski uslovi zasnovani na znanju i razvijenoj infrastrukturi, visokim tehnologijama i inovacijama. Po Porteru nije važno koji se proizvodi proizvode, već kako se proizvode.<sup>35</sup>

Konkurentne prednosti se stvaraju i održavaju stalnim unapređivanjem načina konkurisanja, koji proizilaze iz jedinstvenih nacionalnih proizvoda i procesa.

Iako su po svojim osnovnim ulogama javni i privatni sektor različiti, međusobno su povezani u stvaranju produktivnog i konkurentskog poslovanja. Dobra fiskalna i monetarna politika, efikasni

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<sup>34</sup> Lazarević, M. (2006) Uloga menadžera u kreiranju konkurentne prednosti na svetskom tržištu, Institut ekonomskih nauka, Beograd

<sup>35</sup> Porter, M. (2008) O konkurenciji [prevod sa engleskog Mira i Vera Gligorijević], Fakultet za ekonomiju, finansije i administraciju, Beograd

pravni sistem i stabilne demokratske institucije neophodni su za uspešnu ekonomiju, ali nisu dovoljni. Konkurentne prednosti savremenih organizacija nastaju na mikroekonomskom odnosu

poslovanja, koje je utemeljeno na kvalitetu mikroekonomskog i makroekonomskog poslovnog okruženja.

Uporedo sa razvojem društva dolazi i do promena u načinu poslovanja. Menja se koncept poslovanja i međunarodnih poslovnih aktivnosti sa makroekonomskog na mikroekonomski nivo.

Firma predstavlja ključnog nosioca međunarodnog poslovanja, međunarodne razmene roba i usluga. Pojava internacionalizacije i globalizacije proizvodnje i razmene dovela je do pitanja šta i

gde proizvoditi, kao i koliko i kako proizvoditi.

Novi okviri međunarodnog poslovanja i međunarodne razmene, umnogome su pojačali potrebu za uključivanje firmi u međunarodne tokove. Uključivanje u međunarodno i globalno tržište je neminovnost, razlozi koji govore u prilog tome su između ostalog:<sup>36</sup>

- konkurencija je sveobuhvatnija, kompleksnija, jača,
- tehnološke promene su mnogo brže i tehnološki razvoj je skuplji (posebno je skup za male firme kada je u pitanju razvoj proizvoda),
- barijere za ulazak na savremena tržišta su sve veće, kao i troškovi održavanja odnosno zadržavanja tržišta,
- firmi je sve potrebnije postizanje odgovarajuće ekonomije obima i ekonomije znanja.

U savremenom poslovanju došlo je do pojave ranjivosti nacionalnih privreda gubitkom lokalnih atributa i konkurencijom koja je postala međunarodna i globalna po formi, obliku i intenzitetu. Od velikog značaja je i ulaganje u R&D i stvaranje svetske marke.

Potrebno je uspostavljanje strategije firme, određivanje ciljeva i načina na koji se dolazi do postavljenih ciljeva. Strategija je nužan uslov za postizanje konkurentskih prednosti. Biti konkurentan u savremenom svetu zahteva od firmi da lokalne pozicije i prednosti pretvore u globalne, nacionalne u internacionalne. Važno je uspostavljanje globalne strategije.<sup>37</sup>

Konkurentna strategija predstavlja način na koji se kompanija nadmeće na odabranom tržištu proizvoda kako bi ostvarila svoje posebno definisane ciljeve. Da bi kompanija ostvarila svoju konkurentnu prednost, neophodno je da definiše sopstvenu strategiju koja će je razlikovati od ostalih kompanija. Strategija mora da podržava inovacije, promene, stalna poboljšanja, jačanje ukupnog sistema vrednosti i globalni pristup.

Konkurentne prednosti koje su jednom postignute, stečene i verifikovane kao internacionalne pozicije u globalnom sistemu proizvodnje održavaju se i unapređuju putem stalnog traganja za iznalaženjem novih ili boljih načina poslovanja ili stalne promene ponašanja firme u sklopu opšteg, strateškog koncepta delovanja.

Konkurentne prednosti i pozicije lidera u određenim privrednim granama i njihovim segmentima se teško stiču, ali zato dugo drže. Prema Porteru postoji pet kriterijuma na osnovu

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<sup>36</sup> Tošović-Stevanović, A. (2009.) Konkurentne prednosti i inovacije, Zadužbina Andrejević, Beograd, str.13

<sup>37</sup> Drucker, P. (1999) Management challenges for the 21st Century, Harper Colins, NY

kojih je definisana atraktivnost tržišta:<sup>38</sup> - nove ili promenjene potrebe kupca, - nove ili promenjene tehnologije, - neophodnost novih privrednih segmenata, - promenjeni inputi troškova ili koristi, promene u upravljačkoj funkciji.

Neophodno je stvoriti diferencijalnu konkurentsku prednost. To se može postići ostvarenjem:

- menadžmenta know-how-veština u vođenju poslova na mnogim tržištima, obično stečena iskustvom u različitim zemljama, multinacionalne mreže distribucije i prodajnih ogranaka u mnogim zemljama; pristup retkim sirovinama; uspostavljanje jake marke proizvoda ili trgovinskog imena; posedovanja tehnologije koju će konkurencija kopirati itd. Od velikog je značaja da se poslovanje usmeri ka potrošaču, da se ima vizija, da su planovi održivi na dugi rok i da su razumljivi, fleksibilni, motivacioni. Svaka kompanija proživljava svoj životni ciklus i ako je uspešna, znači da ga je izgradila po svojoj meri..

## 5. DEFINISANJE UTICAJNIH FAKTORA KONKURENTNOSTI KOMPANIJA

Konkurentske prednosti, prema Porteru, ne proizilaze iz međuzavisnosti faktorskih intenzivnosti na nivou grana i prirodnih bogatstava date države. One su rezultat napora kompanija da razviju nove proizvode ili unaprede postojeće, razviju nove robne marke, unaprede sisteme plasiranja proizvoda na tržište i uopšte da inoviraju u širem smislu. Napori menadžmenta kompanije daju podsticaj za razvoj konkurentskih prednosti tamo gde postoje uslovi koji stimulišu inoviranje, bez obzira na faktorsku intenzivnost grana i firmi. Uslovi mikroekonomskog okruženja su uobličeni elementima Porterovog dijamanta konkurentskih prednosti. Ovi uslovi jesu neophodni, ali ne i dovoljni. Kompanije moraju da razviju odgovarajuće strategije kako bi odgovorile na spoljne podsticaje, a same se strategije razlikuju prema lokaciji. Kombinacija spoljnih podsticaja (dijamant) i odgovarajućih strategija kompanija – imajući u vidu specifičnosti svake zemlje posebno – predstavlja konkurentski potencijal jedne zemlje. Porter navodi brojne primere zemalja i privrednih grana kako bi pokazao kako konkurentske prednosti proizilaze iz ove kombinacije, ističući da tradicionalna učenja o apsolutnim i relativnim komparativnim prednostima ne mogu dobro da objasne savremene oblike trgovine između zemelja. Međutim, ono što je značajno jeste Porterova tvrdnja da ocena nacionalnog dijamanta i strategija kompanija omogućavaju ocenu konkurentskog potencijala svake zemlje na mikronivou.<sup>39</sup>

Pravilno shvatanje koncepta konkurentnosti, prema Porteru, podrazumeva nalaženje odgovora na pitanje:<sup>40</sup> Šta je izvor konkurentnosti država, odnosno šta je u osnovi državnog prosperiteta i životnog standarda? Životni standard je rezultat produktivnosti date privrede, merene vrednošću dobara i usluga proizvedenih po jedinici ukupnih resursa kojima jedna ekonomija raspolaže (ljudski kapital, finansijski kapital, prirodni resursi). Konkurentnost zasnovana na produktivnosti je u saglasnosti sa ekonomskim razvojem i visokim životnim

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<sup>38</sup> Porter, M. (2008) O konkurenciji [prevod sa engleskog Mira i Vera Gligorijević], Fakultet za ekonomiju, finansije i administraciju, Beograd

<sup>39</sup> Porter, M. (2007) Konkurentska prednost-Ostvarenje i očuvanje vrhunskih poslovnih rezultata, [prevod sa engleskog Mira i Vera Gligorijević] Asse, Novi Sad, str.23

<sup>40</sup> Isto, str. 91

standardom stanovništva (adekvatno plaćena radna snaga, jaka nacionalna valuta, visoki prinosi na kapital.)

Mikroekonomsku osnovu produktivnosti čine dve međusobno povezane oblasti:

- 1) stepen razvijenosti strategija i operativne prakse kompanija, i
- 2) kvalitet mikro i makroekonomskog poslovnog okruženja.

Jedna ekonomija ne može biti konkurentna ako kompanije koje posluju u njoj nisu konkurentne, bez obzira na to da li se radi o domaćim ili stranim kompanijama i njihovim filijalama. S druge strane, razvijenost strategija i operativnih praksi kompanija je neizbežno povezana sa kvalitetom poslovnog okruženja. Naprednije i razvijenije korporativne strategije zahtevaju visokoobučenu radnu snagu, laku dostupnost informacijama, kvalitetnu infrastrukturu, brojne ponuđače, razvijene naučnoistraživačke institucije i prisustvo jake konkurencije. Uspešan ekonomski razvoj zahteva od kompanija stalno pronalaženje novih izvora konkurentskih prednosti, odnosno unapređivanje načina konkurisanja. Konkurencija kompanija zasnovana na komparativnim prednostima (jeftina radna snaga i prirodni resursi) mora ustupiti mesto konkurenciji kompanija baziranoj na konkurentskim prednostima koje proizilaze iz jedinstvenih nacionalnih procesa.

Danas se smatra da organizacija ima najviše izgleda za uspeh u onim industrijskim granama ili segmentima u kojima su najpovoljniji dijamanti, izraz koji koristi da bi označio odrednice sistema koje se međusobno podržavajući podupiru u ostvarivanju najpovoljnijih rezultata za sistem kao celinu. Slabost bilo koje odrednice limitiraće potencijal cele privredne grane za unapređenje i poboljšanje. Prednosti u jednoj odrednici mogu da stvore ili poboljšaju prednosti u drugima. Prednosti u čitavom dijamantu neophodne su za postizanje i održavanje konkurentskog uspeha u privrednim granama koje zahtevaju intenzivno korišćenje znanja, a sačinjavaju osnov strukture razvijenih privreda i svetske privrede u celini. U osnovi koncepta konkurentskih prednosti nalazi se inovacija i promena, uključujući i promenu i kreiranje konkurentskih prednosti.

## **6. ZNAČAJ NOVIH TEHNOLOGIJA I INOVACIJA**

Konkurentnost u nacionalnoj i međunarodnoj ekonomiji važno je analizirati putem tehnoloških promena, koje utiču i na strateške i na strukturne promene u ekonomiji.

Tehnologija je proces, tehnika ili metodologija koja je opredmećena u dizajnu proizvoda, ili u industrijskim ili uslužnim procesima, koja transformiše inpute rada, kapitala, informacija, materijala i energija u outpute veće vrednosti. Tehnologija se odnosi na procese pomoću kojih organizacija transformiše rad, kapital, materijale i informacije u proizvode ili usluge. Tehnološke promene igraju važnu ulogu u konkurentskoj dinamici. Promene imaju nekoliko ishoda. Prvo, donose nove proizvode i procese. Drugo, menjaju vrednost lanca i vrednost konstalacije firme. Takođe menjaju i prirodu rivaliteta između firmi. Promene u strukturu privrede su stalne. Nova tehnologija, kao rezultat inovacije, ima za posledicu pojavu novih firmi i novih grana. Praćenjem životnog ciklusa proizvoda i firmi mogu se pratiti i strukturne promene u nacionalnoj i međunarodnoj ekonomiji.

Tehnološke promene bitno utiču na promenu ekonomije. Uočljiv je njihov uticaj na rast i razvoj firmi i svake pojedine grane. Tehnološke promene doprinose i strateškim promenama ekonomije.

One dovode u pitanje postojeću konkurentsku prednost firme, ali i kreiraju novu koja je jača od postojeće prednosti. Tehnološke promene izazivaju stanje u kome mnogi proizvodi i usluge postaju nekonkurentni, pa firme u kojima se dešava taj proces imaju samo dve opcije: smanjiti troškove ili izvršiti tehnološke promene kojima će stvarati nove proizvode ili usluge. U dinamičnoj privredi ovo je stalan proces i predstavlja objektivnu ocenu dometa tehnoloških promena. Tehnološke promene ne snižavaju samo troškove poslovanja, što je nekad bio njihov cilj, već osposobljavaju firmu da menja svoju tržišnu orijentaciju, a u slučajevima novih tehnologija i otvaraju nova tržišta. U XXI veku tehnologija je osnovni izvor konkurentskih prednosti Tehnološke inovacije su prva primena nauke i tehnologije u novom smeru sa komercijalnim uspehom i potencijalnom konkurentskom prednošću.

## 7. ZAKLJUČAK

Respektujući redosled do sada prikazane sistematike izlaganja, a u skladu sa postavljenim hipotezama, moguće je donošenje sledećih bitnih zaključaka: 1. Ponuda i potražnja ispoljavaju svoje delovanje posredstvom konkurencije. U tom smislu konkurencija predstavlja unutrašnju motornu snagu koja pokreće tržišni mehanizam. Usled procesa globalizacije i regionalizacije tržišta, kompanije moraju mnogo ažurnije da razmišljaju o jačanju svoje konkurentnosti. Konkurentnost kao jedan od glavnih faktora privrednog razvoja jedne države, omogućava poboljšanje položaja pojedinca, firme i države u poređenju sa drugim sličnim entitetima. Povećanje konkurentnosti zavisi od različitih elemenata, u zavisnosti od potencijala kojima se raspolaže. 2. Efikasnost na bazi obilja prirodnih resursa i jeftine radne snage je legitimna konkurentna strategija. Problem je u tome što prirodni resursi i jeftina radna snaga, čak i kada ih ima u izobilju, predstavljaju resursnu kombinaciju koja se lako imitira, tako da postoji velika verovatnoća pojave novih konkurenata koji isti proizvod mogu ponuditi po nižoj ceni. S druge strane, zemlje koje su podigle životni standard taj prosperitet su prevashodno ostvarile izvozom proizvoda i usluga višeg stepena prerade, plasirajući ih kupcima sa visokim zahtevima, ostvarujući istovremeno i više cene za svoje proizvode. 3. Moderan način rada kompanija podrazumeva preuređivanje funkcija poslovanja. Preduzeća se moraju okrenuti proaktivnom razmišljanju, koje podrazumeva shvatanje i kreiranje promena, kao i davanje većeg značaja onim funkcijama poslovanja koje omogućavaju preduzeću da realizuje, zadrži i jača svoju konkurentnost. Kvalitet i marketing predstavljaju dve funkcije koje poseduju stratešku važnost za poslovanje kompanije.

Kao rezultat navedenih činjenica i analiza, ističe se da se u savremenom razdoblju, osnovom za ekonomski razvitak smatraju napredni faktorski uslovi zasnovani na znanju i razvijenoj infrastrukturi, visokim tehnologijama i inovacijama i da konkurentske prednosti obuhvataju integralno čitav vrednosni sistem ekonomskog subjekta i relevantnog okruženja.

## REFERENCE

1. Drucker, P. (2003) Moj pogled na menadžment, Adižes, Novi Sad
2. Drucker, P. (1999) Management challenges for the 21st Century, Harper Colins, NY
3. Kotler, P. (2003) Kako kreirati, ovladati i dominirati tržištem, Adižes, Novi Sad

4. Lazarević, M. (2006) Uloga menadžera u kreiranju konkurentske prednosti na svetskom tržištu, Institut ekonomskih nauka, Beograd
5. Lončarević, R. Mašić, B., Đorđević – Boljanović, J. (2007) Menadžment. Principi, koncepti i procesi, Univerzitet Singidunum, Beograd
6. Milisavljević, M. (2000) Strategijski menadžment, Čigoja štampa, Beograd
7. Northouse, P. (2008) Liderstvo – teorija i praksa, prevod sa engleskog, Data status, Beograd
8. Porter, M. (2008) O konkurenciji, FEFA, Beograd
9. Porter, M. (2007) Konkurentska prednost-Ostvarivanje i očuvanje vrhunskih poslovnih rezultata, Asse, Novi Sad
10. Robbins S. Coulter M. (2005) Menadžment, Data status, Beograd
11. Stošić Mihajlović Lj. (2016) Marketing, VŠPSS, Vranje
12. Stošić Mihajlović Lj. (2015) Tržište, troškovi i cene, VŠPSS, Vranje
13. Tošković-Stevanović A. (2009) Konkurentske prednosti i inovacije, Beograd



## THE ADVANTAGES AND DISADVANTAGES OF PUBLIC-PRIVATE PARTNERSHIPS

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**Abstract:** For a high quality public services, building infrastructure, providing a variety of services, it is necessary to provide the enormous resources. The budgets of local and central government are limited and usually there is not enough money for the realization of numerous projects simultaneously. Therefore, the public sector seeks help from private. Public-private partnership is a form of cooperation between local and central authorities and private companies. This kind of partnership is usually established in sectors such as transport, waste disposal, water supply and electricity, but also in health care or education. In EU countries, this model of cooperation is on the rise the last two years, while the country is only just beginning. Many case studies around the world show that the PPP failed to fulfill their promise. In most cases, they are expensive and inefficient financing of infrastructure and services, because they hide public debt, while ensuring long-term government guarantee that growth profit private companies. A large network of international institutions, governments and corporate bodies to actively promote the PPP. This promotion has two forms: marketing and advertising at global level; and spending money to subsidize the flow of private debt PPP. This network operates on the global, regional and national levels.

**Key words:** Public-private partnership, the public sector, finance, investment, international financial institutions.

### 1. UVOD

JPP je jedinstveni model saradnje u kojoj obe strane dobijaju. U EU on postoji više decenija dok je u Srbiji definisan tek Zakonom o Javno privatnom partnerstvu i koncesijama. Javno-privatna partnerstva mogu Srbiji doneti veliku korist jer izgradnju škola, bolnica, te puteva pomažu privatne kompanije čime se ne terete budžeti lokalnih samouprava i države.

Zakon propisuje sve oblasti u kojima su ovakvi projekti mogući kao i vrste partnerstava. O

tome da li se neki projekat može realizovati kao JPP i po kom modelu, odlučuje devetočlana Komisija koja radi pri Vladi RS. Nju čine predstavnici relevantnih ministarstava, grada Beograda i Vojvodine.

Pitanje odabira modela finansiranja izgradnje takvog projekta zavisi od toga da li postoje raspoloživa sredstva ili ne i da li i u kom segmentu će rizik za izgradnju tog objekta, upravljanje i održavanje tog objekta preuzeti javna strana ili privatna. Ono što se plaća privatnom partneru jesu upravo te neke naknade koje mogu da budu na mesečnom nivou godišnjem nivou i one su uglavnom fiksne. Projekti JPP su dugi i traju od 5 - 50 godina. Za to vreme privatniku će se vratiti uloženi novac a kad ugovor istekne dobro ili usluga pripada javnoj strani. Ako se jedna ili obe strane ne pridržavaju ugovorenih obaveza

partnerstvo se prekida. Kako bi partnerstva koja se sklapaju u Srbiji bila što povoljnija za obe strane, pomoć pruža Centar za JPP pri privrednoj komori Beograda. Pored stručnih saveta, Centar organizuje i edukativne seminare širom zemlje. Sustina je da mora da se reši ili neka javna usluga ili nesto što je država zakonom obavezna da pruži svojim građanima. Komisija je za godinu dana postojanja odobrila 7 JPP u vrednosti od 500.000 do 5 miliona evra uglavnom iz komunalnih delatnosti poput izgradnje javnih garaza ili poboljšanja gradskog prevoza. Samo jedan od njih je počeo sa realizacijom i to u Novom Sadu gde konzorcijum Slovenačkih firmi pomaže postavljanje optičkih kablova. Javno privatno partnerstvo u Srbiji sklapana su i pre donošenja Zakona krajem 2011-te, i to na osnovu Zakona o koncesijama. Zbog toga je u tom periodu sklopljen veoma mali broj partnerstava, po nekim podacima osam, od kojih su neka u međuvremenu i raskinuta.

Jedan od načina da lokalne ali i republičke vlasti obezbede novac za finansiranje infrastrukturnih projekata i javnih usluga je stvaranje javno privatnih partnerstava tj. pronalaženje privatnih partnera. Od 2011. za ovu vrstu saradnje postoji i zakonski okvir, dok je ranije ova vrsta odnosa bila regulisana zakonima o koncesijama ili o javnim nabavkama. Za sada je u Srbiji ostvareno tek nekoliko ovakvih partnerstava, a jedan od razloga za njihov mali broj je i nedovoljan broj obučeni ljudi u opštinama koji znaju šta je sve potrebno da bi se ovakva saradnja ostvarila. Jedan od težih zadataka je i pronalaženje adekvatnog privatnog partnera, gradovi i opštine u Srbiji često nemaju ni dovoljno stručnog kadra koji bi znao da realizuje JPP. Znajući koliko ovo partnerstvo može biti korisno za grad ili opštinu, Nacionalna alijansa za lokalni razvoj i USAID pomogli su predstavnicima 8 opština da razumeju kako funkcioniše i kako se uspostavlja ovakav model saradnje i to kroz pisanje konkretnih projekata.

Prvi korak bio je izrada akcionog plana.

## **2. JPP U SRBIJI**

JPP je nastala kao računovodstveni trik. Moderna verzija JPP, pri čemu privatnu kompaniju plaća vlada, a ne u potrošači, izmišljena je u Velikoj Britaniji u 1980-ih, od strane vlade Margaret Tačer. JPP je fraza koja ima dva značenja. Prva, ona se koristi, posebno u EU, se odnosi na komunalnapreduzeća čije su akcije delimično u vlasništvu vlade ili opštine, a delom jedne privatne kompanije. Drugo, izraz se takođe labavo koristi. Akcioni planovi podrazumevaju da će lokalne samouprave definisati šta će se raditi, kako će se raditi koja su im sredstva potrebna pripremiti odgovarajuće urbanističke planske akte i na taj način obezbede zainteresovanost investitora. Predstavnici ovih 8 opština nisu imali

nedoumice u toku izrade akcionih planova jer su imali stalnu pomoć stručnjaka. Međutim da bi se JPP-a sklapala i u ostalih 166 lokalnih samouprava neophodna je edukacija opštinskih službenika. Opštine i gradovi najčešće i ne znaju u kojim oblastima je moguće sklapati partnerstva sa privatnim sektorom niti imaju obučeni kadar koji zna kako da privuče privatnike da ulažu u njihovu lokalnu zajednicu. Stručnjaci savetuju opštine da prvo prouče Zakon o JPP i koncesijama iz 2011. koji detaljno navodi sve faze u realizaciji projekta po ovom modelu. Počev od pripreme predloga projekta, postupka javne nabavke koja se mora sprovesti da bi se došlo do privatnog partnera pa na kraju do samog nacrtu ugovora čiji se obavezni elementi navedeni u našem zakonu. Da bi nakon pripreme projekta našli domaću privatnu kompaniju koja će uložiti novac, potrebno je da opštine projekat predstavie što većem broju potencijalnih partnera bilo organizovanjem prezentacija u svojim prostorijama,

na svom veb sajtu ili putem mejla. Kada su u pitanju inostrani investitori, stručnjaci savetuju obraćanje stranim institucijama i organizacijama.

Pored kontakta sa trgovinskim odeljenjima ambasada, tu je i SIEPA za opštine u Vojvodini, njihov VIP odnosno njihov fond za privlačenje investicija. Privatne partnere opštine mogu naći i na investitorskim konferencijama koje bi za njih mogale da organizuju asocijacije poput NALED-a koje imaju dobre kontakte sa domaćim i stranim privatnim sektorom.

Imaćemo i pomoć međunarodnih organizacija recimo engleske privredne komore koji će se potruditi da dovede zainteresovane privatne partnere za ove projekte. Kako je JPP nov i složen model saradnje, gradovi i opštine se za stručnu pomoć mogu obratiti Stalnoj konferenciji gradova i opština, NALEDu, posebnom centru kao i Vladinoj komisiji. Međutim da bi lokalne samouprave bile u mogućnosti da same ugovaraju partnerstva neophodna je obuka u svim gradovima i opštinama. U NALED-u kažu da odgovornost za to snosi država.

Komisija za JPP treba da bude nosilac obuke zaposlenih u opštinama koji bi koji bi bili sposobni da iznose takve projekte Kao dodatni vid podrške opštinama Naled organizuje Forum za JPP koji bi uključio sve predstavnike obe strane koji su zainteresovani za ovaj model saradnje. U okviru toga organizuju se okrugli stolovi, seminari na određene teme iz oblasti JPP-a gde bi zainteresovani subjekti mogli da razmenjuju svoja iskustva, mišljenja probleme i ostalo naravno u sve to ćemo uključiti nadležne državne institucije kao Komisiju za JPP. Da bi ova vrsta partnerstva bila zastupljenija u Srbiji, neophodno je da se opštine više angazuju, da pišu projekte i privuku investitore. S druge strane stručnjaci kazu da bi Vladina Komisija za JPP pored toga sto odobrava projekte, trebalo i da promoviše ovaj model partnersva. To je prvi važan korak ka stvaranju uspešnih partnerstva koja omogućavaju unapređenje infrastrukture i javnih usluga. Model JPP se koristio i u 19 veku, za finansiranje velikih infrastrukturnih projekata širom sveta. Tako su izgrađeni i Suecki i Panamski kanal ili Transsibirksa železnica. I u Srbiji prve koncesije datiraju iz XIX veka, a neke od prvih su koncesija za eksploataciju rudnika u Majdanpeku koju su dobili Francuzi, i uspostavljanje tramvajskog saobraćaja u Beogradu, što je povereno firmi iz Italije.

### 3. JPP U EU

"Termin javno-privatno partnerstvo" nije definisan na nivou Unije. Odnosi se na oblike

saradnje između državnih organa i sveta biznisa koje imaju za cilj da obezbedi finansiranje,

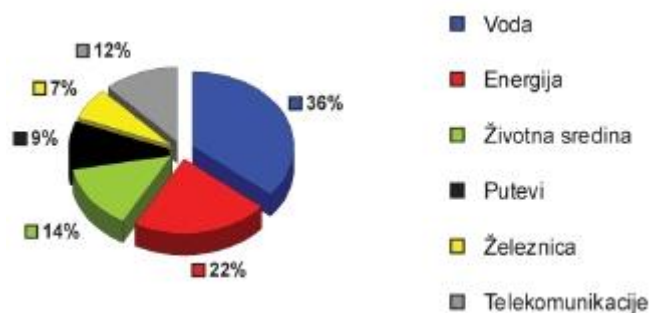
izgradnju, renoviranje, upravljanje i održavanje infrastrukture i pružanje usluga. Partnerstvo javnog i privatnog sektora u obavljanju javnih usluga i za izgradnju infrastrukture, više od dve decenije predstavlja uobičajenu praksu u zemljama EU. JPP sklapaju se ne samo unutar državnih granica već i na nivou Unije, odnosno između privatnih kompanija i institucija EU i to za poslove koji treba da donesu napredak čitavoj Evropi. Neka od poslednjih ovakvih partnerstava, sklopljenih na nivou EU, tiču se naučnih istraživanja i inovacija u oblastima medicine, saobraćaja, zaštite životne sredine, ali i razvoja interneta i digitalizacije kulturnog nasleđa. Kako su koncipirana ova partnerstva i kakve rezultate postižu JPP u Evropi i svetu kao model privatizacije primenjuju se intenzivno u poslednjih dvadeset godina. Samo u poslednjih pet godina na globalnom nivou je uložena suma od 300 milijardi dolara iz privatnog sektora u infrastrukturu kroz JPP i koncesije. Navedeni podaci ukazuju na

značajna infrastrukturna ulaganja, iako se ovaj model ne primenjuje u jednakoj meri svuda, posebno kada su pitanju zemlje članice Evropske unije. Naime, primetne su značajne razlike u ostvarenim JPP projektima na teritoriji „starih“ država članica u odnosu na države koje su se pridružile 2004. i 2007. godine. Razlog ovom „raskoraku“ je u činjenici da je 15 država zajednički integrisano u EU mnogo ranije u odnosu na zemlje postsocijalističkog bloka.

Stoga su ove zemlje mnogo duže koristile sredstva iz strukturnih fondova Evropske unije.

Zahvaljujući dužem korišćenju budžetskih sredstava EU, one danas iziskuju mnogo manja novčana ulaganja u infrastrukturu. Za razliku od njih javni sektor zemalja koje se još uvek nalaze u tranzicionom periodu prolazi kroz duboku krizu, pa se procenjuje da buduća infrastrukturna ulaganja u njihovom slučaju premašuju cifru od 500 milijardi eura. U tu svrhu, Evropska unija je u okviru programa za 2007-2013 godinu izdvojila ukupan iznos od 180 milijardi eura. Najviše interesovanja za JPP pokazala je Mađarska, što je i razumljivo obzirom da ova država već više godina unazad ima visok budžetski deficit. Mađarska primenjuje javno-privatna partnerstva u raznim oblastima: izgradnja sportskih dvorana, hostela, drumske i željezničke infrastrukture, otpadnih voda.

Tabela 1. Potreba ulaganja u infrastrukturu CIE po sektorima 3:



Izvor: Javno privatna partnerstva u regionu“, Pricewaterhouse Cooper, Interexpo, novembar 2009, str. 6

Problem sa manjkom transparentnosti i kršenjem zakonskih procedura postoji u mnogim

zemljama. Manjak transparentnosti i odstupanje od zakonom propisanih normi doprinosi

koruptivnim radnjama. Zbog toga eksperti u ovoj oblasti preporučuju da se oblast javno -

privatnih partnerstava, tj. ugovora ovog tipa „povjeri“ specijalizovanim telima i institucijama.

Zadatak ovakvih tela jeste da ukazuje na neophodne promene u zakonodavstvu i upravljanju JPP, kao i da objavljuvanjem dokumentacije utiču na transparentnost procesa. Zaposleni u ovakvim institucijama su, po pravilu, profesionalci koji u ulozi savjetnika predlažu rješenja za svaki pojedinačni ugovor JPP. Na transparentnost procesa svakako utiču i finansijski detalji ugovora JPP pa je zato neophodno jasno iznošenje u javnost finansijskih obaveza i rokova za njihovo izmirenje.

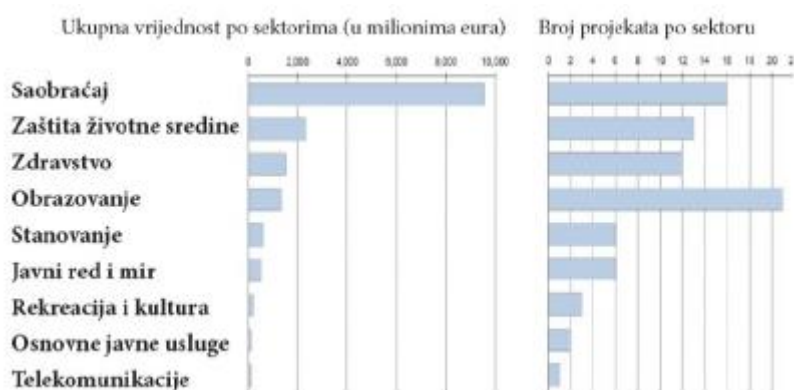
Tokom 2013. godine na evropskom kontinentu je zaključeno 80 JPP projekata u vrednosti od 16,3 milijardi eura. Najviše projekata je zaključila Velika Britanija.

Najzastupljeniji projekti u 14 zemalja koje su imale makar po jedan JPP projekat su: po vrednosti - u sektoru saobraćaja; po broju - u sektoru obrazovanja.

Broj zaključenih projekata na evropskom nivou u jednogodišnjem periodu ukazuje na to da je sprovođenje javno-privatnog partnerstva izazov i za one zemlje koje imaju definisan pravno-institucionalni okvir, odnosno koje imaju više iskustva u sprovođenju ove vrste projekata.

Upravo iskustva zemalja Evropske unije i zemalja u okruženju govore da je neophodno pronaći optimalan način za transfer ekspertize u oblasti JPP na lokalni nivo.

Tabela br.2 : Pregled zaključenih JPP projekata u 2013. godini po sektorima 5



Izvor: "Review of the European PPP market in 2013", EPEC, February 2014

Nemačka pati od velikog nedostatka investicija za svoju infrastrukturu.<sup>41</sup> Vlada ulaže premalo, pozajmljivanje je malo, dok domaća privatna preduzeća ulagažu u inostranstvo. Ulaganje u optičke kablove i obnovljivih izvora energije trenutno zavisi o zadrugama i drugim lokalnim inicijativama. JPP su pokazala uobičajene probleme. JPP za novi berlinski aerodrom je prekinuta; nova koncertna dvorana u Hamburgu je prvobitno procenjena da će koštati milion € 114 i da bude završena u 2010. godini, ali privatno građevinsko preduzeće Hochtief sada očekuje se da bude završena u 2017. po ceni od 780 miliona €. <sup>42</sup>

### 3. PREPREKE ZA STVARANJE JPP

Javno privatnih partnerstava jedan je od načina za razvoj infrastrukture i javnih usluga u opštinama i gradovima Srbije, a ovakav vid saradnje od 2011. regulisan je i posebnim Zakonom. U Srbiji je do sada ostvareno tek nekoliko javno privatnih partnerstava, a neki od razloga za njihov mali broj su nepoznavanje načina na koji ovaj model funkcioniše,

<sup>41</sup> Ukupne rente jednog godina JPP projekata za 90 škola u Offenbach porastao od početne prognoze 780 miliona € do milijarde € 1.3. Predloženo JPP da se ponovo izgradi A7 Autobahn pokazao je da je miliona € skuplji od prvobitno dogovorenog.

<sup>42</sup> Npr. južni most u Rigi (Letonija) je jedan od primjera kada projekat JPP doprinosi u žižu interesovanjaj zbog stalnog povećanja troškova

nedovoljan broj obučenih ljudi na lokalnom nivou, nemogućnost pronalaženja adekvatnog partnera. Čak i kada se uđe u postupak priprema za stvaranje ovakvog partnerstva i dalje se javljaju bojazni i nejasnoće. Izgradnja škola, puteva, bolje komunalne usluge, postaju lista lepih želja za lokalne samouprave. Prezaduženi budžeti takve projekte ne mogu da podrže te se opštine i gradovi sve više okreću saradnji sa privatim sektorom i to kroz JPP. Ovaj model praktično znači da privatnik ulaže novac za unapređenje npr javnog prevoza a za uzvrat dobija priliku da ostvari profit od prodaje autobuskih karata. Iako je cilj ovih partnerstava da obe strane budu na dobitku, kod nedovoljno informisanih lokalnih samouprava javlja se bojazan da ne budu izigrane od strane privatnika. Da bi JPP bila uspešna, opštine moraju dobro da procene i podele rizike sa privatnicima. Pored poteškoće u pisanju projekta, predstavnici lokalnih samouprava kažu da je za realizaciju partnerstva veliki problem što pravna regulativa nije usaglašena sa Zakonom o JPP. Mi imamo zakon o poljoprivrednom zemljištu koji nam ne dozvoljava da damo zemlju u dugoročniji zakup kako bi odgovaralo ili odgovarajuću površinu nemamo u svom vlasništvu nego je to državno poljoprivredno zemljište pa zbog toga treba tražiti saglasnost odgovarajućeg ministarstva. Nadležni kažu da o promeni Zakona o poljoprivrednom zemljištu treba razmišljati samo ako se u više slučajeva potvrdi da je to neophodno i da izolovan primer Zrenjanina nije dovoljan razlog. S druge strane dopunu zakona o JPP traže pojedini privatnici. Austrijska firma sklopila je 25ogodišnja partnerstva sa 12 opština u oblasti prikupljanja i deponovanja otpada. Predstavnici ove firme kažu da je veliki problem što im opštine zabranjuju da podižu cene svojih usluga čak i kada je to opravdano, odnosno kada im troškovi npr za benzin ili rezervne delove porastu. Zbog toga profit ne mogu da ostvare posle dogovorenih 12 već posle 20 godina. Tako da smo mi u ovom trenutku privatni partner koji je sa lokalnom samoup. usao u jedan problem a nema mogućnost nekog nadležnog tela koje je više od lokalne samouprave kome bismo se mi u ovom trenutku obratili. Organ koji bi bio arbitar između partnera se neće formirati, kažu u Komisiji, jer nije u duhu JPP-a. Zakon je opštinama dao samostalnost u odlučivanju i vođenju ovakvih projekata. Svaki problem koji nastane u toku njihove izrade, rezultat je loše procenjenih rizika zbog čega u krajnjem slučaju može da dođe i do raskidanja partnerstva.

Kako je ovaj model nov u Srbiji, opštinama je potrebna edukacija kako bi sigurnije sklapale ugovore sa privatnicima. Ono što će za početak pomoći lokalnim samoupravama je priručnik koji NALED i u kom će se kroz primere dobre i loše prakse ukazati na moguće probleme i rešenja. Važno je razumeti da javno privatna partnerstva nemaju komercijalnu svrhu tj. da predmet ovakve saradnje ne može biti samo komercijalno korišćenje dobara za opštu upotrebu. To naravno ne znači da javni i privatni sektor ne mogu da sarađuju na komercijalnoj osnovi, ali se onda takva saradnja reguliše po nekom drugom zakonu, a ne po Zakonu o JPP.

Lokalne samouprave, koje po pravilu raspolažu malim budžetima muče se sa obezbeđenjem boljih javnih usluga, zaštita životne sredine, pomoć ugroženim grupama stanovništva. Jedan od načina za izlaz iz ovakve situacije je sklapanje lokalnih partnerstava, i to kako sa privatnim tako i sa civilnim sektorom. Stvaranje lokalnih partnerstava jednostavnije je od sklapanja javno privatnih partnerstava, i za njih nema ograničenja u kojim se sve oblastima mogu sklapati. Nevladina organizacija "Građanske inicijative" je svojevremeno organizovala radionice u pet gradova Srbije kako bi lokalne aktere upoznala sa ovakvim modelom partnerstva. Visoka stopa nezaposlenosti, slab privredni razvoj i neiskorišćeni resursi netaknute prirode Priboja, podstakli su članice organizacije Ženska inicijativa da preduzmu korake kako bi se ovakva situacija promenila. Odlučile su da unaprede seoski turizam.

Međutim svoje ideje nisu mogle same da ostvare, pa su pomoć potražile od lokalne samouprave, privatnog i civilnog sektora i sa njima sklopile lokalno partnerstvo. Tako da su one na osnovu tog lokalnog partnerstva, našle podrške, podrške opštine, već ojačale i prodaju taj svoj smeštaj jako uspešno. Fond za otvoreno društvo je prepoznao to osnaživanje njihovo u razvoju turizma tako da je to jedan od uspešnih primera realizacije projekta lokalnog partnerstva Za razliku od zemalja EU koje dobro poznaju koncept saradnje javnog, privatnog i civilnog sektora, u našoj zemlji on tek počinje da se razvija. Među prvima su se sa modelom lokalnog partnerstva upoznali i predstavnici vlasti, privatnog sektora i organizacija civilnog društva iz Pirota, Uzica, Babušnice i Leskovca i to kroz projekat "Građanskih inicijativa".

Bilo je teško okupiti tri grupacije u lokalnoj sredini na jednom mestu. Biznis danas najčešće nema vremena i ne razume civilni sektor, civilni sektor nema vremena i ne razume biznis.

Lokalna samouprava se pita što bismo se mi konsultovali sa građanima. Ipak, posle obuke predstavnika sva tri sektora, postalo je jasnije zašto je lokalno partnerstvo korisno. Bitno je da su tri strane tri aktera prepoznala zajednički interes da su zajedno prošli kroz taj proces prepoznavanja problema, da imaju ideje šta jedni od drugih mogu da očekuju, da podele uloge, i da onda to sve stave na papir i potpišu. Zahvaljujuci ovom projektu, 4 od 5 gradova su pok za saradnjom sa nevladinim i biznis sektorom, međutim samo Priboj i Babušnica su ta partnerstva i realizovali. Razlog sto se opštine teško odlučuju za ovaj vid saradnje je što sporazumi o ovakvim partnerstvima nisu obavezujući i što lokalne vlasti najčešće ne žele da rade više nego što zakon propisuje, čak i kada je to u korist grada ili opštine. Još uvek postoji velika inercija u opštinama kada je u pitanju ekonomski razvoj ili društveni razvoj, jer opštine očekju da to zakon regulise. Znači one očekuju zakonsku prinudu da se bave razvojem. Drugi problem koji usporava razvoj partnerstava u opštinama je diskontinuitet vlasti. Čim vi imate promene koje su izazvane izborima vi imate, kao da se pre toga, kao da je spržena zemlja, kao da se pre toga nista nije događalo i novi ljudi moraju prakticno da počinju stvari ispočetka ili oni koji su već iz nevladinog sektora bili u toj priči oni moraju ponovo da ubeđuju tu novu garnituru. Da razvoj opština ne bi, kao do sada, stao zbog promene vlasti direktor Regionalne agencije Zlatibor kaže da su neophodne dopune Zakona o lokalnoj samoupravi. Pre svega treba da se detaljno propišu obaveze opštinskih kancelarija koje su zadužene za lokalni ekonomski razvoj. Tako da bi trebalo sistemski rešiti da se stvori minimum odnosno obaveznost opština o minimumu poslova koje bi radile kancelarije. Da se definiše model, minimalni model koji bi podrazumevao opis poslova kancelarija za LER i mozda definisani broj ljudi u kancelarijama za LER Dok se ovakve zakonske promene ne usvoje, poruka koja bi mogla da pokrene lokalne samouprave stiže iz EU. U novom ciklusu dodele sredstava iz IPA fondova koji pocinje 2014. glavni adut opštinama i gradovima za dobijanje finansijske pomoći biće upravo lokalna partnerstva. Zato je neophodno da se lokalne samouprave aktiviraju, prepoznaju probleme i nađu partnere za njihovo rešavanje. Lokalne samouprave moraju da budu aktivne u potrazi za partnerima koji finansijski mogu da podrže realizaciju njihovih projekata. Potrebno je da za potencijalne partnere organizuju prezentacije, da imaju kvalitetan vebisajt, dok u potrazi za inostranim investitorima, mogu da se obrate stranim predstavništvima, USAID-u ili Evropskoj banci za obnovu i razvoj.

#### 4. JPP U ZEMLJAMA NAŠEG OKRUŽENJA

Zemlje našeg regiona, po uzoru na praksu u razvijenim evropskim zemljama, sve češće se okreću privatnom sektoru kako bi obezbedile finansiranje infrastrukturnih objekata i pružanje javnih usluga. Za stvaranje uspešnih partnerstva javnog i privatnog sektora potrebni su dobro formulisani zakoni i jake institucije. Studija urađena za potrebe EBRD-ija pokazuje da zemljama Istočne Evrope, pored neadekvatnog pravnog i institucionalnog okvira nedostaju iskustvo, kapaciteti i veštine. Najbolje rangirane zemlje, po uslovima za investiranje u javno privatno partnerstvo su Hrvatska, Litvanija i Slovenija, dok su Turska, Bugarska, Rusija i Slovenija najbolje ocenjene kada je reč o primeni dogovorenih projekata. Kakva su iskustva Hrvatske, a kakva Austrije u sklapanju javno privatnih partnerstva Međugradska rečna linija Dunavom Beč- Bratislava otvorena je pre nekoliko godina zahvaljujući partnerstvu grada Beča sa privatnom kompanijom. Vidimo da investicije u saobraćaju ne moraju da se odnose samo na izgradnju auto puteva. Tvin siti linija koja povezuje Beč i Bratislavu je primer partnerstva koje se razvilo na reci. Javno privatna partnerstva u Austriji počela su u većoj meri da se razvijaju sredinom devedesetih godina i to najpre u oblasti zaštite životne sredine. Na ovaj način mnoge lokalne samouprave su uspele da realizuju infrastrukturne projekte koji se ticu prečišćavanja otpadnih voda i upravljanja otpadom. Zahvaljujući javno privatnim partnerstvima građani dobijaju infrastrukturne i druge objekte koje lokalne samouprave ili država ne mogu sami da finansiraju. U ovom slučaju prednost je u tome što je reč o zaštiti životne sredine, na taj način rešavaju se komunalni problemi što doprinosi boljem životu ljudi.

I u našem susedstvu u Hrvatskoj, finansiranje projekata putem javno privatnog partnerstva sve više dobija na značaju. Hrvatska je usvojila zakon koji regulise ovu oblast 2008. godine a do 2012. uspeła je da realizuje projekte u vrednosti od oko 350 miliona evra. Najveće dvorane u Hrvatskoj izgrađene su uz pomoć jpp-a, zatim škole, bolnice nekakve i evo najnoviji primer je Aerodrom Zagreb, to je 2012 godine potpisan ugovor i sad je upravo realizacija. Hrvatska planira da u narednom periodu realizuje projekte u vrednosti od oko 2 milijarde evra. Najveći deo novca oko milijardu i po, investirace se u projekte kao sto su postavljanje javne rasvete, tretman otpadnih voda i upravljanje otpadom. Vi imate multinacionalne kompanije u inostranstvu koje se isključivo time bave, između ostalog finansiraju u bolnice, dakle u zdravstvo, u škole, obrazovanje, recimo u zatvore, vi imate specijalizovane agencije koje svetom zapravo šire se na taj način svoj poslovni delokrug upravo izgrađujući ovakve objekte u državama kojima nedostaje vlastitih sredstava. Javno privatna partnerstva u Srbiji počela su da se realizuju tek nedavno.

Zakon koji uređuje ovu oblast donet je 2011 godine, a neki od prvih projekata sprovedeni su upravo uz pomoć austrijskih kompanija. Tako su na primer uz partnerstvo dve austrijske

firme, četiri grada u Srbiji rešili problem iz oblasti upravljanja otpadom. U Srbiji postoje potencijali za razvoj komunalnih usluga upravo putem javno privatnih partnerstava. Srbija je tek nedavno krenula sa ovakvim projektima i treba reći da mnoge kompanije koje zele da investiraju jos uvek nisu uocile Srbiju na 25 svom biznis radaru. Neophodno je i da Srbija nastavi da radi smanjenju administrativnih procedura kako bi olaksala dolazak investitora. Od 24 zemlje istočne evrope, Srbija po potencijalima za ulaganje putem javno privatnih partnerstava zauzima 14. mesto pokazuje istrazivanje Evropske banke za obnovu i razvoj.



Zakonodavni okvir i efikasnost administracije su bili neki od kriterijuma po kojima je rađena ova lista. Hrvatska je u ovom rangiranju zauzela prvu poziciju. Postupak sto je kraći, što je jednostavniji, to će biti više zainteresovanih jer ako imate preduge i komplicirane postupke investitori ili agencije koje se bave time će biti veoma suzdržane da dođu na tržište.

U protekle dve godine u Srbiji je odobreno svega 6 projekata javno privatnog partnerstva. To između ostalog govori o tome i da lokalne samouprave još uvek ne prepoznaju u dovoljnoj meri koristi od ovakvog načina finansiranja projekata. Procenjuje se da ove godine vrednost realizovanih investicija u JPP u Evropi iznosi oko 9 milijardi evra. Od ovog novca najveći deo je investiran u sektor transporta, a zatim u zaštitu životne sredine. Najviše partnerstava je realizovano u Velikoj Britaniji, u vrednosti od 3,3 milijarde evra, dok je najskuplji pojedinačni projekat izgradnja auto puta u Italiji koji vredi više od dve (2,3) milijarde evra.

## **5. SARADNJA JAVNIH I PRIVATNIH PARTNERA SRBIJI**

U evropskim zemljama poslednje dve decenije, sklapanje JPP predstavlja jedan od najefikasnijih načina za razvoj infrastrukture i javnih usluga. Ovakav model partnerstava omogućava da se obezbede usluge ili dobra od javnog značaja bez opterećenja državnih i gradskih budžeta. Kako se radi o donekle novim pravilima poslovanja, lokalne vlasti još uvek nemaju dovoljno iskustva u realizaciji javno privatnih partnerstava, zbog čega ih je do sada u Srbiji realizovan samo neznatan broj. Kakva su dosadašnja iskustva u sklapanju JPP u Srbiji i sa kakvim problemima se suočavaju predstavnici opština, prikazaćemo na primeru opštine Loznica.

Iako Loznica nema javno preduzeće za prevoz putnika, njenim ulicama se danas voze autobusi na 30 gradsko-prigradskih linija i to zahvaljujući javno-privatnom partnerstvu sklopljenim sa preduzećem "Lasta". Predstavnici grada koji su prvi u Srbiji ostvarili ovakvo partnerstvo po zakonu iz 2011. kažu da je realizacija takvog projekta veoma komplikovana i da zahteva dugu i složenu proceduru. Pre svega je potrebno uradili koncesioni akt i dobiti pozitivno mišljenje komisije za JPP. Nakon toga je potrebno da skupština usvoji koncesioni akt, a nakon usvajanja sledi raspisivanje javnog poziva. Javni poziv traje 60 dana. Potom se čeka da istekne rok za žalbe a zatim se bira najpovoljniji partner. Za sve to Loznici je trebalo više od godinu dana. Međutim u Centru za JPP koji pruža savetodavnu pomoć u realizaciji ovih projekata ocenjuju da su ovakve primedbe neosnovane i da procedura mora da se poštuje. U Centar za javno-privatno partnerstvokažu da su zakon napravili i da je u celom ovom okruženju oko nas i u EU proglašen za jedan od najboljih zakona i najfleksibilnijih da bi moglo da se sto više projekata realizuje po ovom modelu. Kritike se čuju i iz Zrenjanina.

Predstavnici ovog grada ukazuju da zakon o JPP nije u skladu sa ostalim propisima i da realizaciju koči pribavljanje dozvola. U Zrenjaninu smatraju da zakon o poljoprivrednom zemljestu koji nam ne dozvoljava da damo zemlju u dugoročniji zakup kako bi odgovaralo ili odgovarajuću površinu nemamo u svom vlasništvu nego je to državno poljoprivredno zemljesto pa zbog toga treba traziti saglasnost odgovarajućeg ministarstva Međutim u Centru kažu da je Zakon o JPP potpuno usklađen s drugim propisima i da je procedura dobijanja dozvole neophodna jer je u pitanju državna imovina. Da bi se ovakvi problemi prevazišli, neophodna je sistemska edukacija predstavnika lokalnih samouprava koja zakonom nije predviđena.

Hrvatska ima dobar model edukacije čija Agencija za JPP ima zakonsku obavezu da organizuje seminare za opštine i gradove. Pored toga u ovoj zemlji je osnovan i Centar koji pruža stručnu pomoć lokalnim samoupravama u radu na ovakvim partnerstvima. Godišnja članarina koju gradovi plaćaju za usluge centra je 4000 evra što je povoljnije nego da se za svaki projekat posebno angažuju stručni konsultanti. Da bi se dobra iskustva Hrvatske primenila i u našoj zemlji Komisija Vlade Srbije bi pored davanja mišljenja o tome da li projekti mogu da se realizuju kao JPP, trebala i da ima ulogu edukatora. Za to bi bilo potrebno da se izdvoje dodatne sredstva iz budžeta resornog ministarstva kao i da se zaposle stručnjaci koji bi se samo time bavili, s obzirom na to da sada u njoj sede predstavnici ministarstava kojima je to sekundarni posao. Pošto za sada nema naznaka da će se praksa iz Hrvatske primeniti u Srbiji, opštinama i gradovima kojima je potrebna stručna pomoć mogu da se obrate Centru za JPP pri Privrednoj komori Beograda ili NALED-u. Edukacija lokalnih samouprava nije važna samo da bi se projekti napisali, već i da bi se uspešno realizovali.

Naime, lokalnim vlastima je potrebna savetodavana pomoć kako bi razumeli koja vrsta projekata je atraktivna za potencijalne privatne partnere. Od šest JPP-a za koje je Komisija vlade Srbije do sada dala pozitivno mišljenje, samo jedno je realizovano i to pre svega zbog toga što za ostale nije bilo zainteresovanih privatnih partnera.

## **6. JAVNA PROMOCIJA JPP**

Velika mreža međunarodnih institucija, vlada i kolektivnih tela aktivno promoviše JPP. Ova promocija ima dva oblika: marketing i propagandu na globalnom nivou; i trošenje novca da subvencionišu tok privatnog duga JPP. Ova mreža funkcioniše na globalnom, regionalnom i nacionalnom nivou .

- Međunarodne finansijske institucije (MFI) igra vodeću ulogu: Svetska banka, i njen privatni sektor, IFC; ostali regionalne banke za razvoj, uključujući i evropske banke EIB-a i EBRD; i MMF. MFI ne samo promoviše JPP, oni koriste svoja (javna) sredstava za održavanje i subvencionisanje istih.

Uloga međunarodnih finansijskih institucija (MFI) je od ključnog značaja za finansiranje JPP. Oni pozajmljuju novac na niskim stopama koje organi javnog sektora mogu da dobiju, za projekte koje komercijalne banke ne bi finansirale. Veliki procenat svih JPP oslanjaju se na takve kredite. Mnogi od ovih zajmova idu direktno privatnim preduzećima, što predstavlja mnogo veći procenat zajmova međunarodnih finansijskih institucija. Svetska banka ima istu ulogu kao što je učinio u odnosu na privatizaciju. Najdirektniji primenom uslovljavanja svojim projektima, tako da novac je dostupan za infrastrukturu samo ako vlade koriste JPP.

Trenutno ima 26 aktivnih projekte u vrednosti od preko 4,1 milijardu dolara koji uključuju

neki oblik JPP. Takođe objavljuje tok izveštaja, i organizuje konferencije promovišu JPP. To je dovelo proizvodnju izveštaja o finansiranju investicija za samit u 2013 G20 (sa ulaza iz MMF, OECD, UNCTAD) koji naglašava značaj JPP i potrebu da se podrže sa javnim garancijama i subvencijama.

- Kao i međunarodne finansijske institucije, JPP se u velikoj meri promoviše kroz druga međuvladina tela kao što su G20 i G8, i kroz međunarodnu korporacijuh događaja poput Svetskog ekonomskog foruma (SEF).

- Razvojni ruke EU, njenim članicama, SAD i druge zemlje donatori takođe promoviše i finansira JPP u zemljama u razvoju, uključujući i uslovljavanja pomoći, kao i trgovinske sporazume. Vlade stvaraju specijalne jedinice za promovisanje JPP, i pružaju subvencionisane kredite i garancije za JPP; Evropska unija aktivno podstiče i subvencionira JPP u zemljama članicama.

- Ova javna tela sponzorišu publikacija i savete od međunarodne konsultantske, računovodstva i legalnih firmi, kao što su McKinsey i PWC. Ti konsultacije i sami učine dodatne profite od pravnih i konsultantskom radu koje proizilaze iz kompleksnih ugovornih procesa uključenih u JPP.

## 7. ZAKLJUČAK

JPP su, u većini slučajeva, najskuplji način finansiranja, jer iziskuju povećanje troškova u javnom sektoru. Troškovi finansiranja projekata JPP mogu biti duplo skuplji za javni sektor nego ako vlada pozajmi novac od privatnih banaka, ili direktno emituje obveznice.

Kompanije u privatnom sektoru očekuju da naprave profit za svoje investicije, koje u slučaju neuspeha "Vlada plaća". JPP se mora dodati u ukupnu cenu investicije, dok je u slučaju "korisnik plaća" JPP će povećati troškova za korisnike. U slučaju zemalja u razvoju, prinosi koje zahtevaju investitori su veća nego u razvijenim zemljama, zbog veće mogućeg rizika.

JPP su veoma rizičan način finansiranja za javne institucije. Istorijsko iskustvo nekoliko zemalja pokazuje da JPP može predstavljati veliki finansijski rizik za javni sektor. U fiskalne implikacije JPP dolaze iz netransparentnim potencijalne obaveze (ili rizik od dugova u budućnosti) i očekivanja javnosti da država treba da obezbedi javno pružanje usluga. Ako projekat uspe - a to nije redako - troškovi su ramena od strane javnog sektora, koji mora da spase projekat JPP, ili čak ponekad spasi kompaniju, koja rezultira u privatnim dugovima koji se pomera u javnom sektoru. JPP su obično veoma složena da pregovaraju i sprovede i prečesto podrazumeva veće građevinske i transakcione troškove od javnih radova. Dokaz o uticaju JPP na efikasnost je veoma ograničen i slab. JPP pristalice tvrde da je najveći deo dodatnih troškova privatnog nad javnim finansijama je opravdano zbog povećanje efikasnosti.

## REFERENCE

1. Vladimir M. Vasiljev JAVNO-PRIVATNA PARTNERSTVA U EVROPSKOJ UNIJI I SRBIJI - RAZVOJ MODELA, TRŽIŠTA I ZAKONSKOG OKVIRA, Univerzitet u Beogradu, FPN, doktorska disertacija, 2015.
2. USPEŠNA PARTNERSTVA NA PUTU KA EU BROŠURA O JAVNO PRIVATNIM PARTNERSTVIMA U SRBIJI Beograd decembar 2013.
3. <http://eurodad.org/files/pdf/559e6c832c087.pdf>
4. <http://www.educationincrisis.net/resources/publications/item/1202-why-public-private-partnerships-ppps-don-t-work>
5. Partnerstvo javnog i privatnog sektora: dobre i loše strane,

6. [https://www.google.rs/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjY9NWwh7PSAhXkd5oKHRKtDYoQFggjMAE&url=http%3A%2F%2Fwww.paragraf.rs%2Fpropisi%2Fzakon\\_o\\_javno\\_privatnom\\_partnerstvu\\_i\\_koncesijama.html&usg=AFQjCNGJLkUJCF626hsfZvaktBMmMbnOkw&bvm=bv.148073327,d.bGs](https://www.google.rs/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjY9NWwh7PSAhXkd5oKHRKtDYoQFggjMAE&url=http%3A%2F%2Fwww.paragraf.rs%2Fpropisi%2Fzakon_o_javno_privatnom_partnerstvu_i_koncesijama.html&usg=AFQjCNGJLkUJCF626hsfZvaktBMmMbnOkw&bvm=bv.148073327,d.bGs)

## SCIENCE AND TECHNOLOGY PARK BOR

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**Abstract:** Around the world there are thousands of scientific and technological parks. Despite the fact they are all doing similar work, they are not identical. The purpose of NTP Bor is closely linked to the future of our city as well as providing new opportunities for young people. Due to demographic trends in Bor which have a declining trend, especially when we consider young population, the goal of NTP Bor is to provide conditions for intellectual companionship at the highest level, to create chances to exchange knowledge and ideas, to improve potential of the community and to increase knowledge and achieve suitable bilateral cooperation with similar entities in the world. This research paper provides a review of the current situation in our city and the benefits NTP Bor can provide.

**Keywords:** science and technology park, education, Bor

### 1. UVOD

Ideja za razvoj tehnološkog parka nije nova. Tokom proteklih godina razvojem nauke i internet tehnologija, razvila se i potreba za naučno-tehnološkim parkovima. Naučno-tehnološki parkovi su prvo nastali u SAD-u gde su se razvili tzv. inkubatori. U Nemačkoj i Austriji prevladavaju tehnološki centri, dok u Velikoj Britaniji, Skandinaviji, Belgiji i Holandiji dominiraju naučni parkovi ili centri.

Ciljevi, a ujedno i razlozi za osnivanje naučno tehnoloških parkova, ogledaju se u saradnji postojećih kompanija na polju informacionih i komunikacionih tehnologija, realizaciji projekata koje kompanije nisu sposobne same da izvedu, razvoju neophodne telekomunikacione infrastrukture za lakše poslovanje kompanija, privlačenju velikih inostranih kompanija iz polja tehničkih nauka u region u kome će naučno tehnološki park biti osnovan, razvoju tehničkih fakulteta koji pripadaju univerzitetu u regionu, zaposlenju velikog broja mladih profesionalaca koji će time biti motivisani za ostanak u regionu, podsticanju inovacija i kreiranje ekonomski pozitivnog okruženja, stimulanju osnivanja i finansiranje novih kompanija i utvrđivanju ekonomije bazirane na znanju i inovacijama [1].

Mogu se ustanoviti dva svojstva naučnih parkova. Prvo svojstvo proizilazi iz delovanja NTP poput katalizatora regionalnog ekonomskog razvoja. Drugo svojstvo se odnosi na pojednostavljenje kreiranja i razvoja novih kompanija baziranih na tehnologiji i transfer znanja sa univerziteta u kompanije [2].

Sama lokacija NTP-a je od velike važnosti imajući u vidu to da ukoliko je NTP smešten u blizini važnih kupaca, dobavljača, istraživača i ostalih poslovnih organizacija postoji mogućnost za izgradnju mreže koja će podržati razvoj NTP-a [3].

U ovom radu su analizirani faktori koji bi mogli uticati na formiranje naučno-tehnološkog parka u Boru. TOWS matrica je sastavljena radi identifikacije potencijalnih strategija koje bi se bazirale na snagama, slabostima, šansama i pretnjama u regionu.

## 2. ISTORIJAT NAUČNO TEHNOLOŠKIH PARKOVA

Razvoj naučnih parkova počeo je u Velikoj Britaniji tokom perioda industrijske revolucije i to osnivanjem industrijskog parka Trafford Park Industrial Estate u Mančesteru. Ovo je ujedno bila i najveća industrijska zona u XX veku, a najgori period park je doživeo tokom '70. godina prošlog veka. U Americi je prvi industrijski park napravljen u Čikagu 1905. godine. Međutim, tek nakon II svetskog rata, američke kompanije došle su na ideju da naprave naučno tehnološki park tako što će se udružiti sa univerzitetima. Tokom '50. godina kreirani su prvi naučni parkovi i to Menlo Park i Stanford Science Park u Americi. U Evropi, prvi naučno-tehnološki park osnovan je u Velikoj Britaniji od strane Cranfield i Cambridge univerziteta. Nedugo zatim, 1970. godine osnovan je i Sofia-Antipolis naučni park u Francuskoj, dok su u Italiji i Nemačkoj prvi naučni parkovi osnovani '80. godina [2].

U Srbiji, prvi naučno-tehnološki park osnovan je 2015. godine u Beogradu.

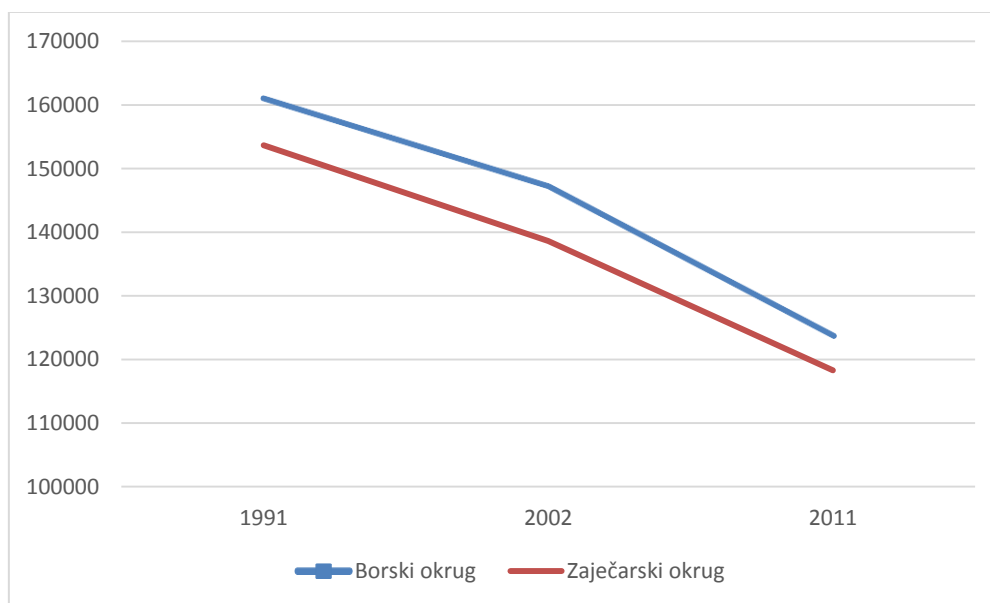
## 3. DEMOGRAFSKA KRETANJA STANOVNIŠTVA BORSKOG I ZAJEČARSKOG OKRUGA

Demografska kretanja jednog regiona ili države značajan su pokazatelj ekonomije te zemlje. Negativna demografska kretanja ukazuju na slabost ekonomije, loš životni standard i nezaposlenost. S druge strane, pozitivna demografska kretanja ukazuju na zdravu ekonomiju i privredu i dobre uslove za život.

Podaci demografskih kretanja u okviru Borskog i Zaječarskog okruga prikazani su u tabeli 1 prema rezultatima popisa izvršenih 1991, 2002 i 2011. godine.

Tabela 1. Stanovištvo Borskog i Zaječarskog okruga prema rezultatima popisa 1991, 2002. i 2011 [4]

Округ	Година пописа		
	1991	2002	2011
Борски	160939	147223	123848
Зajeчарски	153660	138625	118295



Slika 1. Trend ukupne populacije u Borskom i Zaječarskom okrugu

Ukupna populacija u Borskom i Zaječarskom okrugu je tokom prethodnih godina imala opadajući trend. Tokom popisa 1991. godine, u Borskom okrugu registrovano je 160,939 stanovnika, dok je u Zaječarskom registrovano 153,660 stanovnika (Tabela 1). Jedanaest godina kasnije, tokom popisa 2002. godine, broj stanovnika u Borskom okrugu je opao za 8.5% u odnosu na popis iz 1991, dok je smanjenje stanovnika u Zaječarskom okrugu bilo 9.8%. Tokom poslednjeg popisa 2011. godine, broj stanovnika nastavio je da opada. U Borskom okrugu tada je registrovano smanjenje u broju stanovnika od 15.9% u odnosu na popis devet godina ranije, dok je u Zaječarskom okrugu registrovano smanjenje u populaciji od 14.7%. Tabela 2 ukazuje na rast i smanjenje broja stanovnika Borskog i Zaječarskog okruga u sagledanim periodima.

Tabela 2. Rast/Smanjenje broja stanovnika Borskog i Zaječarskog okruga na osnovu popisa 1991,2002. i 2011 [5]

Округ	Раст/Смањење		
	1991	2002	2011
Борски	-13716	-23375	-37091
Зајечарски	-15035	-20330	-35365

Što se prosečne starosti stanovnika tiče, u Boru je prema poslednjim podacima zabeležena prosečna starost muške populacije od 40.9 godina, dok je prosečna starost ženske populacije 43.6 godina. U Zaječaru, prosečna starost muškaraca u populaciji iznosi 43.9 godina, dok je prosečna starost žena u populaciji 47.1 godina (Tabela 3).

Tabela 3. Prosečna starost stanovnika u Boru i Zaječaru [5]

Град	Пол	Просечна старост
Бор	Мушки	40,9
	Женски	43,6
Зајечар	Мушки	43,9
	Женски	47,1

### 3. MISIJA I VIZIJA NAUČNO-TEHNOLOŠKOG PARKA U BORU

Misija naučno-tehnološkog parka u Boru je da ohrabri pametne i školovane ljude da rade i da se usavršavaju i da im pomogne u realizaciji ideja. Takođe, svrha postojanja naučno-tehnološkog parka jeste da pomogne ljudima da realizuju svoje ideje na tržište i da kroz stručnu pomoć ljudi u NTP-u, stvaraju uslove za kreiranje novih proizvoda i usluga i osvajanje novih tržišta.

Naučno-tehnološki park u Boru treba da bude prepoznatljiv kao mesto odakle deluje mnoštvo prepoznatljivih svetskih kompanija. Ujedno, NTP bi trebalo da bude regionalni centar u koji dolaze obrazovani ljudi iz cele zemlje kao i iz zemalja iz okruženja kako bi plasirali svoje ideje na tržište. Ovim putem se stvaraju šanse da se kroz razmenu znanja i ideja, uveća znanje, realizuju nove ideje i stvore šanse da ovaj park postane pogodan za bilateralnu saradnju sa sličnim institucijama iz regiona i sveta. Takođe se, na ovakav način, omogućava mladim visokoškolovanim ljudima da dolaze u Istočnu Srbiju, što će vremenom pozitivno uticati na demografsku strukturu ove regije.

### 5. STRATEGIJSKI CILJEVI OSNIVANJA NTP BOR

Osnivanje Naučno-tehnološkog parka u Boru doprinosi ostvarivanju nekoliko stratezijskih ciljeva. Na prvom mestu, to je stvaranje klime da mladi, pametni i ambiciozni ljudi iz ovog dela Srbije ne napuštaju zemlju, već da svoje ideje realizuju ovde pokretanjem sopstvenog biznisa zasnovanog na idejama visokih tehnologija i njihove realizacije na tržištu. Takođe, ovim putem bi se dala šansa mladim ljudima da svoj potencijal usmere ka stvaranju posla, a ovim putem bi se i monostrukturna privreda zasnovana na prirodnim resursima transformisala u pokistrukturnu u kojoj će znanje biti glavni resurs razvoja ekonomije. Naučno-tehnološki park bi, takođe, doprineo primeni i razvoju savremenih tehnologija, što bi omogućilo da se prate savremena kretanja nauke u svetu. Saradnja sa drugim naučnim parkovima iz zemlje i inostranstva bi doprinela razvoju novih tehnologija, novih materijala i proizvoda, kao i poboljšanju ekonomije zemlje i okruga.

Naučno-tehnološki park u Boru bi sprovodio različite aktivnosti, počev od izrade aplikativnih biznis planova za ocenu ekonomske isplativosti predložene ideje, izrade potrebne administrativne dokumentacije pa sve do edukacija iz oblasti marketinga, upravljanja projektima, stratezijskog menadžemnta i sl.



## 6. SWOT I TOWS ANALIZA BORSKOG I ZAJEČARSKOG OKRUGA

Radi identifikacije konkretnih faktora koji utiču na razvoj Borskog i Zaječarskog regiona, SWOT i TOWS analize su urađene. SWOT analiza je analiza snaga, slabosti, šansi i pretnji. Putem SWOT analize identifikuju se faktori dovodenjem u vezu snaga i slabosti unutar organizacije sa šansama i pretnjama iz okruženja organizacije. TOWS analiza je vrlo slična SWOT analizi i drugačije se naziva situacionom analizom i predstavlja metod identifikacije i analize pretnji i šansi iz okruženja i evaluacije slabosti i šansi unutar jednog entiteta [6]. Analiza faktora može se vršiti na različite načine. Pre svega, treba krenuti od identifikacije problema, a nakon toga treba odrediti ciljeve entiteta i fokusirati se na potencijalne šanse.

Na osnovu detaljne analize, definisane su pretnje koje utiču na razvoj Borskog i Zaječarskog okruga. U središtu posmatranja je region koji i sami stanovnici nazivaju opisuju terminom “slepo crevo”. U tom smislu, moglo bi se istaći da je jedna od najuticajnijih pretnji nerazumevanje vladajuće većine koja pruža otpor promenama u ovom okruženju. Sledeća pretnja koja je postala i odlika ovog okruženja poslednjih godina su nepovoljni demografski trendovi. Statistički podaci popisa u ovom okruženju daju poražavajuće rezultate s obzirom da se beleži veća stopa mortaliteta od nataliteta. Smanjenje broja stanovnika je drastično u poslednja dva popisa koja su se odvijala 2002. i 2011.godine. Prosečna starost stanovnika u zaječarskom i borskom okrugu je od 40 - 50 godina, što ukazuje na nedostatak mladog stanovništva. To se uglavnom može objasniti i “odlivom mozgova” iz ovog regiona. Pored toga, nestabilna ekonomska situacija u zemlji umnogome onemogućuje preduzetničke poduhvate, pa tako i u regionu o kome je reč. Na to se zatim nadovezuje manjak propisa u državi koji se tiču zaštite životne sredine, porast nezaposlenosti što dalje dovodi do porasta siromaštva. Javne institucije nisu dovoljno transparentne, te u nekim oblastima postoji nedovoljna informisanost javnosti. Od velikog broja firmi koje su postojale u Boru i Zaječaru u onima koje su „opstale“ prisutna je upotreba zastarelih tehnologija i mašina. Javlja se potreba za zamenom novim tehnologijama, što uslovljava i adekvatne obuke za radnike koji bi time rukovali. Međutim, javlja se prepreka u vidu starosne strukture zaposlenih u firmama koji su srednjih godina, a nisu zainteresovani za učenje i unapređenje procesa rada, već rade samo da bi dobili mesečnu platu. Industrija se u zemlji mahom zasniva na korišćenju starih tehnologija, pri čemu se javlja značajna potreba za inovacijama što dalje uslovljava neophodnost postojanja većeg broja instituta i istraživačkih centara. Jedna od pretnji ostvarenja ovakvog projekta bi bilo nerazumevanje od strane institucija koje bi bile od vitalnog značaja u pružanju podrške realizaciji projekta.

Šansa najboljim ljudima da svoje ideje mogu da realizuju u Srbiji u Naučno – tehnološkom parku u Boru, daje mogućnost da ostanu u zemlji i da uz daleko manje rizika i uz punu logistiku u okviru Parka pokušaju da tržišno realizuju svoje ideje. Povećanje broja novih kompanija sa visokim tehnologijama biće sve veći, čime bi se veliki procenat odliva mozgova u velikoj meri smanjio. Zbog bogatstva ove oblasti bakrom, naučni park bi veliku pažnju posvetio efikasnom iskorišćenju rudnih bogatstava. Veliki korak ka tome predstavlja uvođenje novih tehnologija i privlačenje mladih i visoko obrazovanih ljudi. Jedan od bitnih spoljašnjih faktora, tj šansi, predstavlja približavanje Srbije ulasku u članstvo EU i nove zakonske regulative koje su u skladu sa propisima u Evropskoj uniji što će poboljšati ekonomsku situaciju u zemlji i regionu i doneće bolje ekološke propise koji se zasnivaju na čistoj životnoj sredini. Ovim bi se takođe uslovio i razvoj industrije i porast zaposlenosti. Ovakvim korakom otvara se velika šansa za moguće povezivanje sa specijalizovanim

institucijama kao i participacija u projektima Evropske Unije, što će za rezultat imati povećanje ekonomske moći regiona. Time se stvara prostor za privlačenje stranih investicije, koje bi imale veliki udeo u masi kapitala. Nove investicije su uzajamno povezane sa povećanjem broja radnih mesta, čijiim se otvaranjem daje mogućnost mladim ljudima za uspehom i napredovanjem. Potencijalna šansa jeste i regionalno i međunarodno povezivanje, naročito zbog blizine granice sa Evropskom Unijom. Ovakvo povezivanje će imati direktan pozitivan uticaj i na demografska kretanja, koja se poslednjih godina nalaze u drastičnom opadanju. Ovim korakom otvoriće se putevi ka regionalnoj i međunarodnoj saradnji naučnih institucija naročito sa Institutima širom zemlje i Univerzitetima. Jednu od šansi predstavljaju mesta koja spadaju pod UNESCO, kao što su Gamzigrad i Romulijana. Pozitivna strana geografske pozicije našeg okruga je i to što se nalazimo u blizini granica sa zemljama članicama Evropske Unije, kao što su Bugarska i Rumunija. Zbog blizine graničnih područja, Vidina ( Bugarska ) i Turn Severin ( Rumunija ), postoji mogućnost korišćenja EU fondova kao i šansa da u ovom parku svoje ideje realizuju mladi i ambiciozni ljudi iz Bugarske i Rumunije stvaranjem Internacionalnih timova i kompanija.

Nova ideja i stvaranje nečeg tako progresivnog kao što je Naučno tehnološki park u samom Boru izaziva strah koji stvara otpor realizaciji projekta. U slabosti se može ubrojiti i nedovoljna razvijenost regiona, kao i prisustvo zagađivača životne sredine, naročito u Borskom okrugu. Još jedna značajna slabost regiona je i neupotreba obnovljivih izvira energije poput solarne energije, energije vetra, energija vode. Otpad se odlaže nekontrolisano, pri čemu se ne kategoriše niti reciklira, što predstavlja još jednu slabost regiona. Što se nekih ekonomskih faktora tiče, privatizacija pojedinih kompanija je često neuspešna i traje predugo, a neretko se dešava i da dođe do gašenja nekih privrednih subjekata. Ovo je takođe uslovljeno i nedostatkom finansijskih sredstava i lošom ekonomskom situacijom, kao i nedovoljnim ulaganjem u privredni razvoj. Iako postoji dobra i razvijena putna mreža, ulaganja u saobraćajnu infrastrukturu su retka i mala. Nezaposlenost u regionu je 23,7%, što je 6% više u odnosu na Srbiju. Jedna od slabosti je takođe i depopulacija regiona jer se broj stanovnika sve više smanjuje od 60-tih godina prošlog veka.

Međutim, značajne snage se takođe mogu identifikovati. Ideja nije nova, pored funkcionisanja širom razvijenog sveta, funkcioniše i Srbiji već desetak godina, pa samim tim potrebna iskustva postoje u zemlji. Bor je posle Beograda pogodno mesto zbog značajne naučno-istraživačke infrastrukture na Tehničkom fakultetu u Boru Univerziteta u Beogradu i institutu za rudarstvo i metalurgiju. Kompanija RTB Bor je od nacionalnog značaja, a njeni potencijali i infrastruktura mogu biti dobar poligon za realizaciju naučnih ideja u praksi koje mogu preko ovog parka dolaziti iz celog sveta. Infrastruktura i prostor u kome bi delovao Naučno-tehnološki park u Boru već postoji sa idealnom pozicijom i ne zahteva investiciona ulaganja za izgradnju već samo neznatna sredstva za rekonstrukciju. Takođe, pored navedenih snaga važno je navesti da Bor poseduje aerodrom na koji mogu sleteti avioni svih veličina. Hoteli viših kategorija predstavljaju takođe snagu (Hotel Albo sa 3\*, Hotel Jezero na Borskom jezeru sa 4\*) i u Zaječaru (Hotel Ludž 3\*). Prednost ovog regiona je i odlična putna mreža, koja povezuje Bor sa većim gradovima kao što su Beograd i Niš, ali i sa objektima Svetske Baštine poput Romulijane u blizini Zaječara. Velika snaga ovog regiona je i dostupnost turističkih lokaliteta koji su od izuzetnog značaja, pa tako region raspolaže atrakcijama poput Romulijane u blizini Zaječara koja je pod zaštitom UNESCA, kao i Borskog jezera i Brestovačke banje. Borski okrug raspolaže i značajnim sportsko rekreativnim sadržajem, poput sportskih hala, fudbalskih terena, teniskih terena, otvorenih i zatvorenih bazena. Postoji dostupnost srednjeg i visokog obrazovanja širokog usmerenja. U

regionu postoje Mašinsko-elektrotehnička škola u Boru, Tehnička škola u Boru i Zaječaru, Ekonomsko-trgovinska škola u Boru i Zaječaru i Medicinska škola u Zaječaru, kao i Tehnički fakultet u Boru, pa samim tim postoji mogućnost prekvalifikacije i dokvalifikacije profila.

Na osnovu navedene situacione analize Borskog i Zaječarskog okruga, na slici 2 prikazana je SWOT matrica koja generiše ključne subfaktore u okviru svakog SWOT faktora (snaga, slabosti, šansi, pretnji).

<b>STRENGTHS (SNAGE)</b>	<b>WEAKNESSES (SLABOSTI)</b>
<ul style="list-style-type: none"> <li>➤ Visokoobrazovani stručnjaci u regionu</li> <li>➤ Postojanje realne mogućnosti realizacije NTP u Boru</li> <li>➤ Dostupnost srednjeg i visokog obrazovanja</li> <li>➤ Mogućnosti prekvalifikacije i dokvalifikacije</li> <li>➤ Sportsko-rekreativni kapaciteti (sportska hala, sportski tereni, bazeni)</li> <li>➤ Dostupnost aerodroma</li> </ul>	<ul style="list-style-type: none"> <li>➤ Nedostatak finansijskih sredstava</li> <li>➤ Nedovoljno ulaganje u privredni razvoj</li> <li>➤ Visoki procenat odliva mozgova</li> <li>➤ Nedovoljna razvijenost regiona</li> <li>➤ Spora privatizacija i gašenje pojedinih privrednih subjekata</li> <li>➤ Niska ulaganja u saobraćajnu infrastrukturu</li> <li>➤ Neupotreba obnovljivih izvora energije</li> </ul>
<b>OPPORTUNITIES (ŠANSE)</b>	<b>THREATS (PRETNJE)</b>
<ul style="list-style-type: none"> <li>➤ Nova radna mesta</li> <li>➤ Tržišna realizacija ideja mladih ljudi</li> <li>➤ Povećanje broja novih kompanija sa visokim tehnologijama</li> <li>➤ Poboljšanje demografskih kretanja</li> <li>➤ Mogućnost efikasnijeg iskorišćenja rudnih bogatstava</li> <li>➤ Participacija u projektima EU</li> <li>➤ Približavanje Srbije ulasku u članstvo EU</li> </ul>	<ul style="list-style-type: none"> <li>➤ "Odliv mozgova"</li> <li>➤ Porast nezaposlenosti</li> <li>➤ Otpor društva promenama</li> <li>➤ Nepovoljni demografski trendovi</li> <li>➤ Korišćenje zastarelih tehnologija u svim granama industrije</li> <li>➤ Nestabilna ekonomska situacija</li> </ul>

Slika 2. SWOT matrica

Da bi se generisale moguće strategije realizacije ideje stvaranja NTP u Boru, na osnovu SWOT matrice generisana je TOWS matrica, odakle su upoređivanjem ključnih subfaktora definisane moguće strategije za realizaciju predložene ideje (slika 3).

SO STRATEGIJE	WO STRATEGIJE
SO1 – Integracija interesa Univerziteta, privrede i lokalne samouprave (NTP) SO2 - Međunarodno povezivanje istraživačkog potencijala regije sa istraživačkim potencijalom u regiji Turn Severina (Rumunija) i Vidina (Bugarska)	WO1 – Promocija i podsticaj najuspešnijih inovacionih ideja i najuspešnijih visokoobrazovanih ljudi iz regije
ST STRATEGIJE	WT STRATEGIJE
ST1 - Razvoj državne regulative za podsticaj razvoja ekonomije zasnovanog na znanju	WT1 – Podsticaj za razvoj privatnog preduzetništva i spin off kompanija WT2 - Smanjenje zagađenja životne sredine i povećanje upotrebe obnovljivih izvora energije čime neće postojati velika i hitna potreba da se uvode novi propisi koji se tiču zaštite životne sredine

Slika 3. TOWS matrica strategija

## 7. ZAKLJUČAK

Sadašnja ekonomska situacija u regionu istočne Srbije može se okarakterisati kao vrlo ekstenzivna. Neke od najvažnijih kompanija u ovom delu Srbije funkcionišu uz minimalno korišćenje svojih potencijala. Broj stanovnika se smanjuje iz godine u godinu, a prosečna starost stanovnika raste, što najbolje oslikava trenutno nepovoljnu situaciju regiona.

Stvaranje NTP u Boru ima za cilj da privuče mlade, obrazovane i ambiciozne ljude da svoje ekonomske potrebe i ambicije ostvare u ovoj zemlji. Ovim putem se stvaraju i uslovi da se uspešni ljudi koji su otišli u inostranstvo vrate i da svoj potencijal iskoriste radom u NTP u Boru.

Integracijom inovativnih naučno-istraživačkih rezultata koji se stvaraju u NTP u interakciji sa potrebama privrede ove regije koje su očigledne, dovodi do stvaranja novih vrednosti u proizvodima postojećih kompanija što uvećava profit i standard zaposlenih u njima. Aktivnostima u NTP u Boru trebalo bi da se stvore uslovi za osnivanje većeg broja spin off preduzeća koja zapošljavaju veći broj visoko-obrazovanih ljudi koji se školuju u

Srbiji, kao i povratak ostvarenih stručnjaka iz inostranstva. Stvaranjem industrijskih zona u svim gradovima ove regije kao izlaznih rezultata stvorenih u NTP u Boru, dramatično se menjaju uslovi života u ovoj regiji i uvećava ekonomski razvoj što treba da učini ovu regiju privlačnom za život.

## REFERENCE

1. Stanković I., Gocić M., Trajković S., Forming of Science and Technology Park as an aspect of Civil Engineering, *Facta universitatis, Architecture and Civil Engineering* Vol. 7, No. 1, 2009
2. Vilà P.C., Pagès J.L., Science and technology parks. Creating new environments favourable to innovation, May 2008.
3. Gursel A., Science and Technology Parks and University Collaborations, *Periodicals of engineering and natural sciences*, Vol. 2 No 2, 2014
4. Population by age and gender, Statistical office of Republic of Serbia, <http://webzs.stat.gov.rs/WebSite/repository/documents/00/02/35/91/3. Stanovnistvo.pdf>
5. The first results of the 2011 census, The Grand decrease in population, *Demographic Review*, Year XII, No. 43/2012, Belgrade
6. Weihrich, H., The TOWS matrix – a tool for situation analysis, *Long Range Planning*, 15 (2), (1982), 62-88.

## STATISTICAL RELIABILITY TESTING OF CAR TIRES WITH THE IMPLEMENTATION OF MONTE CARLO SIMULATION

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**Abstract:** This paper presents the statistical analysis of the reliability of a car fleet of one domestic postal service, based on the monitoring the behavior of 50 vehicles to the first appearance of defects in their tires. The results of reliability parameters of the observed research object (car fleet) were obtained by determining the frequency of failures, the empirical density function and the failure intensity, and, aslo, the actual outcomes were shown by the relevant functions of the reliability  $R(t)$  and unreliability  $F(t)$  at the end. Furthermore, Monte Carlo method, or Monte Carlo simulation, which is based on the implementation of basic attitudes and theorems of mathematical statistics and probability theory for the observed problem, was used in this paper as a separate method of numerical analysis.

**Keywords:** statistical sampling, reliability of the system, system failures, Monte Carlo simulation, car fleet.

### 1. UVOD

U današnjoj industriji razvijaju se sve kompleksniji proizvodi sa sve složenijim karakteristikama, a koji, kao takvi, podrazumevaju veće zahteve za savršenstvom u radu i pouzdanošću u dužem vremenskom periodu. *Pouzdanost nekog sistema* može se definisati kao verovatnoća da će sistem radeći u zadatim uslovima uspešno izvršavati zahtevanu funkciju cilja u toku posmatranog perioda vremena [1].

Naime, pouzdanost se može sagledati i kao agregat sigurnosti i adekvatnosti [2], koji podrazumeva da u funkciji vremena neće doći do otkaza samog sistema, tj. da će sistem izvršavati svoje zadatke na propisani način. Ipak, svaki proizvod ima svoj poseban period rada nakon koga neminovno dolazi pojave defekata, te stoga dijagrami koji prikazuju dati vremenski period imaju vrlo često različite krive [3].

Predmet istraživanja ovog rada jeste statistička analiza pouzdanosti pneumatika 50 vozila voznog parka primenom Monte Karlo simulacije i izvođenje relevantnih zaključaka vezanih za dobijene rezultate. U radu su uz primenu statističke analize dobijeni i grafici kriva funkcije gustine otkaza, intenziteta pojave otkaza, ali i dijagrami funkcija pouzdanosti i nepouzdanosti.

*Prvi deo sprovedenog istraživanja* posvećen je osnovnim dimenzijama i značaju primene Monte Karlo metodologije u statističkoj analizi. Ovde su obrađeni osnovni teorijski pojmovi datog modela, ali je ukazano je i na ključne termine koncepta pouzdanosti sistema.

*Drugi deo rada* zasniva se na konkretnoj statističkoj obradi podataka o evidentiranim otkazima pneumatika vozila voznog parka poštanske službe, i to kroz proračun osnovnih pokazatelja pouzdanosti. Takođe, u ovom delu izvršena je i primena Monte Karlo simulacije u analizi bezotkaznog rada, shodno pređenim kilometrima kada su se otkazi desili.

## 2. TEORIJSKO-METODOLOŠKE POSTAVKE RADA

### 2.1. POUZDANOST I OSNOVNI POKAZATELJI POUZDANOSTI SISTEMA

Kako je već napomenuto, pouzdanost predstavlja verovatnoću da će sistem, odnosno podsistemi, ostvariti zahtevane funkcije na način utvrđen osnovnim ciljem, odnosno parcijalnim ciljevima, i to u jasno definisanim uslovima i u postojećem okruženju [4].

Kada se govori o sistemima, pod njima se podrazumevaju skupovi elemenata i relacija između njih i njihovih karakteristika, pri čemu su dati elementi i relacije međusobno povezani u celinu, na način pogodan za vršenje korisnog rada [1].

Pokazatelji pouzdanosti sistema predstavljaju one veličine koje, neposredno ili posredno, određuju pouzdanost tog sistema, ili nekog njegovog elementa, odnosno njegova svojstva bezotkaznog rada. Najvažniji pokazatelji pouzdanosti dati su u Tabeli 1.

Tabela 1. Osnovni pokazatelji pouzdanosti [5]

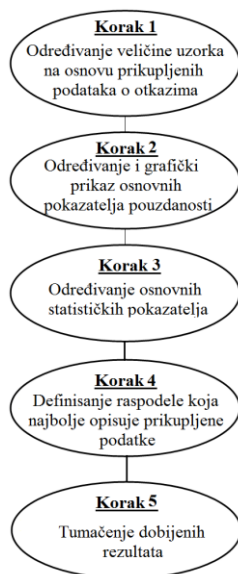
<i>Promenjive</i> →	<i>Diskretne</i>	<i>Kontinuirane</i>
Funkcija kumulativne učestanosti pojave otkaza (funkcija nepouzdanosti)	$F(t) = \frac{N(t)}{n}$	$F(t) = \int_0^t f(t)dt$
Funkcija pouzdanosti	$R(t) = \frac{n - N(t)}{n} = \frac{n(t)}{n}$	$R(t) = 1 - \int_0^t f(t)dt$
	$R(t) + F(t) = 1$	$R(t) + F(t) = 1$
Funkcija učestanosti pojave otkaza (funkcija gustine)	$f(t) = \frac{N(\Delta t)}{n \cdot \Delta t}$	$f(t) = \frac{dF(t)}{dt}$
Funkcija intenziteta otkaza	$\lambda(t) = \frac{N(\Delta t)}{n_{sr}(t) \cdot \Delta t}$	$\lambda(t) = \frac{f(t)}{R(t)}$

Legenda:

- $N(\Delta t)$  – broj otkaza u intervalu vremena  $\Delta t$
- $n$  – ukupan broj posmatranih elemenata u trenutku  $t=0$
- $N(t)$  – broj otkaza elemenata u trenutku vremena  $t$
- $n(t)$  – broj ispravnih elemenata u trenutku vremena  $t$

Na osnovu ovako definisanih osnovnih pokazatelja pouzdanosti sistema koji su proračunati u ovom istraživanju, relevantni rezultati prikazani su odgovarajućim dijagramima, dok je sam

tok ispitivanja koji se generalno primenjuje u statističkoj analizi pouzdanosti dat na sledećoj slici.



Slika 1. Koraci statističke obrade podataka o evidentiranim otkazima [6]

Može se zaključiti da se karakteristike pouzdanosti određuju na osnovu empirijskih podataka o vremenu ispravnog rada do pojave otkaza. Ovi podaci dobijaju se praćenjem elemenata u realnoj eksploataciji, što je slučaj i u ovom radu, ili sprovođenjem ispitivanja. Za sam tok obrade podataka iskorišćene su diskretne promenljive veličine.

Simulacija se može definisati kao dekrriptivna tehnika u kojoj se razvija model procesa, da bi se potom vršili eksperimenti na modelu, a u cilju procene njegovog ponašanja pri različitim uslovima [7].

Simulacione metode postale su veoma aktuelne sa širom primenom računarske tehnike i praktično prate razvoj računara i softvera, što znači da su u stalnoj ekspanziji primene, ali i razvoja [8]. Dovoljan dokaz za to jeste primena softvera korišćenog i u ovom radu, i to u analizi pouzdanosti voznog parka, zahvaljujući čemu su dobijeni odgovarajući rezultati.

Do danas su razvijene brojne simulacione tehnike. Monte Karlo metoda jedna je od njih, a naziva se još i probabilističkom simulacijom.

Ipak, vrlo je teško dati tačnu i celovitu definiciju Monte Karlo metode. Može se reći da je to numerička metoda za rešavanje složenih matematičkih, statističkih, fizičkih, telekomunikacijskih i drugih problema sa slučajnim izborom uzoraka. Osnovna ideja Monte Karlo metode jeste izgradnja stohastičkog modela koji je u skladu sa stvarnim problemom, ili je, pak, izravna simulacija stvarnog problema. [9] Simulacija se izvodi određeni broja puta, a skup dobijenih realizacija predstavlja statistički materijal, koji se određenim statističkim metodama obrađuje i interpretira [10].

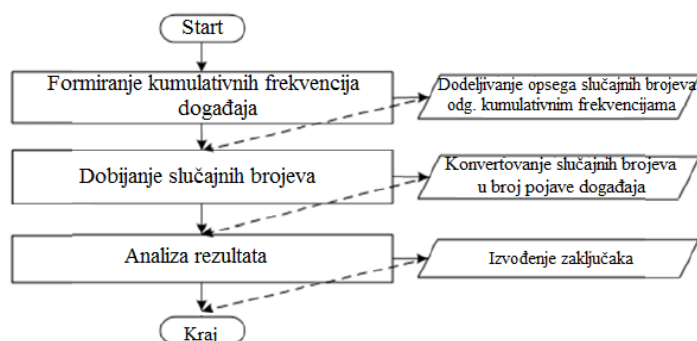
Ovaj vid simulacije može se koristiti samo kada procesi imaju komponentu slučajnosti (random component). Naime, u Monte Karlo metodi identifikuje se raspodela verovatnoće koja reflektuje komponentu slučajnosti proučavanog sistema, u ovom slučaju pneumatika. Slučajni uzorci uzeti iz ove distribucije verovatnoće analogni su snimanjima koja se odvijaju na samom sistemu. Kako raste broj posmatranja, rezultati simulacije približnije će odgovarati



ponašanju posmatranog sistema. Pod uslovom da je razvijen adekvatan model, samo uzorkovanje vrši se primenom slučajnih brojeva. [7]

Način na koji će se generisati slučajni brojevi nije od suštinske važnosti. Ono što je značajno je da su oni uniformno distribuirani. To znači da bez obzira na način grupisanja cifara u slučajnom broju, svaki mogući ishod ima pojedinačnu verovatnoću pojave. [7]

Koraci u postupku primene Monte Karlo metodologije dati su na Slici 2. [11]



Slika 2. Koraci u primeni Monte Karlo simulacije

### 3. REZULTATI ISTRAŽIVANJA

Na osnovu praćenja 50 vozila voznog parka privatne poštanske službe, evidentirani su otkazi pneumatika shodno broju pređenih kilometara kada se otkaz dogodio. U zavisnosti od tipa i marke vozila sva prevozna sredstva grupisana su u relevantne grupe ( $G_1 - G_9$ ), a polazni podaci, kao i definisani varijacioni niz dati su u Tabelama 2. i 3.

Tabela 2. Varijacioni niz evidentiranih otkaza

Varijacioni niz				
350	6230	11900	16100	20000
725	6350	12200	16450	23344
1250	7350	12300	17100	23602
1250	8500	13110	18750	24500
3654	8500	13120	19150	25640
4120	8500	13120	19200	26000
5100	8500	14150	19200	27000
5100	10250	14200	20000	27500
5350	10250	14500	20000	29932
6230	11420	14800	20000	30000

Predstavljeni varijacioni niz u kome su podaci o evidentiranim otkazima pneumatika poređani po rastućem redosledu, dobijen je na osnovu polaznih merenja otkaza, koji su prikazani u Tabeli 3. onako kako su i zabeleženi od strane odgovornih u poštanskoj službi.

Tabela 3. Polazni podaci sa definisanim grupama

Vozila:	Merenja otkaza pneumatika voznog parka (oštećenje, dotrajalost) u km	
Renault Kangoo A	350	G1
Renault Kangoo B	6230	G1
Renault Kangoo C	1250	G1
Fiat Ducato	725	G2
Fiat Ducato Maxi	8500	G2
Peugeot Boxer	7350	G3
Volkswagen Caddy	4120	G4
Opel Combo	20000	G5
Citroen Jumper Su	14800	G6
Volkswagen T5	20000	G4
Volkswagen Crafter	19200	G4
Volkswagen Golf+	20000	G4
Ford Transit	8500	G7
Opel Vivaro	12200	G5
Iveco Daily	23344	G8
Volkswagen Polo	25640	G4
Iveco Daily Truck	30000	G8
MAN	29932	G9
Renault Traffic	14150	G1
Volkswagen Caddy	23602	G4
Renault Kangoo B	6230	G1
Fiat Ducato Maxi	8500	G2
Volkswagen Crafter	20000	G4
Fiat Ducato	6350	G2
Peugeot Boxer	10250	G3
Opel Vivaro	11900	G5
Iveco Daily Truck	27500	G8
Opel Vivaro	13110	G5
MAN	26000	G9
Renault Kangoo A	5100	G1
Citroen Jumper Su	16100	G6
Opel Vivaro	14500	G5
Renault Traffic	3654	G1
Renault Kangoo A	5100	G1
Renault Kangoo A	11420	G1
Iveco Daily Truck	27000	G8
Fiat Ducato	14200	G2
Renault Kangoo C	17100	G1
Fiat Ducato Maxi	8500	G2
Renault Kangoo C	13120	G1
Renault Kangoo A	18750	G1
Volkswagen Golf+	19200	G4
Opel Combo	10250	G5
Renault Kangoo B	16450	G1
Renault Kangoo C	1250	G1
Fiat Ducato	19150	G2
Volkswagen Caddy	5350	G4
Renault Kangoo C	13120	G1
Iveco Daily Truck	24500	G8
Renault Kangoo A	12300	G1

### 3.1. REZULTATI DOBIJENI STATISTIČKOM OBRADOM PODATAKA

Broj interval u koje su grupisani posmatrani podaci usvojen je na osnovu sledećih preporuka:

$$z_i = \sqrt{n} = \sqrt{50} = 7,071 \quad (1)$$

$$z_i = 1 + 3,3 \cdot \log n = 1 + 3,3 \cdot \log 50 = 6,607 \quad (2)$$

$$z_i = 5 \cdot \log n = 5 \cdot \log 50 = 8,495 \quad (3)$$

Na osnovu datih preporuka usvaja se broj intervala  $z_i = 7$ . Kako je pojava prvog otkaza nastala nakon  $t_{max} = 350$  km, a poslednjeg na  $t_{min} = 30000$  km, širina svakog intervala jednaka je:

$$\Delta t = \frac{t_{max} - t_{min}}{z_i} = \frac{30000 - 350}{7} \approx 4240 \quad (4)$$

Shodno tome, broj otkaza po intervalima dat je u Tabeli 4.

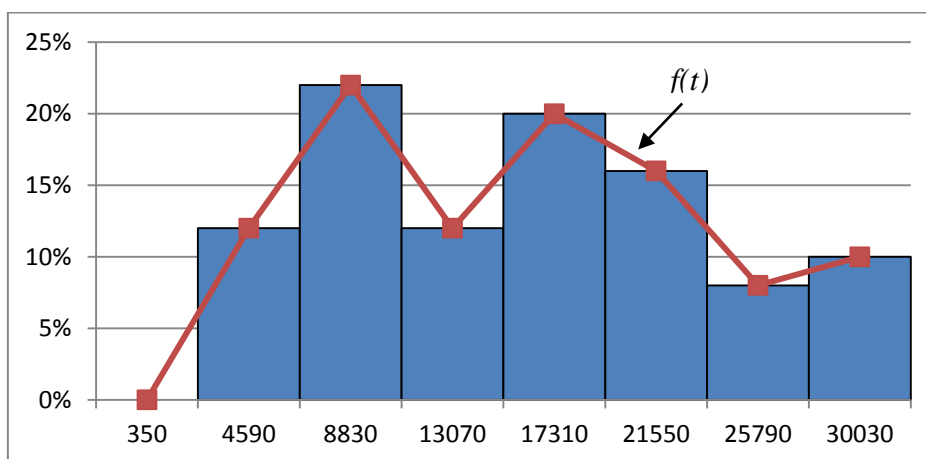
Tabela 4. Definisane intervale i raspodena otkaza po intervalima  $N(\Delta t)$

<i>Int.</i>	$\Delta t$	<i>t</i>	$N(\Delta t)$
<i>i</i>	$t_d \div t_g$		
1	350-4590	4590	6
2	4590-8830	8830	11
3	8830-13070	13070	6
4	13070-17310	17310	10
5	17310-21550	21550	8
6	21550-25790	25790	4
7	25790-30030	30030	5

Učestanosti pojave otkaza  $f_{rel}$  (relativne frekvencije) za svaki od navedenih intervala proračunate su i date u Tabeli 5. Shodno proračunatim učestanostima pojave otkaza za relevantne intervale konstruisan je i grafički prikaz u vidu histograma učestanosti pojave okaza, kao i empirijska funkcija gustine otkaza koja se na preko datog histograma može dobiti.

Tabela 5. Učestanosti pojave otkaza  $f_{rel}$  po intervalima

<i>Int.</i>	$\Delta t$	$t$	$N(\Delta t)$	$f_{rel}(t) = \frac{N(\Delta t)}{n} \cdot 100$
$i$	$td \div tg$			
1	350-4590	4590	6	12,00%
2	4590-8830	8830	11	22,00%
3	8830-13070	13070	6	12,00%
4	13070-17310	17310	10	20,00%
5	17310-21550	21550	8	16,00%
6	21550-25790	25790	4	8,00%
7	25790-30030	30030	5	10,00%

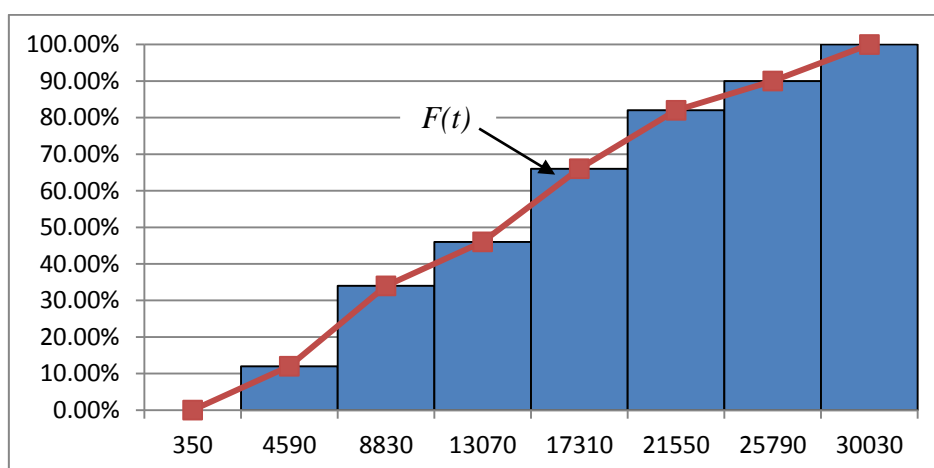


Slika 3. Histogram učestanosti pojave otkaza i empirijska funkcija gustine  $f(t)$

Vrednosti kumulativne učestanosti pojave otkaza dobijene su sabiranjem učestanosti okaza i predstavljene u Tabeli 6.

Tabela 6. Kumulativne učestanosti pojave otkaza  $F_e$

<i>Int.</i>	$\Delta t$	<i>t</i>	$N(\Delta t)$	$f_{rel}(t) = \frac{N(\Delta t)}{n} \cdot 100$	$F_e$
<i>i</i>	$td \div tg$				
1	350-4590	4590	6	12,00%	12,00%
2	4590-8830	8830	11	22,00%	34,00%
3	8830-13070	13070	6	12,00%	46,00%
4	13070-17310	17310	10	20,00%	66,00%
5	17310-21550	21550	8	16,00%	82,00%
6	21550-25790	25790	4	8,00%	90,00%
7	25790-30030	30030	5	10,00%	100,00%



Slika 4. Histogram kumulativne učestanosti pojave otkaza i empirijska funkcija kumulativne učestanosti pojave otkaza  $F(t)$

Broj otkaza vozila pneumatika  $N(t)$  u odgovarajućem vremenskom trenutku određen je kao suma svih prethodnih otkaza na kraju intervala:

$$N(4590) = N_1(\Delta t) = 6 \quad (5)$$

$$N(8830) = N_1(\Delta t) + N_2(\Delta t) = 6 + 11 = 17$$

$$N(13070) = N_1(\Delta t) + N_2(\Delta t) + N_3(\Delta t) = 6 + 11 + 6 = 23$$

$$N(17310) = N_1(\Delta t) + N_2(\Delta t) + N_3(\Delta t) + N_4(\Delta t) = 6 + 11 + 6 + 10 = 33$$

$$N(21550) = N_1(\Delta t) + N_2(\Delta t) + N_3(\Delta t) + N_4(\Delta t) + N_5(\Delta t) = 6 + 11 + 6 + 10 + 8 = 41$$

$$N(25790) = N_1(\Delta t) + N_2(\Delta t) + N_3(\Delta t) + \dots + N_6(\Delta t) = 6 + 11 + 6 + 10 + 8 + 4 = 45$$

$$N(30030) = N_1(\Delta t) + N_2(\Delta t) + N_3(\Delta t) + \dots + N_7(\Delta t) = 6 + 11 + 6 + 10 + 8 + 4 + 5 = 50$$

Na osnovu broja otkaza  $N(t)$  određen je i broj ispravnih vozila u vremenskom trenutku:  $n(t) = n - N(t)$  i predstavljen u Tabeli 7.

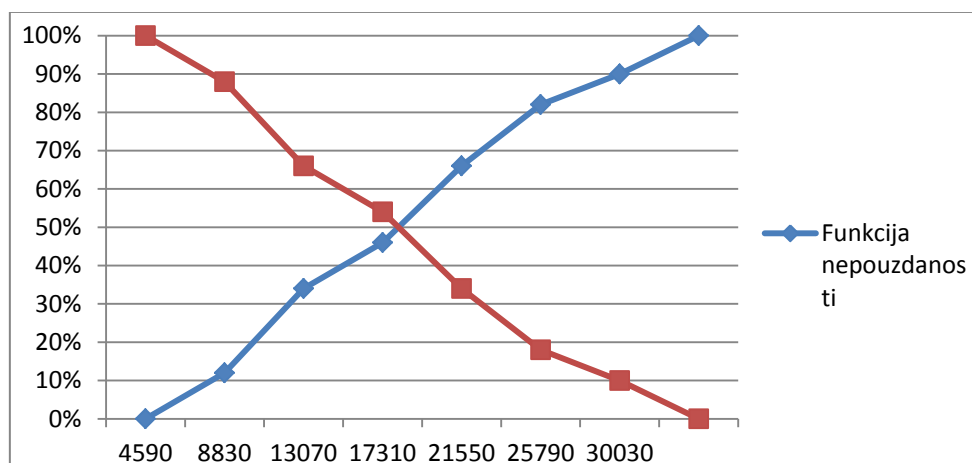
Tabela 7. Broj otkaza pneumatika  $N(t)$  i broj ispravnih vozila  $n(t)$  u odg. trenutku vremena

<i>Int.</i>	$\Delta t$	$t$	$N(\Delta t)$	$N(t)$	$n(t)$
$i$	$td \div tg$				
1	350-4590	4590	6	6	44
2	4590-8830	8830	11	17	33
3	8830-13070	13070	6	23	27
4	13070-17310	17310	10	33	17
5	17310-21550	21550	8	41	9
6	21550-25790	25790	4	45	5
7	25790-30030	30030	5	50	0

Na osnovu proračunatih vrednosti  $N(t)$  i  $n(t)$ , određene su i vrednosti funkcija pouzdanosti  $R(t)$  i nepouzdanosti  $F(t)$  za posmatrani problem i predstavljene u Tabeli 8.

Tabela 8. Vrednosti funkcija pouzdanosti i nepouzdanosti

<i>Int.</i>	$\Delta t$	$t$	$N(\Delta t)$	$N(t)$	$n(t)$	$F_e(t) = \frac{N(t)}{n}$	$R_e(t) = \frac{n(t)}{n}$
$i$	$td \div tg$						
1	350-4590	4590	6	6	44	12,00%	88,00%
2	4590-8830	8830	11	17	33	34,00%	66,00%
3	8830-13070	13070	6	23	27	46,00%	54,00%
4	13070-17310	17310	10	33	17	66,00%	34,00%
5	17310-21550	21550	8	41	9	82,00%	18,00%
6	21550-25790	25790	4	45	5	90,00%	10,00%
7	25790-30030	30030	5	50	0	100,00%	0,00%

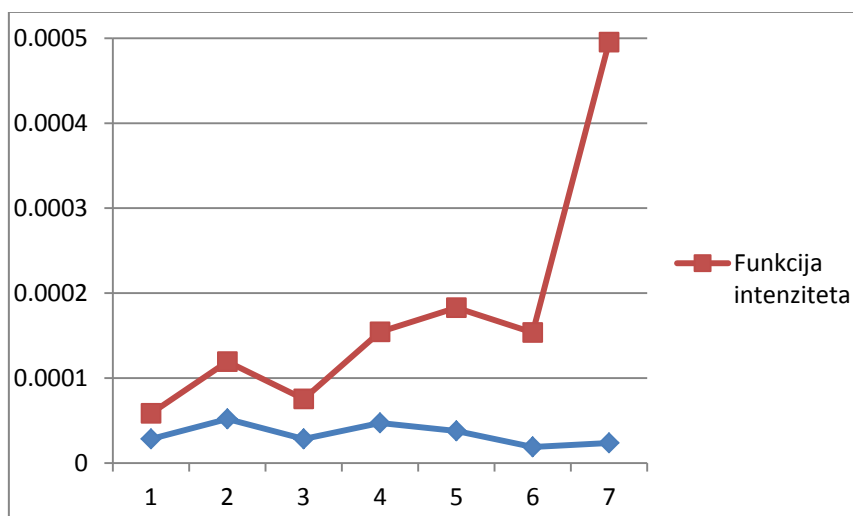


Slika 5. Funkcije pouzdanosti  $R(t)$  i nepouzdanosti  $F(t)$

Vrednosti funkcija učestanosti pojave otkaza  $f(t)$  i intenziteta otkaza  $\lambda(t)$  prikazane su u Tabeli 9.

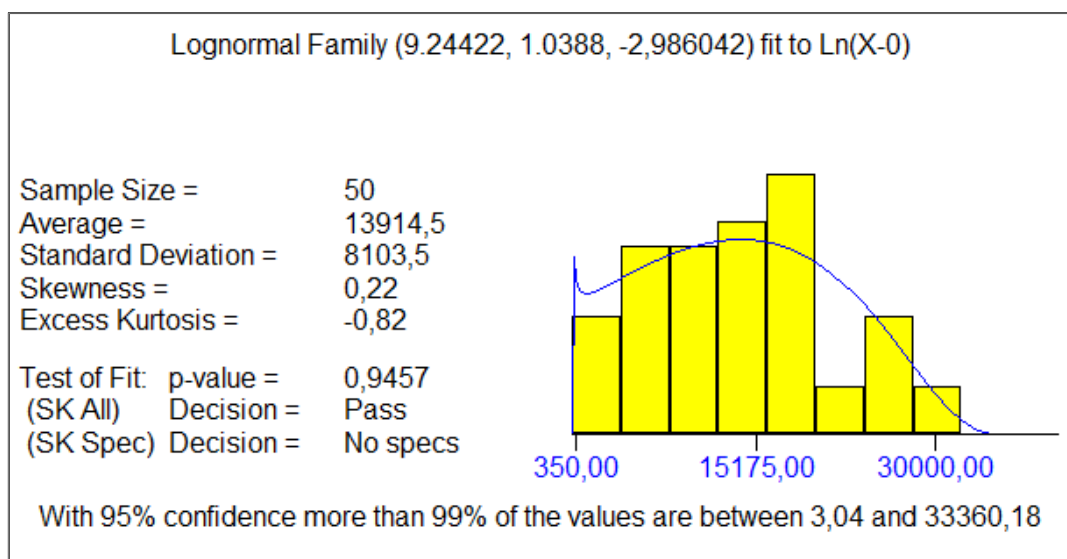
Tabela 9. Vrednosti funkcija intenziteta pojave otkaza i učestanosti otkaza

<i>Int.</i>	$\Delta t$	$t$	$N(\Delta t)$	$N(t)$	$n(t)$	$f_e(t) = \frac{N(\Delta t)}{n \cdot \Delta t}$ $10^{-5} \text{ km}^{-1}$	$n_{sr} = \frac{n(t - \Delta t) + n(t)}{2}$	$\lambda_e(t) = \frac{N(\Delta t)}{n_{sr} \cdot \Delta t}$ $10^{-5} \text{ km}^{-1}$
<i>i</i>	$t_d \div t_g$							
1	350-4590	4590	6	6	44	2,83019	47	3,01084
2	4590-8830	8830	11	17	33	5,18868	38,5	6,73854
3	8830-13070	13070	6	23	27	2,83019	30	4,71698
4	13070-17310	17310	10	33	17	4,71698	22	10,72041
5	17310-21550	21550	8	41	9	3,77358	13	14,51379
6	21550-25790	25790	4	45	5	1,88679	7	13,47709
7	25790-30030	30030	5	50	0	2,35849	2,5	47,16981



Slika 6. Funkcije učestanosti pojave otkaza  $f(t)$  i intenziteta otkaza  $\lambda(t)$

Primenom softverskog paketa Distribution Analyzer došlo se i do raspodele koja na najbolji mogući način opisuje posmatrani skup podataka o evidentiranim otkazima, što je i dato na Slici 7.



Slika 7. Lognormalna raspodela evidentiranih otkaza pneumatika

### 3.2. REZULTATI DOBIJENI MONTE KARLO SIMULACIJOM POJAVE OTKAZA

Bilo koji način rešavanja problema koji se oslanja na generisanje velikog broja slučajnih brojeva, te posmatranje udela datih brojeva koji prikazuju željena svojstva odgovarajućeg problema naziva se Monte Karlo metoda [12].

Za posmatrani konkretan problem ispitivanja pouzdanosti pneumatika motornih vozila voznog parka poštanske službe, definisana pojava otkaza pneumatika zbog dotrajalosti, ili,



pak, oštećenja, može se desiti u opsegu od 1-38, sa sledećim frekvencijama određenim u prethodnom periodu vremena, datim u Tabeli 10.

Tabela 10. Apsolutne i relativne frekvencije pojave otkaza shodno odgovarajućoj kilometraži kada se otkaz dogodio

		Frequency	Percent	Valid Percent	Group
Valid	350,00	1	2,0	2,0	1
	725,00	1	2,0	2,0	2
	1250,00	2	4,0	4,0	1
	3654,00	1	2,0	2,0	1
	4120,00	1	2,0	2,0	4
	5100,00	2	4,0	4,0	1
	5350,00	1	2,0	2,0	4
	6230,00	2	4,0	4,0	1
	6350,00	1	2,0	2,0	2
	7350,00	1	2,0	2,0	3
	8500,00	4	8,0	8,0	2,7
	10250,00	2	4,0	4,0	3,5
	11420,00	1	2,0	2,0	1
	11900,00	1	2,0	2,0	5
	12200,00	1	2,0	2,0	5
	12300,00	1	2,0	2,0	1
	13110,00	1	2,0	2,0	5
	13120,00	2	4,0	4,0	1
	14150,00	1	2,0	2,0	1
	14200,00	1	2,0	2,0	2
	14500,00	1	2,0	2,0	5
	14800,00	1	2,0	2,0	6
	16100,00	1	2,0	2,0	6
	16450,00	1	2,0	2,0	1
	17100,00	1	2,0	2,0	1
	18750,00	1	2,0	2,0	1
	19150,00	1	2,0	2,0	2
	19200,00	2	4,0	4,0	4
	20000,00	4	8,0	8,0	5,4
	23344,00	1	2,0	2,0	8
	23602,00	1	2,0	2,0	4
	24500,00	1	2,0	2,0	8
	25640,00	1	2,0	2,0	4
	26000,00	1	2,0	2,0	9
	27000,00	1	2,0	2,0	8
	27500,00	1	2,0	2,0	8
	29932,00	1	2,0	2,0	9
	30000,00	1	2,0	2,0	8
Total		50	100,0	100,0	

Polazni podaci, kao što se može uočiti, prethodno su podeljeni u grupe ( $G_1$ - $G_9$ ), u zavisnosti od tipa vozila kome pripadaju, s tim da su kod nekih grupa vozila iste kilometraže kada su se otkazi dogodili, te su takve grupe za posmatrane kilometre definisane na sledeći način: 2,7; 3,5 i 5,4.

Ako se želi simulirati događaj pojave otkaza na određenom kilometru u odg. periodu, prvo je potrebno na osnovu proračunatih relativnih frekvencija formirati kumulativne frekvencije, što je i prikazano Tabelom 11.

Tabela 11. Kumulativne frekvencije pojave otkaza

kilometers	frequencies	%	cunulative %	frequency ration	Group
350,00	1	2,0	2,0	0,02	1
725,00	1	2,0	4,0	0,04	2
1250,00	2	4,0	8,0	0,08	1
3654,00	1	2,0	10,0	0,1	1
4120,00	1	2,0	12,0	0,12	4
5100,00	2	4,0	16,0	0,16	1
5350,00	1	2,0	18,0	0,18	4
6230,00	2	4,0	22,0	0,22	1
6350,00	1	2,0	24,0	0,24	2
7350,00	1	2,0	26,0	0,26	3
8500,00	4	8,0	34,0	0,34	2,7
10250,00	2	4,0	38,0	0,38	3,5
11420,00	1	2,0	40,0	0,4	1
11900,00	1	2,0	42,0	0,42	5
12200,00	1	2,0	44,0	0,44	5
12300,00	1	2,0	46,0	0,46	1
13110,00	1	2,0	48,0	0,48	5
13120,00	2	4,0	52,0	0,52	1
14150,00	1	2,0	54,0	0,54	1
14200,00	1	2,0	56,0	0,56	2
14500,00	1	2,0	58,0	0,58	5
14800,00	1	2,0	60,0	0,6	6
16100,00	1	2,0	62,0	0,62	6
16450,00	1	2,0	64,0	0,64	1
17100,00	1	2,0	66,0	0,66	1
18750,00	1	2,0	68,0	0,68	1
19150,00	1	2,0	70,0	0,7	2
19200,00	2	4,0	74,0	0,74	4
20000,00	4	8,0	82,0	0,82	5,4
23344,00	1	2,0	84,0	0,84	8
23602,00	1	2,0	86,0	0,86	4
24500,00	1	2,0	88,0	0,88	8
25640,00	1	2,0	90,0	0,9	4
26000,00	1	2,0	92,0	0,92	9
27000,00	1	2,0	94,0	0,94	8
27500,00	1	2,0	96,0	0,96	8
29932,00	1	2,0	98,0	0,98	9
30000,00	1	2,0	100,0	1	8

Tabela 12. Definisani opsezi od 00 do 100 = (00 - 100]

kilometers	frequencies	%	cumulative %	frequency ration	range
350,00	1	2,0	2,0	0,02	00 ~ 01
725,00	1	2,0	4,0	0,04	02 ~ 03
1250,00	2	4,0	8,0	0,08	04 ~ 07
3654,00	1	2,0	10,0	0,1	08 ~ 09
4120,00	1	2,0	12,0	0,12	10 ~ 11
5100,00	2	4,0	16,0	0,16	12 ~ 15
5350,00	1	2,0	18,0	0,18	16 ~ 17
6230,00	2	4,0	22,0	0,22	18 ~ 21
6350,00	1	2,0	24,0	0,24	22 ~ 23
7350,00	1	2,0	26,0	0,26	24 ~ 25
8500,00	4	8,0	34,0	0,34	26 ~ 33
10250,00	2	4,0	38,0	0,38	34 ~ 37
11420,00	1	2,0	40,0	0,4	35 ~ 39
11900,00	1	2,0	42,0	0,42	40 ~ 41
12200,00	1	2,0	44,0	0,44	42 ~ 43
12300,00	1	2,0	46,0	0,46	44 ~ 45
13110,00	1	2,0	48,0	0,48	46 ~ 47
13120,00	2	4,0	52,0	0,52	48 ~ 51
14150,00	1	2,0	54,0	0,54	52 ~ 53
14200,00	1	2,0	56,0	0,56	54 ~ 55
14500,00	1	2,0	58,0	0,58	56 ~ 57
14800,00	1	2,0	60,0	0,6	58 ~ 59
16100,00	1	2,0	62,0	0,62	60 ~ 61
16450,00	1	2,0	64,0	0,64	62 ~ 63
17100,00	1	2,0	66,0	0,66	64 ~ 65
18750,00	1	2,0	68,0	0,68	66 ~ 67
19150,00	1	2,0	70,0	0,7	68 ~ 69
19200,00	2	4,0	74,0	0,74	70 ~ 73
20000,00	4	8,0	82,0	0,82	74 ~ 81
23344,00	1	2,0	84,0	0,84	82 ~ 83
23602,00	1	2,0	86,0	0,86	84 ~ 85
24500,00	1	2,0	88,0	0,88	86 ~ 87
25640,00	1	2,0	90,0	0,9	88 ~ 89
26000,00	1	2,0	92,0	0,92	90 ~ 91
27000,00	1	2,0	94,0	0,94	92 ~ 93
27500,00	1	2,0	96,0	0,96	94 ~ 95
29932,00	1	2,0	98,0	0,98	96 ~ 97
30000,00	1	2,0	100,0	1	98 ~ 100

Dobijanje slučajnih brojeva u opsegu (0 - 100] izvršeno je u MLAB softverskom paketu, i to putem komande: IRAN(0[,0,[100]]).

Za eksperiment od 38 ponavljanja, dobijeni su sledeći brojevi:

43 66 48 24 77 13 55 68 89 81 64 75 51 100 65  
 91 6 46 44 38 37 94 90 39 50 47 63 59 80  
 70 76 93 85 99 1 17 56 60

Tako dobijeni slučajni brojevi konvertovani su u broj pojave događaja otkaza pneumatika shodno kilometraži, a u zavisnosti od toga kom intervalu pripada svaki od njih. Konačni rezultati simulacije javljanja otkaza Monte Karlo metodom dati su na Slici 8.

M2: a 38 by 6 matrix					
1: 350	2	1	43	5	0
2: 725	4	2	66	1	0
3: 1250	8	1	48	1	0
4: 3654	10	1	24	3	0
5: 4120	12	4	77	5.4	1
6: 5100	16	1	13	1	1
7: 5350	18	4	55	2	0
8: 6230	22	1	68	2	1
9: 6350	24	2	89	4	0
10: 7350	26	3	81	5.4	0
11: 8500	34	2.7	64	1	0
12: 10250	38	3.5	75	5.4	0
13: 11420	40	1	51	1	0
14: 11900	42	5	100	8	0
15: 12200	44	5	65	1	0
16: 12300	46	1	91	9	0
17: 13110	48	5	6	1	0
18: 13120	52	1	46	5	1
19: 14150	54	1	44	1	0
20: 14200	56	2	38	1	0
21: 14500	58	5	37	3.5	0
22: 14800	60	6	94	8	0
23: 16100	62	6	90	9	0
24: 16450	64	1	39	1	0
25: 17100	66	1	50	1	0
26: 18750	68	1	47	5	1
27: 19150	70	2	63	1	0
28: 19200	74	4	59	6	0
29: 20000	82	5.4	80	5.4	0
30: 23344	84	8	70	4	0
31: 23602	86	4	76	5.4	1
32: 24500	88	8	93	8	0
33: 25640	90	4	85	4	0
34: 26000	92	9	99	8	1
35: 27000	94	8	1	1	0
36: 27500	96	8	17	4	0
37: 29932	98	9	56	5	0
38: 30000	100	1	60	8	0

Slika 8. Rezultati Monte Karlo simulacije

Sa slike se jasno može uočiti da se, recimo u prvom slučaju, generisani slučajni broj 77 nalazi u intervalu od 74 do 81, što odgovara činjenici da će se na 20000 pređenih kilometara pojaviti otkaz pneumatika vozila u realnom vremenu. I ostale vrednosti slučajnih brojeva ispred kojih je za odgovarajuću kilometražu upisana jedinica, takođe ukazuju na mogućnost pojave otkaza pneumatika nakon navršenog određenog broja kilometara odgovarajućeg vozila. Na ovaj način, uz veći broj ponavljanja procedure, jasno se može simulirati proces nastanka otkaza na vozilima i izvući relevantni zaključci o eventualnoj pouzdanosti voznog parka, te analizirati uzroci i trendovi pojave nastanka defekata na pneumaticima.

#### 4. DISKUSIJA REZULTATA

Na osnovu rezultata dobijenih statističkom obradom empirijskog skupa, jasno je uočljivo da se prikupljeni podaci o evidentiranim otkazima najbolje mogu opisati

Lognormalnom raspodelom, sa prosečnim brojem kilometara otkaza pneumatika od 13914,5 km ( $\bar{x} = 13914,5$ ) i srednjim standardnim odstupanjem od uzoračke sredine u iznosu od 8103,5 km ( $\sigma = 8103,5$ ).

Takođe, sa grafika funkcija pouzdanosti i nepouzdanosti (Slika 5.) jasno je učiljiv trend pada funkcije pouzdanosti  $R(t)$  sa rastom broja otkaza, kao i respektivni rast funkcije nepouzdanosti  $F(t)$  iskazan procentualnim veličinama. Naime, funkcija pouzdanosti ima u početnom trenutku vremena za  $t = 0$  vrednost  $R(t) = 100\%$ , nakon čega funkcija monotono opada i na kraju, kada sve jedinice otkazu, dostiže vrednost  $R(t) = 0\%$ . Potpuno suprotna situacija očitovala se kod funkcije nepouzdanosti. Zapravo, vrednost ove funkcije za nulti vremenski trenutak iznosila  $F(t) = 0\%$ , da bi sa rastom broja otkaza pneumatika njena vrednost monotono rasla sve do  $F(t) = 100\%$ . Time je na praktičnom primenu dokazan osnovni koncept komplementarnosti između ovih dveju funkcija i ukazano na trend pada pouzdanosti voznog parka poštanske službe sa svakim evidentiranim kilometrom otkaza odgovarajućeg vozila.

Da bi se ukazalo na pad pouzdanosti voznog parka u funkciji broja pređenih kilometara, izvršena je konkretna simulacija javljanja otkaza uz primenu Monte Karlo metodologije. Naime, na osnovu grupa u koje su podeljena sva vozila na kojima je evidentiran otkaz pneumatika, generisani su slučajni brojevi, putem kojih su i dobijeni rezultati simulacije nastanka defekata u realnom vremenu. Iako je proces ponavljan dokle god je bilo memorije u računaru za tako nešto, u radu su predstavljeni rezultati posle prvog ponavljanja, nakon koga se jasno može uočiti da simulacija putem Monte Karlo metode može veoma jednostavno i brzo prikazati i simulirati jedan proces, kakav je, uostalom, i nastanak defekata na pneumaticima.

Naime, sa Slike 8, na kojoj su dati rezultati Monte Karlo simulacije, jasno se mogu uočiti pojave otkaza na 5100, 13110, 19150, 20000, 30000 kilometara, i to za sledeća službena poštanska vozila: Renault Kangoo A, Opel Vivaro, Fiat Ducato, Opel Combo, Volkswagen T5, Volkswagen Golf+, Volkswagen Crafter i Iveco Daily Truck. Na osnovu sprovedene simulacije, od svih navedenih marki vozila, prevozna sredstva marke Volkswagen imala su čak 3 otkaza pneumatika, i to sva na pređenih 20000 km. Time se može uočiti trend oštećenja pneumatika na ovim vozilima pri datoj kilometraži, što podrazumeva detaljniju analizu kako bi se otkrio uzrok ove pojave.

## 5. ZAKLUČAK

Svrha ovog rada jeste statistička analiza i simulacija pouzdanosti pneumatika vozila voznog parka poštanske službe, uz primenu osnovnih statističkih metoda za obradu prikupljenih podataka, te Monte Karlo metode za simulaciju istih.

Odabrani pristup same Monte Karlo simulacije zasnovan je na primeni softvera putem koga je simulacija i izvršena, pri čemu predstavljeni rezultati ukazuju na jednu od velikog broja iteracija u kojoj je sprovedena gore opisana procedura i, uz generisane slučajne brojeve, simulirana pojava otkaza shodno odgovarajućoj kilometraži.

Uzimajući u obzir različiti i relativno inovativan pristup simulaciji i oceni pouzdanosti voznog parka, može se reći da je primenjena metodologija dala odgovarajuće rezultate, na osnovu kojih se može zaključiti da pošta, koja u upotrebi ima sva navedna vozila, posebnu pažnju treba da obrati na vozila tipa Renault Kangoo A, s obzirom na broj otkaza pneumatika koji je evidentiran na ovim vozilima. Detaljnom analizom treba utvrditi koji je uzrok učestale

pojave otkaza pneumatika na ovom tipu vozila, a u cilju preduzimanja odgovarajućih preventivnih mera i snižavanja troškova stalnih popravki i promena pneumatika. Pažnju treba obratiti i na vozila Opel Vivaro, jer broj otkaza ovih vozila oscilira na kilometraži većoj od 10000 kilometara.

## ZAHVALA / ACKNOWLEDGEMENT

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## LITERATURA / REFERENCES

- [1] Milčić, D. (2005): *Pouzdanost mašinskih sistema*, Mašinski fakultet, Univerzitet u Nišu, Niš, p. 11, 96
- [2] Anne Tondel, I., Foros, J., Skaufel Kilskar, S., Hokstad, P., Gilje Jaatun, M. (2017): Interdependencies and reliability in the combined ICT and power system: An overview of current research, *Applied Computing and Informatics* 13(2), King Saud University, Riyadh, Saudi Arabia, pp. 1-11
- [3] Vukotić, V., Tanasijević, R. (2014): Revitalizacija i pouzdanost rotornog bagera ER-1250 17/1.5, *Tehnika – rudarstvo, geologija i metalurgija* 65(1), Savez inženjera i tehničara Srbije, Beograd, pp. 43 – 50
- [4] Mihajlović, I., Nikolić, Đ., Jovanović, A. (2009): *Osnove teorije sistema*, Tehnički fakultet u Boru, Univerzitet u Beogradu, Bor, p. 21
- [5] Milčić, D., Mijajlović, M. (2008): *Pouzdanost mašinskih sistema – zbirka rešenih zadataka*, Mašinski fakultet, Univerzitet u Nišu, Niš, p. 3
- [6] Kimber, A. C., Smith, R. L., Sweeting, T. J. (1996): *Statistical Analysis of Reliability Data*, First Edition, Chapman & Hall/CRC, London, UK, pp. 2-8
- [7] Stevenson, J. W. (1996): *Production / Operations Management*, Fifth Edition, Irwin McGraw-Hill, Boston, USA, p. 842, 844
- [8] Nikolić, N. (2010): Kontrola tačnosti rezultata u simulacijama Monte Karlo, *Vojnotehnički glasnik* 58(2), Ministarstvo odbrane Republike Srbije, Beograd, pp. 90 – 107
- [9] Ostojić, D., Pokorni, S., Rakonjac, P., Brkić, D. (2012): Accuracy of Reliability Calculated by the Monte Carlo Simulation Method, *Vojnotehnički glasnik* 60(4), Ministarstvo odbrane Republike Srbije, Beograd, pp. 47-58
- [10] Milčić, D., Mijajlović, M. (2005): *Primena Monte-Karlo simulacije u analizi pouzdanosti sistema*, 12. Simpozijum termičara Srbije i Crne Gore, Zbornik radova simpozijuma, Sokobanja, pp. 1-7
- [11] Mihajlović, I. (2017): *Monte Carlo simulacija*, Autorizovana predavanja, Tehnički fakultet u Boru, Univerzitet u Beogradu, Bor, pp. 3-5
- [12] Milić Crnjac, D., Masle, D. (2013): Mogućnost primjene Monte Carlo metode na primjeru agroekonomskog problema prilikom donošenja odluka u uvjetima rizika, *Ekonomski vjesnik* 26(1), Ekonomski fakultet u Osijeku, Osijek, pp. 309 – 314

## PROJECT RGOŠKA SPA AS A STRATEGY FOR THE DEVELOPMENT OF THE EASTERN SERBIA

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**Abstract:** The main aim of this paper is to present the project ‘Rgoška Spa as a strategy of developing the region of Eastern Serbia’. Rgoška Spa is a unique Knjaževac tourist destination which will contribute to the municipal economic development in Eastern Serbia. The most important thing is building a wellness center, and all the other facilities will be built later.

The impact of this project will be brand building and promoting of this tourist destination, which will make the image of this place recognizable.

This region has considerable natural resources and offers a variety of traditional, organic food and quality wines.

The realization of this project will raise ecology awareness along with the awareness of the importance of renewable energy sources.

This spa will have treatment, relaxation and recreational function, it will influence spa and rural tourism and will also have a large impact on economic development and employment.

**Keywords:** spa, brand, organic food, tourism, project, ecology, natural resource

### 1. UVOD

Banje predstavljaju područja na kome postoji jedan ili više prirodnih faktora koje ispunjavaju uslove za korišćenje.

Banje se odlikuju izraženim zdravstveno – rekreativnim funkcijama, usled različitih prirodnih elemenata (termomineralni izvori, plemeniti gasovi, peloid, klimatski elementi, vegetacija), zbog kojih ova vrsta mesta odavno pobuđuje veliko interesovanje turističke tražnje. [1]

Srbiju popularno zovu „državom banja“, zbog brojnosti termomineralnih izvora, duge tradicije i opšte poznatosti banja, kao i njihovog značaja u turističkom prometu. Uspon banjskog turizma posebno je bio izražen u prvim decenijama posle II svetskog rata, kada su podstaknute državnom socijalnom politikom, banje zakonskim putem dobile status prirodnih lečilišta. [1]

Banje u Srbiji su veoma izuzetne i čine veliki potencijal Srbije i srpskog turizma. Lekoviti gas i lekovito blato upotpunjuju banjsko bogatstvo Srbije. Preko 1000 izvorišta i na njima preko 50 banja, učinili su banjski turizam u Srbiji, najrazvijenijom turističkom granom.

U novembru 2016. god., u smeštajnim objektima u Republici Srbiji, evidentirano je 177.474 dolazaka turista, što je za 22 % više u odnosu na isti period 2015.god. Broj dolazak stranih turista, u odnosu na novembar prethodne godine, veći je za skoro 30%, dok je broj

dolazaka domaćih turista veći za 15, 2%. U strukturi noćenja stranih turista koja se povećala za 31%, najviše noćenja su ostvarili turisti iz: Bosne i Hercegovine (7,9%), Hrvatske (7,6%) i Crne Gore (6,2%). Gustina putne mreže u Timočkoj krajini je iznad republičkog proseka, čime je dostupnost naselja veća od republičkog proseka. Međutim, putna mreža prve kategorije još uvek nije adekvatna, odnosno ne odgovara modernim standardima, transportnim sredstvima i većim računskim brzinama.

\* (Zvanični podaci - Republički zavod za statistiku, Mesečni statistički bilten 10/2016, Beograd 2017.)

## 2. POJAM PROJEKTA

Projekat predstavlja složeni i neponovljivi poduhvat koji se preduzima u predviđenom vremenu i sa predviđenim troškovima da bi se postigli željeni ciljevi u budućnosti [2]. Naučne studije projekt menadžmenta obično definišu projekat kao skup aktivnosti ili zadataka namenjenih postizanju jedinstvenog kratkoročnog cilja organizacije, sa specifičnim zahtevima za izvršenje, koji se podložni vremenskim i vrednosnim ograničenjima [3]. Takođe, bitno je naglasiti da projekti predstavljaju privremene organizacije, dizajnirane tako da donose određene koristi matičnoj organizaciji i interesnim grupama kroz kompleksne procese rešavanja zadataka i problema. [4]

Zajedničke osobine projekata, kao poduhvata su:

Cilj – svaki projekat ima svoj cilj;

Rokovi – određeni cilj se mora ostvariti u određenom roku;

Kompleksnost – mnogo faza, podfaza, aktivnosti, učesnika;

Definisan obim i priroda zadataka;

Definisani resursi, po prirodi ograničeni, a koji su na raspolaganju za realizaciju poduhvata;

Posebna organizaciona struktura za izvršenje poduhvata – projekta;

Poseban informacioni i kontrolni system [2].

Projekti imaju ograničenja resursa, kao što je ograničen broj ljudi, novca ili mašina posvećene projektu [4]. Rukovodilac projekta ima samo jedan zadatak, a to je da projekat dovede do uspešnog završetka. On mora da rukovodi ekipom ljudi, povezuje i kordinira sve učesnike u projektu i zadužen je za generalni cilj projekta [2].

## 3. PROCES PLANIRANJA PROJEKTA

Proces grupe planiranja obuhvata sve procese koje se odnose na odgovore dva pitanja: “Šta želite da uradite?” i “Kako ćete to da uradite?” [5] Proces su sledeći:

- 1) Definisavanje svih poslova projekta;
- 2) Procena vremena izvršenja poslova;



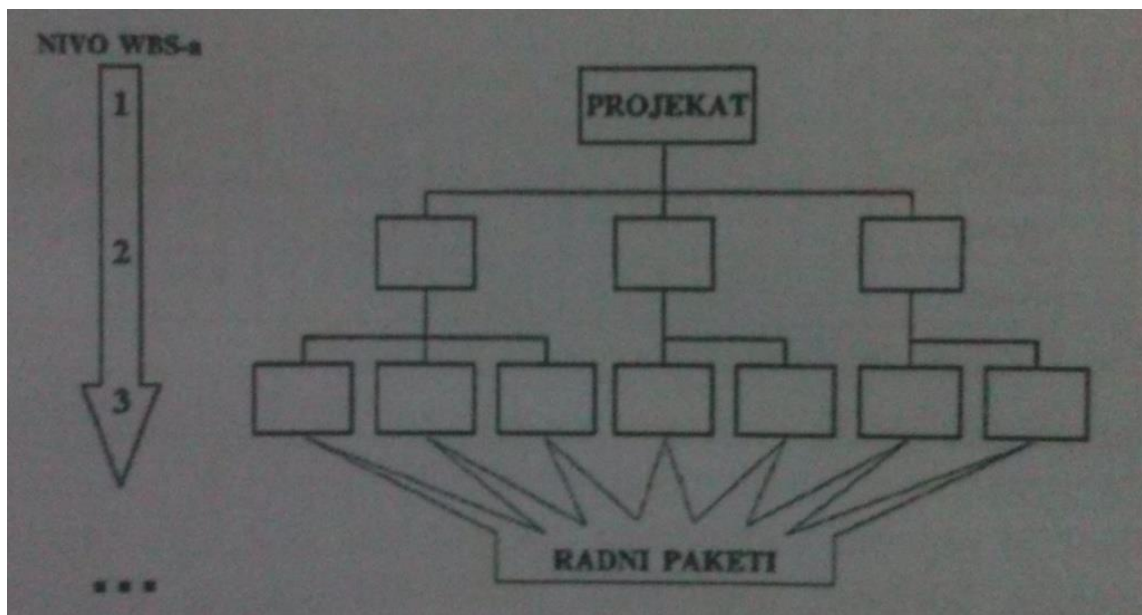
- 3) Procena potrebnih resursa za izvršenje poslova;
- 4) Sastavljanje početnog rasporeda projekta;
- 5) Analiza i podešavanje rasporeda projekta;
- 6) Sastavljanje dokumentacije plana rizika;
- 7) Dokumentovanje plana projekta;
- 8) Dozvola od menadžmenta za pokretanje projekta [5].

#### 4. STRUKTURA PROJEKTA – WBS TEHNIKA

Tehnika organizaciono – tehnološkog struktuiranja projekta, odnosno raščlanjivanja ukupnog zadatka (projekta) na sastavne elemente naziva se WBS tehnika ( The Work Breakdown Structure). Ona ima široku primenu u upravljanju raznovrsnim poslovnim poduhvatima, odnosno projektima, kao što su upravljanje razvojem novog proizvoda, upravljanje realizacijom krupnih projekata, upravljanje osvajanjem i proizvodnjom složenih proizvoda, itd [3].

WBS tehnika se najčešće definiše kao metod kojim se vrši raščlanjivanje nekog zadatka ili poduhvata na sastavne elemente, sa prikazanim postojećim odnosima između elemenata i celine. Ovo raščlanjivanje ide logikom sistemskog pristupa o podeli jednog složenog sistema na podsisteme i to u više nivoa [3].

Hijerarhijska lokacija elemenata WBS-a utvrđuje se označavanjem nivoa. Svakom elementu WBS-a pripisuje se jedinstveni identifikacioni broj, kao što je prikazano na slici 1 [3].



Slika 1. Hijerarhijska lokacija elemenata WBS-a [3]

## PROJEKAT RGOŠKA BANJA

Rgoška banja je poznata od davnina, o čemu svedoče ostaci nekadašnjeg rimskog kupatila, kao i pisani dokaz koji je ostavio Feliks Kanic 1804. godine pišući o njenim termalnim izvorima i lekovitim svojstvima. Najnoviji rezultati iz 2008. godine su pokazali da je voda, koja izvire u selu Rgošte, opalescentna, bez mirisa i ukusa, čija je temperatura 27,2 C°, što je svrstava u grupu hipotermalnih voda. Banja raspolaže neiskorišćenim resursima, kojima banja koji projektom mogu da se maksimalno iskoriste, a posebno može da se utiče na razvoj regiona Istočne Srbije i Opštine Knjaževac što predstavlja opšti cilj projekta.

**Glavni projekat**, koji je detaljno razrađen, predstavlja Sportsko-rekreativni i zdravstveno-rehabilitacioni centar „Rgoška banja“ koji će sadržati sledeće prostorije:

- 1) Prostorija za specijalističke preglede;
- 2) Slana soba;
- 3) Prostorije za relax masažu, vinoterapiju;
- 4) Prostorija za hidromasažu;
- 5) Đakuzi;
- 6) Prostorija za fizikalnu terapiju;
- 7) Wc i tuševe;
- 8) Kabine za presvlačenje;
- 9) Kancelarija direktora, recepcija, hol;
- 10) Skladište i sigurnosni ormarići.

**Dodatni projekti** koji bi upotpunili ovaj kompleks „Rgoška banja“ i koji bi se mogli izgraditi naknadno, ulaganjem privatnih investitora, su:

- 1) Uređenje Izvorišta i obala reke svrljiškog Timoka;
- 2) Izgradnja šetališta i biciklističkih staza;
- 3) Registracija seoskih kuća za iznajmljivanje;
- 4) Renoviranje postojećeg objekta u restoran eko hrane;
- 5) Izgradnja fabrike za flaširanje vode u eko bocama (Plantbottle);
- 6) Plastenik za uzgajanje organske hrane;
- 7) Izgradnja sportskih terena (za košarku, fudbal, tenis, rekreativno penjanje);
- 8) Izgradnja ustave za podizanje nivoa reke za plovidbu čamcima.

## 5. PROIZVODI I USLUGE

Cilj ovog projekta je da promovisanje srpskih brendova, odnosno **brendove Istočne Srbije**, fokusirajući se na **etno** i **eko** karakter.

U ponudi će biti proizvodi koji će biti ekološki obeleženi (eco-labels) koji:

- 1) U što je moguće manjoj meri, ugrožavaju životnu sredinu;
- 2) Prilikom čije proizvodnje će maksimalno štedeti prirodni resursi;
- 3) Uz korišćenje materijala podložnih reciklaži;
- 4) Koji nisu ispitivani na životinjama.

Ponuda se sastoji iz sledećeg: zdravstveni pregledi, lečenje lekovitom vodom sa vira, smeštaj u seoskim kućama, fizikalna terapija, masaže (malinama, medom, vinom), terapije (čokoladom, kafom,), fish spa, slana soba, đakuzi, hidromasaža, salon lepote, spa papuče – vunene čarape, organska hrana iz sopstvenog plastenika, knjaževačka vina i rakije, specijaliteti i sokovi od višanja, kupina i malina, flaširana voda u eko bocama, tereni za sportske aktivnosti, sapuni sa kozjim mlekom (lavanda, cimet, med), joga u prirodi...

## 7. LOKACIJA

Rgoška banja se nalazi u selu Rgošte, 5 km jugozapadno od Knjaževca, na obali Svrljiškog Timoka u podnožju planine Tresibabe (787m); 1 km od magistralnog puta Niš-Knjaževac-Zaječar.

Područje opštine Knjaževac se prostire u živopisnim dolinama reka Svrljiški, Trgoviški i Beli Timok, na brežuljkastim padinama Tresibabe i Tupižnice i na privlačnim područjima severnog dela Stare planine.

## 8. MISIJA I VIZIJA

Misija projekta je usmerena na klijenta i njegovo fizičko i psihičko zdravlje, da se pomogne svima onima koji su pronašli volju i želju da promene sebe, kako bi se savršeno osećali u svom telu. Okruženi prirodnim lepotama, koristeći resurse na održiv način, projekat treba nadmašiti očekivanja korisnika. Misijom se stvara mogućnost da svaki poslovni čovek 21.veka, koji je pod stresom i prepun obaveza, koji se neredovno i nepravilno hrani, može da vrati sebe u stanje tela i duha u kom se oseća zdravo, relaksirano i energično.

Klijentima se nude drugačiji i jedinstveni proizvodi i usluge: (vinoterapija, masaža čokoladom, mlekom i kokosom, spa papuče - vunene čarape, masaža stopala malinama i kupinama, razne vrste melema, a gosti će moći da, prilikom relaksacija, uživaju u vrhunskim knjaževačkim vinima, staroplaninskom kačkavalju, belmužu, organskoj hrani iz našeg plastenika, rtanjskom čaju za opuštanje).

Viziju projekta čini inovativni, moderni i liderski kompleks u Istočnoj Srbiji u što kraćem roku koji pozitivno utiče na način života i zdravlje naših gostiju, kao i pružanje zdravstveno-rekreativnog, društvenog i kulturnog doprinosa gradu, regionu i državi.

Ključne vrednosti na kojima se gradi vizija “Rgoške banje” su: kvalitet, jedinstvenost, kreativnost, inovativnost, timski duh, poverenje, pažnja, ekologija.

Ovim projektom članovi tima žele da:

- 1) Stvaranje brenda koji će opravdati svoj uspeh kroz zadovoljstvo klijenata;
- 2) Stalno postavljanje viših standarda kvaliteta;
- 3) Zaposlenima obezbedi stimulatívno radno okruženje, koje će ih motivisati i inspirisati da postignu željene rezultate i ostvare svoje poslovne ciljeve;
- 4) Uvođenje ekoloških prihvatljivih tehnologija kako bi ostali u ravnoteži sa prirodom;
- 5) Sinonim za kompaniju koja predviđa i kreira promene, navike i trendove, kako bi svaki klijent osećao vrhunsko psihofizičko zadovoljstvo.

## 9. STRATEGIJSKI CILJEVI

Većina država smatra osnovnim stratezijskim ciljevima razvoja turizma: podsticanje ekonomskog i regionalnog razvoja [6].

Uz ove osnovne ciljeve navode se i: stvaranje povoljnog imidža zemlje, zaštita prirode, zaštita kulturno – istorijskog nasleđa, poboljšanje kvaliteta života, zaštita potrošača i podsticanje privrednog razvoja u nedovoljno razvijenim područjima [6].

Period od godinu dana:

- 1) Podizanje svesti o Rgoškoj banji kao turističkoj destinaciji među lokalnim stanovništvom, posetiocima i inostranim turistima;
- 2) Razvojem moderne i snažne kompanije, doprineti ekonomskom i kulturnom razvoju opštine i zapošljavanju lokalnog stanovništva;
- 3) Negovanje dobre poslovne komunikacije i brige o svojim korisnicima, zaposlenima, svim resursima životne sredine i održivom energetsom razvoju;
- 4) Promotivnim sredstvima privući korisnike i povećati broj korisnika za 30%;
- 5) Praćenje razvoja novih tehnologija na svetskom tržištu i razvoj inovativnih Wellness proizvoda i usluga.

Dugoročni period od dve do pet godina:

- 1) Stalni rast Bruto Godišnjeg Prometa;
- 2) Razvoj zajedničkih standarda kvaliteta;
- 3) Uspostavljanje saradnje sa zdravstvenim, Wellness i Spa centrima;
- 4) Povećanje broja korisnika za 80% u periodu od 5 godina nakon otvaranja;
- 5) Poboljšanje uslova rada i povećanje zarada zaposlenima od 5 - 10%.

## 1. PLAN REALIZACIJE PROJEKTA

Celokupnu izgradnja planirana je od marta 2018.god. do kraja septembra 2021.god., što znači da projekat izgradnje svih objekata može biti realizovan za 4 god.

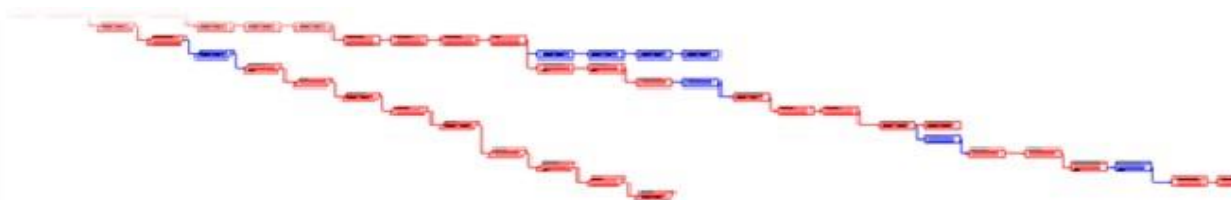
### A. MREŽNI DIJAGRAM AKTIVNOSTI WELLNESS CENTRA

Mrežni dijagram je grafički prikaz projekta. On odražava međusobnu povezanost svih aktivnosti i događaja projekta. Redosled aktivnosti i njihova međusobna zavisnost čine strukturu projekta. Mrežni dijagram ima jedan početni događaj, to je početni događaj projekta i jedan završni događaj, koji predstavlja završni događaj projekta [3].

Izgradnja glavnog projekta – Wellness centra počinje 1. aprila 2018. i traje do 16. novembra 2018. godine. Projektom je obuhvatio subotu i nedelju kao neradne dane, uključujući i praznike kao što su Uskrs i Praznik rada. Cilj je da angažovanjem većeg broja radne snage skрати trajanje realizacije projekta.

Primena računarskih programa pri planiranju vremena, budžeta i resursa je postala standard. Jedan od najznačajnijih računarskih sistema jeste Microsoft Project. Microsoft Project je prilagodljiv i za velike i za male projekte i predstavlja neprocenjiv alat za planiranje i kontrolu realizacije projekta [2].

Kritični put projekta je put koji se proteže od prvog do poslednjeg događaja i to je put koji ima najduže vreme trajanja i sadrži samo kritične aktivnosti (aktivnosti koje se realizuju striktno u skladu sa predviđenim vremenskim planom).



Slika 2. MD Wellness Centra u MS Project-u sa prikazanim kritičnim putem

### B. RESURSI

Planiranje resursa, kao poseban podproces u okviru procesa planiranja projekta obuhvata sledeće aktivnosti:

- 1) Utvrđivanje potrebnih količina resursa;
- 2) Određivanje vremenskih termina kada su pojedini resursi potrebni;
- 3) Obezbeđenje potrebnih resursa u potrebnim količinama, potrebnom kvalitetu i u potrebnom trenutku. [2]

Ovaj projekat obuhvata plan potrebnih resursa za izgradnju glavnog objekta ovog projekta, što pokazuje naredna tabela, a to je Wellness Centar.

Tabela 1. Tabela prikaz resursa

	Resource Name	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1	Izrada Biznis plana	50.000,00 Din.		0,00 Din.	Prorated		
2	Analiza osetljivosti	5.000,00 Din.		0,00 Din.	Prorated		
3	Studija izvodljivosti	0,00 Din.		0,00 Din.	Prorated		
4	Gradjevinska dozvola	0,00 Din.		0,00 Din.	Prorated		
5	Kanalizacione cevi	150.000,00 Din.		0,00 Din.	Prorated		
6	Vodovodne cevi	200.000,00 Din.		0,00 Din.	Prorated		
7	Armatura	50.000,00 Din.		0,00 Din.	Prorated		
8	Cement	150.000,00 Din.		0,00 Din.	Prorated		
9	Pesak	50.000,00 Din.		0,00 Din.	Prorated		
10	Blok	420.000,00 Din.		0,00 Din.	Prorated		
11	Gipsani unutrašnji zidovi	30.000,00 Din.		0,00 Din.	Prorated		
12	Sistem podnog grejanja	750.000,00 Din.		0,00 Din.	Prorated		
13	Laminat	10.000,00 Din.		0,00 Din.	Prorated		
14	Grede	400.000,00 Din.		0,00 Din.	Prorated		
15	Crep	300.000,00 Din.		0,00 Din.	Prorated		
16	Krovna limarija	41.000,00 Din.		0,00 Din.	Prorated		
17	Izolacija objekta	115.000,00 Din.		0,00 Din.	Prorated		
18	Izolacija krova	250.000,00 Din.		0,00 Din.	Prorated		
19	Električne instalacije	300.000,00 Din.		0,00 Din.	Prorated		
20	Vrata - unutrašnja	100.000,00 Din.		0,00 Din.	Prorated		
21	Vrata - spoljašnja	80.000,00 Din.		0,00 Din.	Prorated		
22	Prozori	150.000,00 Din.		0,00 Din.	Prorated		
23	Glet masa	115.000,00 Din.		0,00 Din.	Prorated		
24	Kreč	25.000,00 Din.		0,00 Din.	Prorated		
25	Pločice	450.000,00 Din.		0,00 Din.	Prorated		
26	Video nadzor	30.000,00 Din.		0,00 Din.	Prorated		
27	Klima	100.000,00 Din.		0,00 Din.	Prorated		
28	Recepcioni nameštaj	40.000,00 Din.		0,00 Din.	Prorated		
29	Klub sto	4.000,00 Din.		0,00 Din.	Prorated		
30	Ugaona garnitura	50.000,00 Din.		0,00 Din.	Prorated		
31	Radni sto	25.000,00 Din.		0,00 Din.	Prorated		
32	Stolice	25.000,00 Din.		0,00 Din.	Prorated		
33	Police	25.000,00 Din.		0,00 Din.	Prorated		
34	Krevet za pregled	20.000,00 Din.		0,00 Din.	Prorated		
35	Racunar	30.000,00 Din.		0,00 Din.	Prorated		
36	Frizerske stolice	15.000,00 Din.		0,00 Din.	Prorated		
37	Ogledala	44.000,00 Din.		0,00 Din.	Prorated		
38	Šamponjera	20.000,00 Din.		0,00 Din.	Prorated		
39	Hauba za kosu	16.000,00 Din.		0,00 Din.	Prorated		
40	Krevet za masažu	20.000,00 Din.		0,00 Din.	Prorated		
41	So	20.000,00 Din.		0,00 Din.	Prorated		
42	Tv	27.000,00 Din.		0,00 Din.	Prorated		
43	Fotelje	30.000,00 Din.		0,00 Din.	Prorated		
44	Halogenerator	330.000,00 Din.		0,00 Din.	Prorated		
45	Vezivna masa za so	50.000,00 Din.		0,00 Din.	Prorated		

## 2. MARKETING MIKS

Marketing miks smatra se instrumentom marketinga i ima dva zadatka: komunikacijski i operativni. Komunikacijski aspekt ima za cilj da stvori takve uslove da proizvod na tržištu sretne kupca. Operativni zadatak marketing miksa ima za cilj da stvori uslove da dođe do razmene, odnosno transakcije [7].



Slika 3. Marketing miks Rgoške banje

### 3. ZAKLJUČAK

Analiziranjem lokalnog tržišta u oblasti pružanja usluga, uočeno je da ne postoji nijedna banja tog tipa za lečenje reumatizma, saniranja raznih bolesti u okruženju i izveden je zaključak da su potrebe za lečenjem, rekreacijom izražene, nepokrivene i da stalno rastu.

Ispitivanjem građana, došlo je do saznanja da je nedostatak ovog omiljenog izletišta Knjaževčana i posetioca, upravo nepostojanje smeštajnih kapaciteta i pružanje usluga lečenja i specijalističkih pregleda. Cilj ovog projekta jeste da zadovolji tu potražnju.

Projekat doprinosi razvoju ruralnih sredina, omogućuje povratak ljudi iz gradova u selo, kao i razvoju turizma Timočke krajine. Takođe, doprinosi zapošljavanju mladih lica.

Projekat će privući inostrane turiste prvenstveno iz Rumunije i Bugarske, odnosno naših susednih država, takođe će se omogućiti korist državi koja se ogleda u povećanu državnog budžeta u smislu plaćanja boravišne takse i plaćanje PDV-a od prodaje flaširanih voda, kao i drugih administrativnih propisa i procedura.

Realizacija projekta će omogućiti mladima da svoje vreme provedu kvalitetnije, u prirodi sa svojim vršnjacima, podizanju svesti ljudi o ekologiji kao i očuvanju životne sredine i širenju svesti o važnosti korišćenja obnovljivih izvora energije.

Ovim projektom se stvara pozitivna slika o regionu, pruža se mogućnost za dodatan razvoj, učenje, napredovanje, kao i promovisanje zdravog načina života, lečenje bolesnih, ali i relaksaciju zdravih osoba.

## REFERENCE

1. Dobrica Jovičić, Glasnik Srpskog geografskog društva, 2008, p. 17
2. Dr Aca Jovanović, dipl. ing., Upravljanje projektom, Bor, 2004/2005, p. 2, p. 129
3. Predrag S. Stanimirović, Ivan M. Jovanović; Mrežno planiranje i MS project; Niš, 2008, p. 10, 21, 241
4. Pemsel, S., Wiewiora, A. (2013). Project management office a knowledge broker in project-based organizations, *International Journal of Project Management*, 31, 31–42.
5. Robert K. Wysocki, *Effective Project Management: Traditional, Agile, Extreme*, 2011
6. Jovan Popesku, *Menadžment turističke destinacije*, Beograd, 2011.
7. Radoslav Avlijaš, *Preduzetništvo*, Beograd 2010, p. 170



## **ORGANIZING PRICE, VERTICAL DELEGATING AND HORIZONTAL DISPERSION PRICE MANAGEMENT**

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**Abstract:** In modern conditions, on market is more and more talking and using of business to business management. Considering the fact that the prices are one of the most important factor of profit growth in company, one of the common challenges which companies are facing is dilemma which method should be used when they forming the prices: vertical delegating and horizontal dispersion. For needs of comparative analysis of this methods, an research has been implemented by questionnaire in two different trade companies. Given results shows advantages and disadvantages of practical use of this methods in forming prices in retail. Combinating these two methods when forming prices in retail allows bigger salary and better profitability.ž

**Key words:** Business to business, price formation, horizontal dispersion, vertical delegating

### **1. UVOD**

Tema našeg rada je „**Organizovanje cena, vertikalno delegiranje i horizontalna disperzija upravljanja cenama**“. Ključni problem ovog istraživanja bazira se na načinima formiranja cena i na to, koji metod je bolji za poslovanje preduzeća. Takođe se istražuju termini kao što su bussines to bussines, vertikalno delegiranje, horizontalna disperzija i drugi. U radu ćete videti detaljno razrađeno istraživanje.

### **2. BUSINESS TO BUSINESS (B2B)**

B2B model elektronskog poslovanja predstavlja poslovanje izmedju dva ili više preduzeća, odnosno, razmenu proizvoda, usluga ili informacija koju jedno preduzeće obavlja sa jednim ili više drugih preduzeća iz svog okruženja. Za razliku od B2C modela koji podrazumeva poslovanje preduzeća sa krajnjim korisnicima, u B2B modelu na obe strane uglavnom figuriraju dobavljači, posrednici, distributeri.

Jedna od najvećih B2B oblasti obuhvata postavljanje sistema za kompanije preko kojih se one snabdevaju robom drugih kompanija. U današnje vreme e-trgovina podrazumeva korišćenje interneta i za pridobijanje "poena" u odnosu na konkurenciju, ne samo poboljšanjem efikasnosti i efektivnosti postojećeg poslovanja, već konstantnim prilagođavanjem brzim promenama. I pored ovih imperativa za prebacivanje poslovanja na internet, kupovina na ovakav način je i dalje prilično nezgrapna i skupa.

Elektronsko poslovanje izmedju preduzeća prošlo je u svom razvoju kroz tri etape. U prvom etapi korišćen je sistem elektronske razmene podataka (EDI - Electronic Data

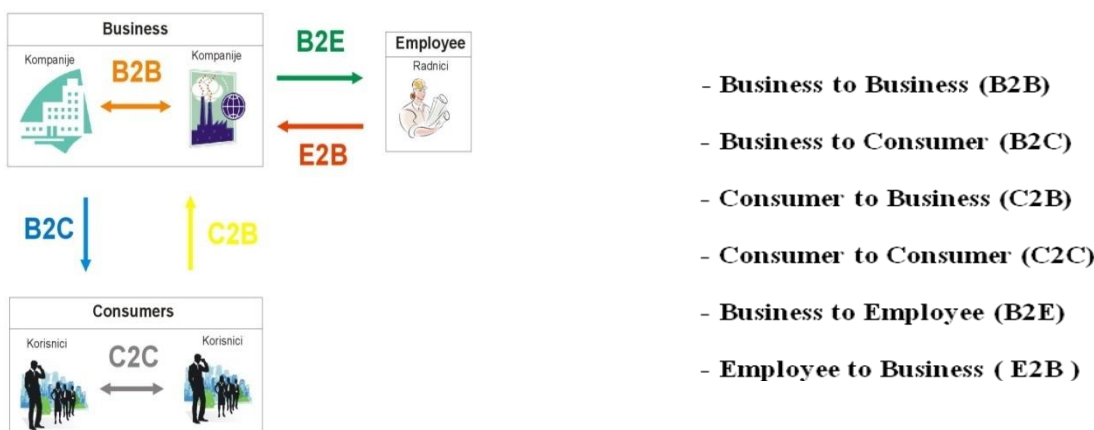
Interchange). U drugoj etapi uočen je potencijal interneta i nastaje osnovni B2B e-commerce sistem. Treća etapa predstavlja proširen B2B e-commerce sistem koji se ogleda u agregaciji ponude pod imenom Electronic Marketplaces (eMarkets) [1]

Prednosti B2B poslovanja su [2]:

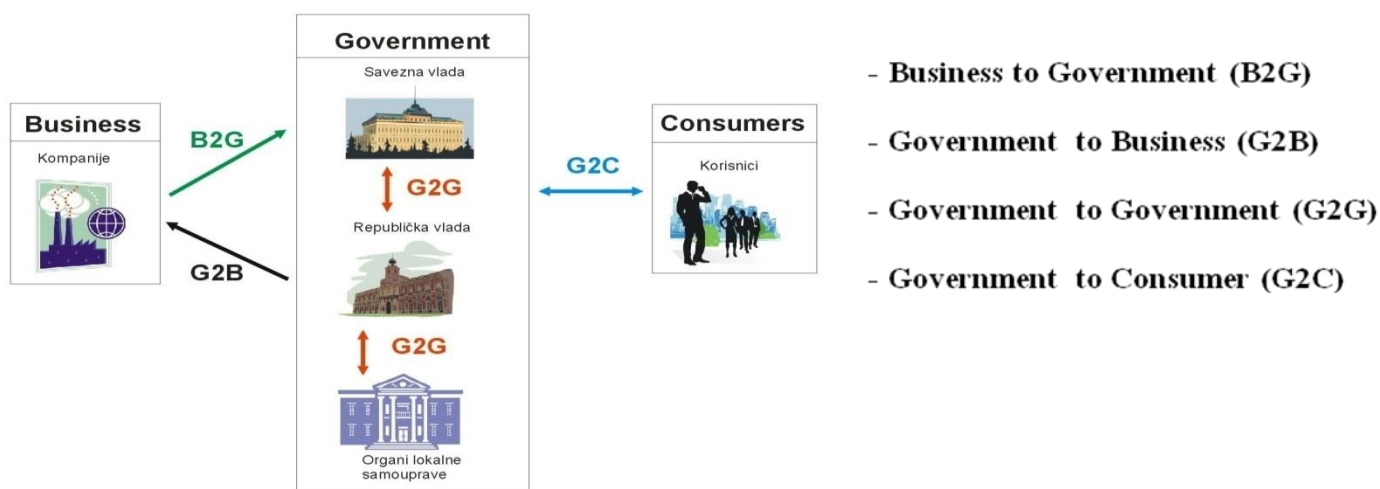
- Komunikacija između firmi je jednostavna (interni e-mail, sajt),
- Dostupna on-line dokumentacija (podaci o firmi, projektna dokumentacija),
- Distribucija izveštaja i bitnih informacija klijentima,
- Praćenje nabavke i isporuke,
- Smanjenje troškova,
- Integracija lanca nabavke,
- On-line pribavljanje robe jedne firme za drugu,
- Povećanje transparentnosti poslovanja,
- Mogućnost pristupa novim tržištima,
- Mnoge nove, efikasnije i fleksibilnije transakcione metode.

Nedostaci B2B poslovanja su:

- Sporo reagovanje na brojne zahteve klijenata zbog integrisanog sistema,
- Pravni aspekti u međunarodnim ugovorima,
- U automatizovanim sistemima nema pogađanja oko cene,
- Nema žive reči (ponekad nam treba čovek sa druge strane).



Slika 1. Komunikacije između kompanija i krajnjih korisnika



Slika 2. Komunikacije u elektronskoj vladi

### 3. CENE

Cene su jedan od najbitnijih faktora rasta profita. Cena je jedan od četiri elemenata marketing miksa. Ona je sredstvo, a ne cilj. Cenovna strategija svakog biznisa mora biti u skladu sa definisanim proizvodom, odabranim kanalima prodaje i načinom promocije. Sva četiri elementa marketing miksa zajedno definišu marketing strategiju kojom nastupate na tržištu i važna su u budućem tržišnom pozicioniranju.

Cena je podjednako važna kupcima u donošenju odluke o kupovini luksuznog i skupog proizvoda, kao i prilikom kupovine manje kvalitetnog proizvoda. U oba slučaja cena mora biti u skladu sa očekivanom korisnošću. U slučaju luksuznih proizvoda cena mora biti dovoljno visoka da ukazuje na njihovu retkost i kvalitet, dok u slučaju kupovine manje kvalitetnih proizvoda očekivanja kupaca su da je cena što niža.

#### 3.1. POPUSTI

Prilikom definisanja cena treba ukalkulisati i dodatne popuste. Popusti se obično odobravaju za određene kanale prodaje i krajnje kupce. Poznato je nekoliko vrsta popusta u cenama [3]:

- Količinski popusti - odobrava se za određeni obim kupovine, prema unapred definisanim rasponima.
- Kumulativni popusti - za razliku od količinskih, odobravaju se tek kada se postigne određeni unapred definisani obim kupovine, s tim da se računaju sve porudžbine u definisanom vremenskom intervalu važenja popusta.
- Sezonski popust - odobrava se kod sezonskih proizvoda na kraju sezone ili kod određenih u pred sezoni.

- Keš popusti - odobravaju se na avansno i gotovinsko plaćanje.
- Promotivni popusti - kratkotrajni popusti u cilju promocije određenih proizvoda i privlačenja što većeg broja kupaca.
- Popusti prema određenim kanalima prodaje - marže koje važe za određene veleprodajne i maloprodajne kanale prodaje.

### 3.2. FAKTORI KOJI UTIČU NA FORMIRANJE CENA

Što se tiče faktora vezanih za kupce računamo da osetljivost kupaca na cene kontroliše njihovu elastičnost. Ova promenljiva se odnosi na to koliko se kupci oslanjaju na cene prilikom odabira dobavljača. To im omogućava veći pritisak na dobavljače kako bi zadržali veći iznos ekonomske rente. Zbog toga mi kontrolišemo centralizovanu nabavku kupca koja se odnosi na sakupljanje informacija o cenama i pregovaranje o cenama na centralnom nivou.

Što se tiče faktora vezanih za troškove, kontrolišemo relativni udeo promenljivih troškova koji određuje donja granica cena i tako ograničava diskreciono pravo u odlukama o cenama. Relativni udeo varijabilnih troškova se odnosi na procenat varijabilnih troškova vezanih za obim prodaje. Kad posmatramo faktore vezane za konkurenciju uzimamo u obzir intenzitet konkurencije, to podrazumeva pritisak na firmu koji čine aktivnosti konkurenata. U industrijama gde je intenzitet aktivnosti konkurencije veći, firme su primorane da smanje maržu kako bi se izborili sa pritiskom konkurentskih cena.

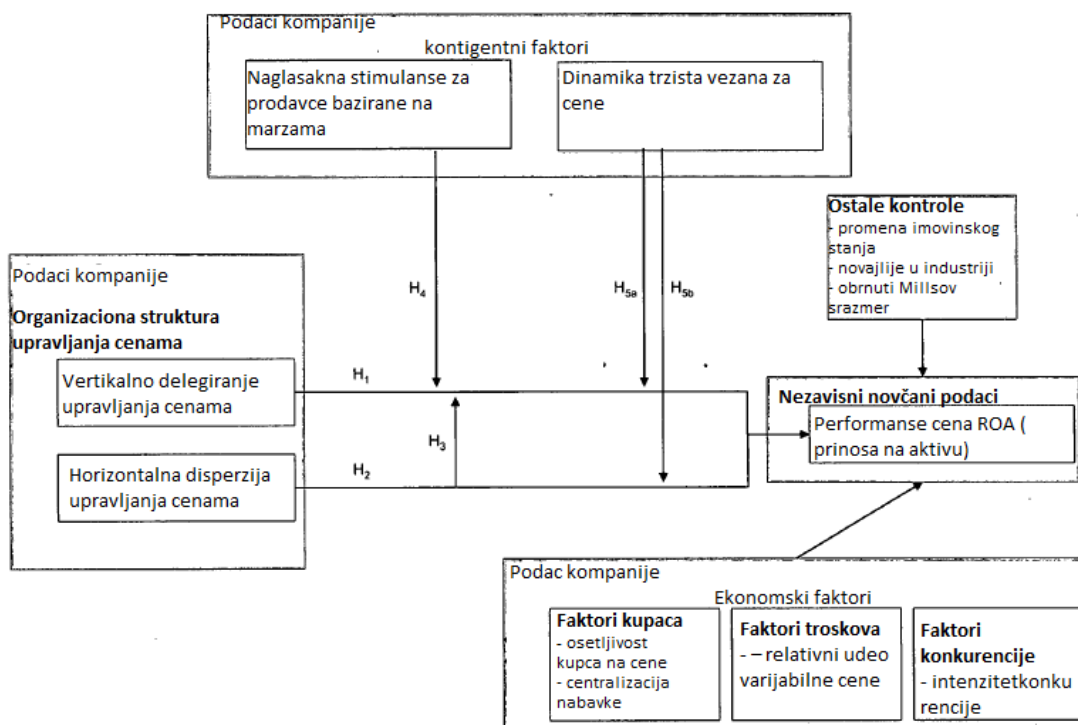
### 3.3. NAČINI UPRAVLJANJA CENAMA

Najvažniji problem kod donošenja odluka o cenama je mesto donošenja odluka o cenama, što se odnosi i na jedinicu odluka o cenama. Ovaj problem postavlja pitanje ko treba da ima vlast u donošenju odluka o cenama u okviru jedne organizacije. Istraživači znaju iznenadjujuće malo o ovom problemu što dovodi do nedostatka informacija o cenama u trenutnoj literaturi. "Jako je malo uporednog istraživanja o tome kako kompanije odlučuju o cenama" [4]. Iz razloga što je sposobnost obrade podataka važna u donošenju odluka o cenama, verujemo da stanovište obrade podataka omogućava adekvatnu teorijsku pozadinu za ispitivanje organizacione strukture upravljanja cenama.

Donošenje odluka o cenama je kompleksno i podrazumava posedovanje puno informacija, uključujući mnogobrojne specijalizovane ali nezavisne sektore, gde svaki sektor ima specifične relevantne informacije. Takodje firme moraju uzeti u obzir različite informacije vezane za kupce, konkurenciju i cene iz različitih izvora kako bi se donela odluka o optimalnoj ceni.

Stoga ćemo zamisliti dve ključne dimenzije strukture upravljanja cenama[5]:

1. Vertikalna decentralizacija (delegiranje) upravljanja cenama u okviru prodaje i
2. Horizontalna decentralizacija (disperzija) upravljanja cenama u prodaji, marketingu i finansijama

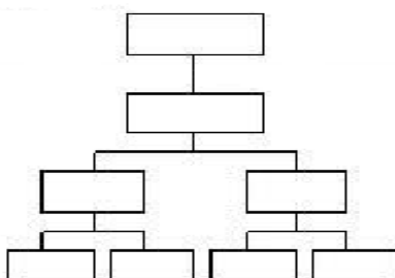


Slika 3. Organizacioni dizajn upravljanja cenama sa stanovišta obrade podataka

#### 4. VERTIKALNO DELEGIRANJE UPRAVLJANJA CENAMA

Delegiranje je proces uslovljen podelom zadataka i podelom ovlašćenja. Stepem prenošenja ovlašćenja od vrhovnog rukovodstva na niže rukovodioce niz hijerarhijsku lestvicu je mera decentralizacije kao element organizacione strukture.

Veća decentralizacija po vertikali dovodi do kompetentnijeg odlučivanja, ali u isto vreme produžava lanac komandovanja.



Slika 4. Šematski prikaz vertikalnog delegiranja

Vertikalna dimenzija se bavi upravljanjem cenama prilikom taktičkih, čestih problema kao što su pregovori o finalnim uslovima prodaje sa kupcima. Uobičajeno je da prodajni sektor donosi ove odluke zato što B2B kupci potražuju rabate i pregovaraju cene individualno tokom direktne interakcije sa odsekom prodaje.

Vertikalno delegiranje upravljanja cenama možemo da definišemo kao vertikalnu decentralizaciju upravljanja cenama u okviru prodajnog sektora kao što je delegiranje upravljanja cenama sa centralnog menadžmenta na prodavce. Suprotno tome u centralizovanom sistemu upravljanja cenama predstavnici prodaje moraju da traže dozvolu od nadležnih menadžera prilikom sastavljanja ponude kupcu ukoliko žele da ponude veći rabat.

Podela poslova kao delova zadataka u organizaciji zahteva i podelu upravljačke funkcije u domenu dodeljenog poslovnog zadatka. Rast organizacije uslovio je i umnožavanje broja zadataka i broja izvršioca, iz ovoga proizilazi nužnost dodeljivanja ili delegiranja autoriteta da bi se zadaci obavili.

Delegiranje autoriteta znači da se upravljačka moć rasprostire čitavom strukturom organizacije [6]:

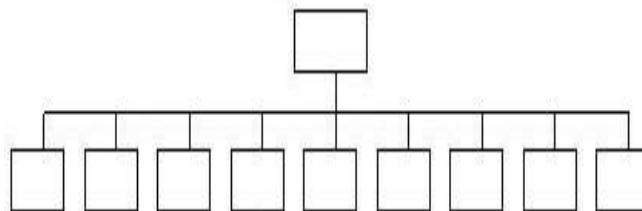
- Kako je definisan cilj organizacije,
- Kako su definisane upravljačke kompetencije,
- Ko su nosioci pojedinih upravljačkih kompetencija – strateških, taktičkih, operativnih, kontrolnih,
- Kako je izvršena podela zadataka,
- Kako je završena podela, delegiranje autoriteta ili moći,
- Kako su odabrani nosioci delegiranih ovlašćenja.

Vertikalno delegiranje ima svoje prednosti i nedostatke. Najvažniji nedostatak vertikalnog delegiranja upravljanja cenama je povećana asimetrija informacija menadžera prodaje o trudu prodavaca u obavljanju njihovog posla. Menadžeri prodaje moraju odobriti sniženja cena. Ako bi se prodavcima dala veća autonomija u donošenju odluka o cenama bez prethodnog odobrenja pretpostavljenih, pospešuje se asimetrija informacija koje menadžeri poseduju. Dakle menadžeri prodaje imaju problem da razaznaju da li je erozija cena u određenim oblastima prodaje uzrokovana nesposobnošću prodavca da odbrani cene koje je firma postavila ili na tu eroziju utiču drugi faktori, kao na primer agresivna konkurencija. Drugim rečima asimetrija informacija koju poseduju menadžeri može navesti prodavce da "igraju na sigurno" nudeći niže marže kako bi zaključili posao. Kako bi izbegao dugo i stresno pregovaranje, prodavac koji ima veća prava u odlučivanju o cenama može odmah ponuditi veći rabat. Ako bi prodavac pak imao manja prava u donošenju odluka morao bi da konsultuje menadžera što dozvoljava menadžeru da sazna razlog za odobravanje rabata i time se smanjuje asimetrija informacija koje menadžer poseduje. Sa tim u skladu manje nepotrebnih rabata koji pritom nisu optimalni se odobravaju kada je vertikalno delegiranje manje zastupljeno.

Prednosti su pre svega nadgledanje iz blizine, kontrola iz blizine, brza komunikacija izmedju podređenih i nadređenih.

## 5. HORIZONTALNA DISPERZIJA UPRAVLJANJA CENAMA

Horizontalna dimenzija se bavi strateškim dugoročnim manje frekventnim i fundamentalnim odlukama o postavljanju vrednosti cene tokom celog životnog ciklusa proizvoda. Horizontalna decentralizacija je stepen raspodele autoriteta izmedju rukovodilaca istog ranga ili izmedju rukovodilaca i izvršilaca. Prodaja, marketing i finansije odlučuju o ovome u centrali.



Slika 5. Šematski prikaz horizontalne disperzija

Veća horizontalna decentralizacija daje fleksibilnost firmi, ali odlučivanje čine sporijim.

U skladu sa teorijom otvorenog sistema, sa stanovišta obrade informacija pretpostavljamo da su organizacije sačinjene od specijalizovanih i različitih podjedinica. Ipak ove podjedinice se oslanjaju jedna na drugu i rade na zajedničkim poslovima kao što je formiranje cena. Odatle horizontalna dimenzija upravljanja cenama predstavlja centralizaciju različitih odseka u okviru firme pri upravljanju cenama. Preciznije, horizontalna disperzija upravljanja cenama se odnosi na to kako firme raspodeljuju pravo donošenja strateških odluka o cenama na sektore prodaje, marketinga i finansija [7]. Tu podrazumevamo formiranje cena za novi proizvod, cena proizvoda tokom celog životnog ciklusa, kreiranje sistema uslova za popuste i bonuse, kao i praćenje i analiza cena.

Horizontalna disperzija upravljanja cenama je maksimalna kada prodaja, marketing i finansije imaju isti udeo u odlučivanju o cenama. Nasuprot tome, disperzija je minimalna ako je upravljanje cenama samo u rukama jednog sektora. Ova konceptualizacija horizontalne disperzije je u skladu sa prethodnim istraživanjem o disperziji marketing aktivnosti, takodje je u skladu sa istraživanjem o uticaju različitih sektora na marketing aktivnosti.

Dve studije o uticaju marketinga na firme daju čvrste dokaze da prodaja, marketing i finansije imaju najveći uticaj na formiranje cena. Retko nalazimo da samo jedan sektor odlučuje o cenama. U modernim organizacijama horizontalna disperzija predstavlja glavnu dimenziju u formiranju cena.

Ovaj metod poseduje nedostatke i prednosti. Kao neke od nedostataka možemo navesti tendenciju da preopterećeni nadređeni postanu „uska grla“ u odlučivanju, opasnost da nadređeni izgubi kontrolu, zahteva izuzetno kvalitetne menadžere. Dok prednosti obuhvataju to da podređeni moraju da budu pažljivo odabrani, da su potrebne jasne politike, i sl.

## 6. METODOLOŠKI DEO

Da su vertikalno delegiranje i horizontalna disperzija u zajedničkom delovanju najbolja kombinacija za uspešno poslovanje preduzeća ne dokazuje samo teorija na kojoj su se zasnivale tvrdnje, već i stvarno poslovanje preduzeća. U daljem radu je prikazan način poslovanja dva preduzeća. Preduzeće "Medisan" i preduzeće "Nelt" su se odazvali i upoznali nas sa svojim načinom poslovanja, formiranjem cena i metodama koje koriste za isto. Da li je kombinacija vertikalnog delegiranja i horizontalne disperzije uspešna i u praksi, utvrđeno je u daljem radu.

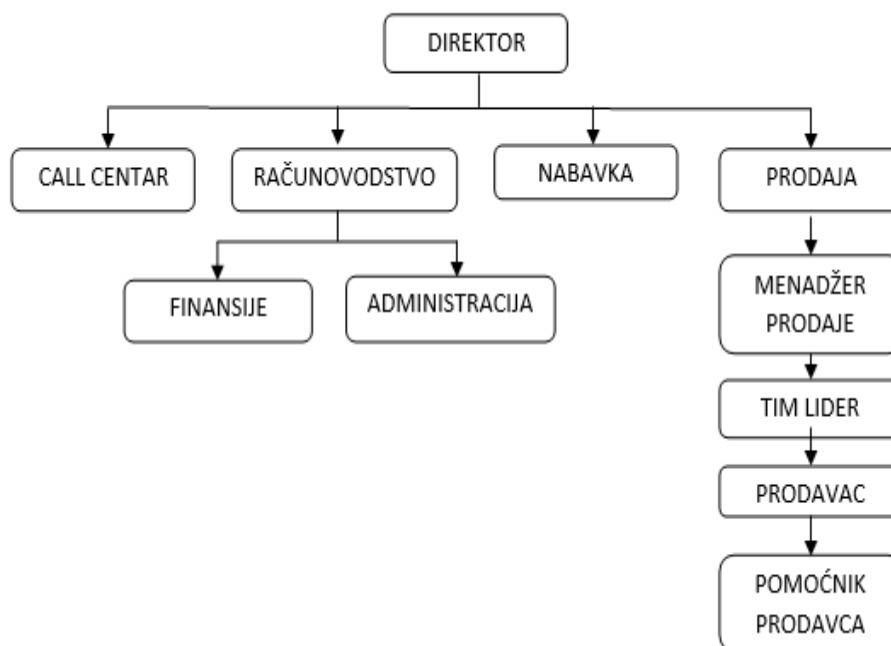
*Preduzeće „Medisan“ je osnovano kao društvo sa ograničenom odgovornošću. Nalazi se u ulici Rimska 1 u Beogradu, njegovi osnivači su Saša Adamović i Stefan Urošević. Preduzeće postoji na tržištu od februara 2011. godine. Terenska prodaja proizvoda u vidu prezentacija je u današnje vreme postala svakodnevica, pitanje je samo koje je preduzeće dovoljno inovativno i sposobno da opstane na tržištu. B2B poslovanje je vid poslovanja i preduzeća "Medisan". Nabavku većine proizvoda koje nudi svojim potrošačima, nabavlja iz uvoza ili preduzeća sa domaćeg tržišta. Tako nabavljenu robu dalje prodaje u gradovima širom Srbije. Preduzeće "Woltex" je njihov stalni saradnik i dobavljač. Posluju po principu slobodnog formiranja cena, što će reći da preduzeće "Medisan" ima potpunu samostalnost u formiranju cena za proizvode kompanije "Woltex" Postepenim pregovaranjem i korektnim odnosom, posle dužeg zajedničkog poslovanja, preduzeće "Medisan" se izborilo za određene povlastice, a to su: avansno plaćanje, plaćanje u roku, popust za poručenu veću količinu robe i slične. Na samom početku poslovanja, preduzeće "Medisan" kao novo na tržištu nije imalo mnogo iskustva, pa se odlučilo da svoje cene formira vertikalnim delegiranjem. Njihov oblik poslovanja je izgledao na sledeći način:*



Slika 6. Šematski prikaz prvobitnog načina poslovanja preduzeća "Medisan"

Međutim, ovaj vid poslovanja se nije pokazao veoma uspešnim iz razloga što nije davao realnu sliku uspešnosti poslovanja. S obzirom da direktor kao najviši na lestivici poslovanja, nije imao tačan uvid u rad svojih prodavaca, jer nije bio u direktnoj vezi sa njima. Prodavci su imali mogućnost davanja popusta bez konsultacije direktora pa je to uzelo maha, kako bi spasili preduzeće odlučili su se da vertikalno delegiranje promene u kombinaciju vertikalnog delegiranja i horizontalne disperzije. Nakon uvedenih promena šematski prikaz je izgledao ovako:





Slika 7. Šematski prikaz poslovanja nakon uvedenih promena

Uvedene promene nisu odmah rezultirale uspehom. Zaposleni su ih odbijali, pružali su otpor i pokušavali da se odupru. Potrebno je bilo vreme kako bi se zaposleni navikli i kako bi uvedene promene rezultirale uspehom. Uvodjenjem kombinacije ovih dveju metoda preduzeće "Medisan" je dalju prodaju proizvoda vršilo putem formiranih cena, sa mogućnošću davanja popusta u određenim situacijama. Na ovaj način preduzeće je zadržalo svoj ugled, potrošačko tržište i uspelo da izbjije među prvih pet kompanija u ovoj delatnosti.

Sada smo posmatrali formiranje cena i korišćenje ove dve metode iz ugla poslodavca kao krajnjeg prodavca, a sada ćemo se osvrnuti na formiranje cena, korišćenje ovih dveju metoda, ali iz ugla distributera. Obratićemo pažnju na uslove i mogućnosti koje on kao takav daje svojim kupcima prilikom preprodaje njegovih proizvoda.

*Preduzeće "Nelt" je na tržištu već mnogo godina, osnovano je 1992. Ubrzo posle toga postalo je distributer multinacionalne korporacije Procter&Gamble za područje tadašnje SR Jugoslavije. Uspeh i dostignuće kompanije "Nelt" potvrđuje činjenica da je danas glavni distributer maloprodajnih objekata. Poznato je po širokom asortimanu kvalitetnih proizvoda. Osim što vrši prodaju proizvoda, prodavci na terenu su zaduženi za održavanje izgleda rafova svojih proizvoda. Goran Katić je jedan od glavnih i odgovornih za poslovanje kompanije "Nelt" u Borskom regionu, kao takav on je upoznat sa svim metodama, prednostima i manama u poslovanju ove kompanije. Preduzeće "Nelt" svojim saradnicima u zavisnosti od proizvoda koji uzimaju od njega, daje mogućnost prodaje istih tih proizvoda pa fiksnoj ili slobodno formirajućoj ceni.*

## 6.1. SLOBODNO FORMIRANJE CENA

Prilikom slobodnog formiranja cena, preduzeće se služi vertikalnim delegiranjem. Slobodno formiranje cena vrši se za određene proizvode kao što su prehrambeni proizvodi (bez hleba), hemijski proizvodi i drugi. Preduzeće "Nelt" svojim kupcima daje mogućnost da samostalno formiraju cene bez određenog procenta marže. Takođe kupci mogu ostvariti popuste kao što su: količinski, popust za redovno plaćanje, za pozicioniranje proizvoda, za sekundarne pozicije. Zatim na formiranje marže samo nabavka sirovina, proizvodnja, skladištenje te robe, distribucija i dostava. Takođe je važno reći da troškovi mogu i ne moraju uticati na formiranje cene u zavisnosti koja je vrednost robe koja se vozi i koliko je udaljen objekat u koji se vozi, tako i troškovi utiču.

## 6.2. FIKSNE CENE

Prodaja proizvoda po fiksnim cenama je drugačija u mnogo čemu od prodaje proizvoda po slobodno formirajućim cenama. Prodaja cigareta Philip Moris je odličan primer za ovaj način formiranja cena. Cigarete su proizvod koji se prodaje po fiksnoj ceni. Cenu cigareta određuje sam proizvođač. Cigarete predstavljaju akciznu robu, čija je maloprodajna cena oglašena u službenom glasniku, bez mogućnosti promene trgovca.

Cenu se mogu menjati samo u skladu sa zakonom. Saradnici kompanije "Nelt" ostvaruju zaradu na osnovu rabata koji nema mogućnost za promenu već se kreće od 2,2% do 4,5%, u zavisnosti od vrste cigareta. Nekada su se sve cigarete prodavale po slobodno formirajućoj akcizi, što je dovelo pobunu kod prodavaca kao što je Philip Moris, jer je na taj način njegovo preduzeće bilo ugroženo. Da se nastavilo tim načinom poslovanja, ime i brend Philip Moris bi propalo. Zato je uvedena ista akciza za sve vrste cigareta, kako bi mogle da se odvoje bolje cigarete od onih malo lošijih.

## 7. ZAKLJUČAK

Iz svega priloženog možemo da zaključimo da bi za preduzeće bilo najbolje da se služi obema metodama. Preduzeće "Medisan" je pokazatelj da ukoliko se izvrši promena formiranja cena na pravi način, moguće je kompaniju dovesti do željnog uspeha. Međutim kombinovanje vertikalnog delegiranja i horizontalne disperzije je moguće samo kod kompanija koje nemaju fiksne cene. Fiksne cene zahtevaju primenu vertikalnog delegiranja. Kombinacija ove dve metode poboljšava efikasnost, u isto vreme povećavaju prednosti i umanjuju nedostatke. Korišćenjem obe metode dolazi do rasterećenja pojedinih sektora, poboljšanja informisanosti nadležnih i što je najvažnije do zadržavanja postojećih cena prilikom prodaje. Svako preduzeće teži da zadrži svoje cene i na taj način postigne uspeh, jer davanje starih popusta dovodi do prividnog uspeha preduzeća, a zatim do naglog pada i bankrota.

## REFERENCE

- [1] Predatory Pricing and Marketing Theory: Applications in Business-to-Business Context and Beyond," *Journal of Business-to-Business Marketing*,
- [2] Stephenson, Ronald P., William L. Cron, and Gary L. Frazier (1979), "Delegating Pricing Authority to the Sales Force: The Effects on Sales and Profit Performance," *Journal of Marketing*, 43 (Spring)
- [3] Kern R. (1989), "Letting Your Salespeople Set Prices (Sort of)," *Sales and Marketing Management*, 14 (August)
- [4] Mengue, Bulent and A. Tansu Barker (2003), "The Performance Effect of Outcome-Based Incentive Pay Plans on Sales Organizations: A Contextual Analysis," *Journal of Personal Selling and Sales Management*,
- [5] Guiltinan, Joseph (2011), "Progress and Challenges in Product Line Pricing," *Journal of Product Innovation Management*
- [6] Mishra, Birenda K. and Ashutosh Prasad (2004), "Centralized Pricing Versus Delegating Pricing to the Salesforce Under Information Asymmetry," *Marketing Science*
- [7] Mantrala, Murali K., Sönke Albers, Fabio Caldieraro, Ove Jensen, Kissan Joseph, Manfred Krafft, et al. (2010), "Sales Force Modeling: State of the Field and Research Agenda," *Marketing Letters*

## PRILOG

### Anketa 1.

1. Podaci o kompaniji
2. Koliko dugo poslujete?
3. Da li imate dobavljača sa kojim poslujete duži niz godina?
4. Kakvo je vaše poslovanje sa "x" kompanijom?
5. Da li imate pravo na sopstveno formiranje cena za kupljene proizvode od kompanije x ?
6. Da li se vaša kompanija bavi B2B poslovanjem?
7. Kojom metodom se služite prilikom formiranja cena ?
8. Da li ste od početka poslovanja koristili ovaj metod ?
9. Zašto ste odlučili da ga promenite ?
10. Da li je promena načina poslovanja odmah dala rezultat?
11. Kakvu ulogu mogu imati troškovi prilikom formiranja cene?
12. Koji su faktori u vašoj kompaniji koji vrše pritisak na formiranje marže?
13. Da li svojim popustima uspevate da privučete što više kupaca i bivate iznad konkurencije?

## **Anketa 2.**

1. Podaci o kompaniji
2. Koliko dugo poslujete?
3. Da li se vaša kompanija bavi B2B poslovanjem?
4. Da li svabdevate sve prodavce u gradu i okolini?
5. Da li vašim saradnicima dajete mogućnost da samostalno formiraju cene ili su cene vaših proizvoda fiksne?
6. Ukoliko su cene fiksne, kako vaši saradnici ostvaruju zaradu?
7. Kojom metodom se služite prilikom formiranja cene?
8. Da li ste se od početka poslovanja služili ovom metodom?
9. Ukoliko niste, kakve promene vam je doneo novi metod?
10. Da li promena načina poslovanja odmah dala rezultat?
11. Da li ste zadovoljni postojećim metodom ili mislite da su potrebne promene?
12. Koje popuste dajete vašim saradnicima?
13. Kakvu ulogu mogu imati troškovi prilikom formiranja cene?
14. Koji su faktori u vašoj kompaniji koji vrše pritisak na formiranje marže?
15. Da li svojim popustima uspevate da privučete što više kupaca i bivate iznad konkurencije?

## THE IMPLEMENTATION OF THE ABC METHOD IN THE PROCESS OF SELECTING THE PRODUCTION PROGRAM

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**Abstract:** The stock management is a very important logistic task in production systems. Late delivery of the products, long delivery time, unpredictable demand, as well as many other influential factors can have a significant impact on creating an optimal stock management model. Therefore, the usage of ABC method is proposed as an efficient approach for stock management, as well as a method of coordination between all purchases, production and distribution processes. Finally, a numerical illustration is presented in order to highlight the efficacy of the considered ABC method.

**Keywords:** ABC method, selection, „Bambi“ company, stock management, production program

### 1. UVOD

U industrijskom poslovnom sistemu, proizvodni program se definiše vrstom i količinom pojedinih proizvoda. Naime, proizvod se javlja u funkciji „generatora“ poslovnih tokova, koji su usmereni ka ostvarenju proizvodnje da bi se podmirile odgovarajuće potrebe potrošnje i postigli ekonomski efekti, koji bi obezbedili permanentnost cikličnog poslovnog procesa u sistemu. S obzirom da proizvodni program obuhvata više različitih proizvoda, u proučavanje i praćenje generišuće linije proizvoda neophodno je uključiti bojne interakcije koje nastaju između pojedinih proizvoda kroz sve faze, jer se u ovoj sferi nalaze značajne mogućnosti za razne vidove racionalizacije.

Upravljanje zalihama svakako je jedan od najvažnijih logističkih zadataka preduzeća. Neisporučivanje robe na vreme, duga vremena čekanja, nepredvidljivost potražnje i mnogi drugi problemi, razlozi su koji otežavaju pronalaženje optimalne politike upravljanja zalihama. Optimalno upravljanje poslovnim procesom upravljanja zalihama zahteva usklađivanje sa svim proizvodnim, nabavnim i distribucijskim aktivnostima unutar logističkog lanca. [1]

Ključni problem ovog istraživanja bazira se na implementaciji ABC metode selekcije programa proizvodnje, što će biti dalje u radu opisano i detaljno razrađeno.

### 2. OSNOVNE KARAKTERISTIKE ZALIHA

Zalihe su ekonomski pojam kojim se označavaju količine sirovina, komponenti, sklopova, potrošnog materijala, kao i samih gotovih proizvoda u pojedinim preduzećima i fabrikama. One predstavljaju deo kratkotrajne imovine nekog privrednog društva, koje ono

koristi u svom poslovanju, bilo za proizvodnju, ili, pak, za prodaju. [2] Zalihe su, bolje rečeno, deo materijalne imovine koji je [2]:

- 1) namenjen prodaji u redovnom poslovanju,
- 2) u procesu proizvodnje za takvu prodaju,
- 3) u obliku materijala ili delova zaliha koje se troše u proizvodnom procesu ili pružanju usluga.

Ukupna vrednost zaliha predstavlja podatak koji ukazuje menadžmentu na imovinu koja je vezana u robi na skladištu. Nepisano ekonomsko pravilo je da u proizvodnim preduzećima zalihe čine od 20% do 30% imovine, dok u trgovačkim preduzećima ta brojka se penje i na 75% posto.

Najvažniji razlozi koji ukazuju na potrebu održavanja zaliha su sledeći [2]:

1. Dostupnost robe u slučaju neplaniranih zahteva kupaca. Neplanirani nedostatak materijala može dovesti do gubitka kupca, odnosno profita. Iako je zahtev kupca uvek teško predvideti, ovaj problem postaje sve izraženiji u novije vreme.
2. Povoljnije cene transporta za veće količine robe.

## 2.1. EKONOMSKA FUNKCIJA ZALIHA U PROIZVODNOM PROCESU

Da bi se rizici i nesigurnosti smanjili na razumnu meru, ili se potpuno eliminisali, forsiraju se zalihe koje deluju kao zaštitni mehanizam proizvodnog sistema [3]. Najbolji primer gore navedenog je sprečavanje rizika zakašnjenja isporuke materijala od dobavljača postojanjem dovoljne količine materijala na zalihama [3].

Temeljni cilj upravljanja zalihama mogao bi se definisati kao osiguranje neometanog odvijanja poslovanja, odnosno poštovanje odgovarajućih količina i odgovarajućih rokova isporuke, sa zadržavanjem troškova na minimalnoj osnovi, izbegavajući prevelike zalihe i nekonkurentne zalihe. [3]

S obzirom na navedeno, mogu se spomenuti i osnovni razlozi zbog kojih se formiraju zalihe [3]:

1. *Zahtevi tržišta* – svaka organizacija proizvodi neke proizvode, koje kupci očekuju da su uvek na raspolaganju. Najbolji primer za navedeno su prehrambeni proizvodi poput mleka i hleba. Proizvođači su prisiljeni da vode računa o potražnji, te na osnovu procene da određuju količinu za proizvodnju. Kako bi proizvodnja bila moguća potrebno je biti obezbeđen sirovinama
2. *Zalihe za planirane aktivnosti* – najčešće se zasnivaju na prekomernoj dozi proizvoda zbog nekog događaja, obično promotivnog karaktera
3. *Zalihe u distributivnim centrima* – zalihe koje služe za brzo podmirivanje kupaca
4. *Sigurnosne zalihe* – kao što im i samo ime kaže, vrsta zaliha koja se koristi kao osiguranje od nepredviđenih promena u potražnji i ponudi

5. *Minimalne zalihe* – najmanja količina potrebna da se pravovremeno zadovolje obaveze preduzeća
6. *Maksimalne zalihe* – gornja količina robe u skladištu
7. *Špekulativne zalihe* – zalihe koje se koriste kako bi se iskoristile očekivane promene na tržištu. Nafta se jako često spominje kao primer špekulativnih zaliha
8. *Sezonske zalihe* – količina robe koja se skuplja tokom godine, kako bi se zadovoljila potražnja u jednom delu godine
9. *Nekonkurentne zalihe* - roba u skladištu koja se ne može prodati po svojoj realnoj vrednosti zbog gubitka svojstva ili zastarelosti
10. *Optimalne zalihe* – količina robe koja osigurava redovno i potpuno zadovoljenje potreba kupaca uz minimalne troškove skladištenja.

### 3. OPTIMIZACIJA ZALIHA I ABC ANALIZA

Svaki optimalni program proizvodnje podrazumeva da se između velike količine proizvoda odabere onaj asortiman koji će obezbediti najbolje ekonomske efekte iz ograničene količine proizvodnih resursa. Selekcija se vrši na osnovu zadatog kvantitativnog ili, pak, kvalitativnog kriterijuma i služi za klasifikaciju i kontrolu celokupnog obima proizvodnje. *ABC metoda* jedna je od vrlo korisnih tehnika u određivanju kvantitativnih karakteristika grupacija proizvoda na osnovu zadatih kriterijuma, a nakon čega se formiraju prioriteta datih proizvoda po grupama A, B i C. [1]

Naime, većina preduzeća poseduje previše artikala na zalihama, te stoga koriste ABC analizu kako bi izdvojili važne artikle od nevažnih i posvetili im više pažnje. Analiza se temelji se na Pareto pravilu, ili tzv. pravilu 80:20, koje je elaborirao italijanski ekonomista Alfredo Pareto. Pravilo govori o činjenici da 80% uspeha proizlazi iz 20% aktivnosti, dok ostalih 20% uspeha proizlazi iz ostatka aktivnosti. Stoga, kod ABC analize, artikli se razvrstavaju u tri grupe na osnovu određenih parametara koji su važni za poslovanje preduzeća. [4]

*Prva A grupa elemenata* relativno je malobrojna, s obzirom da nju čini tek 10 do 30% proizvoda ukupnog broja elemenata (proizvoda), koji, sa druge strane, participiraju od 60 do 80% u stoprocentnoj vrednosti svih proizvoda. Kada je reč o *grupi B*, prema dosadašnjem iskustvu autora, nju pretežno čini od 20 do 30% narednih proizvoda od njihovog ukupnog broja, dok vrednost ove grupe varira u ukupnoj vrednosti od 20 do 25%. *Grupu C* čini veća grupa proizvoda (od 50 do 70%), koja participira manji deo ukupne vrednosti, i to između 5 i 15% (slika 1). [5]

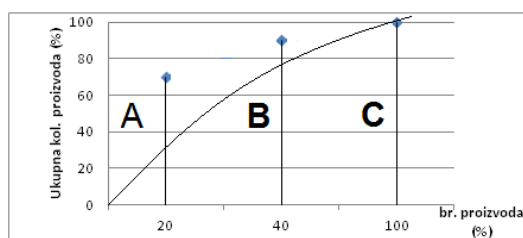
Tabela 1. Struktura ABC metode prema br. elemenata i učešću u ukupnoj vrednosti

Podskup	Broj elemenata (%)	Učešće u ukupnoj vrednosti (%)
A	10-30	60-80
B	20-30	20-25
C	50-70	5-15

Osnovni kriterijumi selekcije proizvoda ABC metodom su sledeći: (1) obim proizvodnje, (2) jedinični poslovni prihod i (3) jedinični poslovni prihod po času.

Za ovaj rad značajno će biti razmatranje razvrstavanja proizvoda shodno *obimu proizvodnje*. Program proizvodnje predstavlja uređeni skup proizvoda ( $P_1, P_2, P_3, \dots, P_n$ ) sa odgovarajućom količinom tih proizvoda ( $Q_1, Q_2, Q_3, \dots, Q_n$ ). Optimizacija programa proizvodnje jedan je od osnovnih upravljačkih zadataka svakog preduzeća. Kako ističu profesori Sajfet i Nikolić, odnos uređene dvojke ( $P_1, Q_1$ ) zavisi, najpre, od uslova na tržištu i potencijala, tj. mogućnosti samog preduzeća. [5]

Grafički, selekcija ABC metodom prema obimu proizvodnje može se prikazati na sledeći način, mada je sama skica za sva tri kriterijuma identična.



Slika 1. Grafički prikaz ABC metode

Putem datog grafika, može se zaključiti da grupi A i B pripada po 20% proizvoda, dok grupa C participira sa čak 60% proizvoda u ukupnom proizvodnom asortimanu.

#### 4. PRIMENA ABC METODE NA PRIMERU PREDUZEĆA KONDITORSKIH PROIZVODA „BAMBI” IZ POŽAREVCA

Za interval od godinu dana, na osnovu grube analize tržišnih i raspoloživih kapaciteta došlo se do sledećeg plana proizvodnje preduzeća „Bambi” (Tabela 2). Cilj je da se broj proizvoda što je više moguće smanji, a da se pojedinačni obimi proizvodnje povećaju. Pri analizi tržišta došlo se do zaključka da se prodajne mogućnosti za sve proizvode mogu povećati za 25%. Ukupan obim proizvodnje ograničen je raspoloživim kapacitetima i ne može se menjati.



Tabela 2. Plan proizvodnje preduzeća „Bambi”

Redni broj	Naziv proizvoda	Planirana količina (t)
1.	Bambi čokolada	250
2.	Još	550
3.	Zlatni pek	120
4.	Scarlet	30
5.	Belvit	80
6.	Plazma	1500
7.	Krem banana	18
8.	Yo D'oro	350
9.	Wellness	600
10.	Poslastina	15
11.	Well Be	17
12.	Čoko plazma	1400
13.	Charger	12
14.	Boni fazoni	20
15.	Yo Yo	13
16.	Juhu	25
UKUPNO		5000

Najpre je određena polazna količina proizvoda koji pripadaju grupi A, a koja se sa povećanjem od 25% može dovesti do ukupne količine od 5000 tona. Određivanje se vrši pomoću sledećeg obrasca:

$$\frac{\text{Ukupna količina}}{1,25}$$

Sledi da u grupu A spada sledeća količina proizvoda:  $\frac{5000}{1,25} = 4000$  tona.

Najpre se rangiraju proizvodi u opadajućem nizu po količini, pa se zatim kumulativno obračunava ukupna količina, kao i procenat svih proizvoda. Na kraju se određuju grupe kojima pripadaju dati proizvodi (Tabela 3).

Tabela 3. Formiranje grupa proizvoda

Rang	Naziv proizvoda	Planirana količina	Ukupna količina	%	Grupa
1.	Plazma	1500	1500	30	A
2.	Čoko plazma	1400	2900	58	
3.	Wellness	600	3500	70	
4.	Još	550	4050	81	
5.	Yo D'oro	350	4400	88	B
6.	Bambi čokolada	250	4650	93	
7.	Zlatni pek	120	4770	95,4	
8.	Belvit	80	4850	97	
9.	Scarlet	30	4880	97,6	
10.	Juhu	25	4905	98,1	C
11.	Boni fazoni	20	4925	98,5	
12.	Krem banana	18	4943	98,86	
13.	Well Be	17	4960	99,2	
14.	Poslastina	15	4975	99,5	
15.	Yo Yo	13	4988	99,76	
16.	Charger	12	5000	100	

Može se zaključiti da u grupu A spada 4050t proizvoda. Grupa B se dobija kada se na broj proizvoda grupe A doda 1. Količina proizvoda u grupi B je 830t. Ostali proizvodi spadaju u grupu C i njihova količina iznosi 120t.

Na osnovu Tabele 3, formira se sledeća tabela koja pokazuje brojeve i količine proizvoda po grupama, kao i ukupne vrednosti.

Tabela 4. Selekcija proizvoda po grupama

Grupa		A	B	C	Ukupno
Broj proizvoda	Količina	4	5	7	16
	%	25	31,25	43,75	100
Količina proizvoda	Količina	4050	830	120	5000
	%	81	16,6	2,4	100

U narednoj tabeli dat je novi osnovni plan proizvodnje, koji uključuje samo proizvode iz primarne grupe A.

Tabela 5. Novi osnovni plan proizvodnje

Redni broj	Naziv proizvoda	Planirana količina	Povećanje obima (%)	Novi obim
1.	Plazma	1500	25	1875
2.	Čoko plazma	1400	25	1750
3.	Wellness	600	25	750
4.	Još	550	25	687,5
UKUPNO		4050	/	5062,5

Na osnovu Tabele 5, može se zaključiti da se svaka količina proizvoda pojedinačno može povećati za 25%, na osnovu čega se dobija približno ukupan obim proizvodnje od 5062,5 tone. Jasno je naglašeno da je maksimalno uvećanje 25%, što podrazumeva da kod određene vrste proizvoda to uvećanje može biti nešto manje da bi se obim proizvodnje uskladio sa postojećim kapacitetima od 5000 tona godišnje.

## 5. ZAKLJUČAK

S obzirom da se pojam zaliha odnosi na sirovine i materijale, odnosno zalihe nedovršene proizvodnje i gotovih proizvoda, zaključuje se da one kao takve uveliko utiču na novčana sredstva preduzeća. Iako upravljanje zalihama ima za cilj minimiziranje obima i

vremena angažmana obrtnog kapitala u zalihama, razumevanje upravljanja zalihama omogućava i zadovoljstvo kupaca i minimalne troškove vezane za čuvanja zaliha, a spoj navedenog dovodi i do povećanja rentabilnosti, što je cilj svakog preduzeća.

Mnoga preduzeća suočena su s problemima koji otežavaju pronalaženje optimalne politike upravljanja zalihama zbog nesigurnih procesa dostave, ili dugih vremena isporuke. S jedne strane zalihe su nužne za ostvarenje kontinuiteta procesa proizvodnje, dok s druge prouzrokuju troškove držanja.

S obzirom na navedeno, ABC analiza je dobar alat pri kreiranju optimalne količine zaliha. Svrha primene ove metode je uspostavljanje delotvornog sistema čiji je cilj postizanje što veće ekonomičnosti i uspešnosti poslovanja.

Kao što se iz navedene studije slučaja moglo videti, veliki broj segmenata u rešavanju problema ABC metodom svodio se na ličnu procenu autora rada. Dakle, to je više iskustveni metod koji se, logično, bazira na iskustvu onoga koji ga primenjuje, pogotovo u odabiru onih proizvoda koji će činiti primarnu A grupu. Takođe, može se zaključiti, na temelju ovog primera, da se najveći deo ukupnog prometa, odnosno proizvodnje, postiže isključivo sa relativno malim brojem artikala. Tako je u grupi A bilo 4 proizvoda, dok su grupe B i C zajedno podražavale veći broj artikala, ali ne i sa većim udelom u ukupnoj vrednosti. Upravo zbog toga, za preduzeće „Bambi“, prva od tri particije konditorskih proizvoda ima najveći značaj i predstavlja onu kojoj će ova kompanija pridavati najviše pažnje.

Na samom kraju, vrlo je jasno da se pod ABC analizom podrazumeva analitička metoda koja omogućava da se u poslovanju preduzeća, sa ekonomskog aspekta, razlikuje *bitno od nebitnog*, odnosno važno od nevažnog.

## 6. REFERENCE

- [1] Jovanović, A., Mihajlović, I., Živković, Ž. (2005): *Upravljanje proizvodnjom*, Tehnički fakultet u Boru, Bor
- [2] Dujmović, A. (2015): *Postupak primjene abc analize kod upravljanja zalihama*, Završni rad, Fakultet prometnih znanosti, Zagreb.
- [3] Čefko, D. (2015): *Mogućnosti optimiranja zaliha u opskrbnom lancu*, Završni rad, Fakultet prometnih znanosti, Zagreb
- [4] Regodić, B., D. (2016): *Zalihe*, [Power Point prezentacija], Univerzitet Singidunum, Beograd
- [5] Sajfert, Z., Nikolić, M. (2007): *Proizvodno-poslovnii sistemi*, Tehnički fakultet „Mihajlo Pupin“, Zrenjanin

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