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INTRODUCTION

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

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

Within this Proceedings are presented all accepted papers received for VII International Symposium Engineering Management and Competitiveness (EMC 2017). This year at the symposium we have 50 papers and 2 abstracts. The authors come from 13 countries: Bosnia and Herzegovina, Canada, Croatia, Hungary, Iran, Macedonia, Montenegro, Romania, Russia, Slovenia, Turkey, USA and Serbia. The papers are divided into seven sessions: Plenary session, Session A: Management and operation management, Session B: Human resource management, Session C: Marketing and marketing management, Session D: Economy and financial management, Session E: IT management, Session F: Other.

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

Symposium EMC become a traditional meeting of researchers in June, every year. We are open and thankful for all useful suggestions which could contribute that the next, VIII International Symposium Engineering Management and Competitiveness (EMC 2018) become better in organizational and program sense.

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

Zrenjanin, June 2017.

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CONTENTS

Plenary session	...1
Ali Reza Afshari, Dragan Čočkaló, Mohammad Anisseh FLIGHT ARRIVAL SIMULATION	...3
Mohammad Anisseh, Parvaneh Haghshenas, Ali Reza Afshari BEST SELECTION OF THE MAINTENANCE POLICY IN THE AUTOMOTIVE INDUSTRY WITH ENVIRONMENTAL PROTECTION APPROACH BY USING AHP AND TOPSIS METHODS	...9
Dragan Čočkaló, Dejan Đorđević, Milan Nikolić, Sanja Stanisavljev, Edit Terek DEVELOPMENT OF THE ENTREPRENEURIAL BEHAVIOR AMONG YOUNG PEOPLE - RESEARCH RESULTS FROM THE BANAT REGION	...17
Stevan Mušicki, Dejan Vasović, Goran Janačković FRAMEWORK FOR DISASTER PREPAREDNESS BASED ON EFFICIENT SAFETY RESOURCE MANAGEMENT	...23
Larisa Nikitina, Igor Risin, Dmitriy Treshchevskiy, Alena Plugatyreva SMALL BUSINESSES AND LOCAL GOVERNMENT: REGIONAL HORIZONS	...31
László Szabó, Zoltán Kovács, Atila Zelić THE ROLE OF TECHNOLOGY MANAGEMENT FROM THE ASPECT OF A GIVEN ENGINEERING COMPANY	...37
Session A: MANAGEMENT AND OPERATION MANAGEMENT	...43
Srđan Bogetić, Snežana Lekić, Zorana Antić 21st CENTURY CHALLENGES IN STRATEGIC MANAGEMENT	...45
Violeta Cvetkoska THE ROLE OF OPERATIONS RESEARCH IN MANAGERIAL DECISION-MAKING	...51
Slobodan Jankovic, Velimir Petrović MANAGEMENT OF A NEW VEHICLE SHORT-TERM DEVELOPMENT PROCESS BASED ON RTC TEST BED	...57
Stevan Mušicki, Goran Janačković, Dejan Vasović SAFETY CULTURE OBSERVED FROM THE STANDPOINT OF CONTEMPORARY SCIENCE AND PREVIOUS EXPERIENCE	...64
Vladan Paunovic, Miroslav Radojicic, Jasmina Vesic Vasovic, Sanja Puzovic, Aleksandra Jovicic INTEGRATED MCDM APPROACH BASED ON AHP AND PROMETHEE METHODS FOR TOOL SELECTION	...68
Sanja Puzovic, Miroslav Radojicic, Jasmina Vesic Vasovic, Vladan Paunovic USE OF MULTI-CRITERIA DECISION MAKING METHODS IN FUNCTION OF QUALITY IMPROVEMENT	...74
Milan Stajić, Ivan Palinkaš, Igor Kekenj THE IMPORTANCE OF THE FAMILY OF ISO 9000 IN IMPROVING OF PRODUCTION PROCESS	...81
Milan Stajić, Ivan Palinkaš, Draško Kovač, Igor Kekenj EXCELLENCE THROUGH SIX SIGMA SYSTEM	...86

Vesna K. Spasojevic Brkic, Zorica A. Veljkovic, Nada Stanojevic INDUSTRIAL COMPANIES' OPERATIONAL PERFORMANCE: EVIDENCE FROM SERBIA	...90
Sanja Stanisavljev, Mila Kavalić, Dragica Radosav, Branko Markoski, Saša Zec LEAN CONCEPT AND PRODUCTION MANAGEMENT ENTERPRISES IN SERBIA	...95
Mustafa Ertunc Tat, Melih Cemal Kushan IMPACT OF INDUSTRY 4.0 TO AIRCRAFT MAINTENANCE, REPAIR AND OVERHAUL	...101
Miroslav Vulić, Eleonora Desnica, Milan Nikolić MANAGING PROCESS OF END-OF-LIFE VEHICLES TOXIC FLUIDS FROM ENVIRONMENTAL SUSTAINABILITY AND LEGISLATION ASPECT	...106
Session B: HUMAN RESOURCE MANAGEMENT	...111
Nemanja Berber, Agneš Slavić A RESEARCH OF THE CSR AND SUSTAINABLE DEVELOPMENT THROUGH THE PRACTICE OF HUMAN RESOURCE MANAGEMENT IN SERBIA	...113
Aleksandra Felbab, Dragica Ivin, Natalia Lerik, Maša Magzan JOB SATISFACTION AS THE BEST WAY OF ORGANIZING AND MANAGING A COMPANY AIMED AT BUSINESS OBJECTIVES FULFILLMENT	...119
Eleonora Desnica, Francisc Popescu , Milan Nikolić, Miroslav Vulić EDUCATION STRATEGY ANALYSIS AND DEVELOPMENT OF HUMAN RESOURCES IN THE FIELD OF ELV RECYCLING	...124
Bojana Gligorović, Katarina Zorić THE IMPORTANCE OF LOCUS OF CONTROL IN BUSINESS SETTINGS AND ITS RELATION TO VARIOUS WORK OUTCOMES	...129
Žarko Jokšić SURVEY ON JOB SATISFACTION AND MOTIVATION OF EMPLOYEES IN THE EVENT OF A HIGHER EDUCATION INSTITUTIONS AND CONSTRUCTION COMPANY	...135
Mina Paunović, Vesna Marić, Nataša Đalić, Milica Milojević ANALYSIS OF THE IMPACT STRESS ON MOTIVATION IN THE WORK ENVIRONMENT	...139
Nikola Petrović, Nebojša Tatomirov, Danka Joksimović LEADERSHIP AS A PREREQUISITE IMPROVING THE QUALITY OF DOMESTIC ENTERPRISES	...145
Dragana Sajfert, Jesa Kreiner, Škrinjarić Zoran, Nikola Jančev BEHAVIOR OF BIG FIVE PERSONALITY FACTORS ON GENERAL JOB SATISFACTION	...150
Dijana Tadić FEAR OF PUBLIC PERFORMANCES AND ITS OVERCOMING	...155
Dijana Tadić, Edit Terek, Edin Strukan THE GROWING IMPORTANCE OF INTERNAL COMMUNICATION ON BUSINESS SUCCESS	...159
Katarina Zorić, Tamara Zorić, Bojana Gligorović COMPENSATIONS AND BENEFITS IN ORGANIZATIONS IN SERBIA	...165

Session C: MARKETING AND MARKETING MANAGEMENT **...171**

Mihalj Bakator, Vesna Marić, Slađana Borić, Dušanka Milanov THE USE OF SOCIAL MEDIA IN MARKETING STRATEGY DEVELOPMENT	...173
Mihalj Bakator, Nikola Petrović, Mina Paunović ANALYSIS OF PRODUCT QUALITY AND BRAND LOYALTY ON THE SMARTPHONE MARKET IN SERBIA	...178
Dragan Čočkalo, Melita Čočkalo-Hronjec, Jelena Tasić, Cariša Bešić, Miloš Vorkapić THE ASPECTS OF CRM APPLICATION ON SOCIAL NETWORKS IN SERBIAN BUSINESS PRACTICE	...183
Dejan Đorđević, Srđan Bogetić, Snežana Bešić THE ANALYSIS OF MARKETING PRACTICE IN DOMESTIC ENTERPRISES	...188
Aleksandar Grubor, Nikola Milicevic, Nenad Djokic RETAIL CENTRALIZED DISTRIBUTION SYSTEM	...194
Bojan Matkovski, Marija Jeremić, Danilo Đokić, Žana Kleut COMPETITIVENESS OF SERBIAN MEAT AND MEAT PREPARATIONS ON THE INTERNATIONAL MARKET	...200
Miloš Pjanić, Branimir Kalaš, Ivan Milenković ONLINE DISTRIBUTION CHANNELS FOR INSURANCE PRODUCTS IN SERBIA AND THE EUROPEAN UNION	...206
Bruno Završnik SLOVENIA'S IMAGE AS A TOURIST DESTINATION	...212

Session D: ECONOMY AND FINANCIAL MANAGEMENT **...219**

Jelena Andrašić, Vera Mirović, Nada Milenković ANALYSIS OF BUSINESS RESTRUCTURING IN THE SERBIAN MARKET	...221
Savina Čolić SUSTAINABLE DEVELOPMENT: HOW FAR ARE WE FROM THERE?	...226
Marko Ivaniš, Lazar Ožegović, Luka Filipović LIQUIDITY MANAGEMENT BY FINANCIAL INDICATORS	...231
Marko Ivaniš, Lazar Ožegović, Milan Mihajlović COST-BENEFIT ANALYSIS IN INVESTMENT MANAGEMENT	...237
Lejla Terzić IDENTIFYING THE CONSTRAINTS OF SMALL AND MEDIUM SIZED ENTERPRISES COMPETITIVENESS IN BOSNIA AND HERZEGOVINA	...243
Yuri Treshchevsky, Tatyana Pankova, Elena Trakhtenberg THE ASSESSMENT OF INVESTMENT'S ACTIVITY LEVEL IN CENTRAL BLACK EARTH REGIONS OF RUSSIA	...249
Marko Vlahović, Mila Kavalić, Savina Čolić, Darko Bađok, Arben Lunjić THE FASTEST-GROWING FOUR CONTINUE THEIR TREND DESPITE THE CHALLENGES	...255

Session E: IT MANAGEMENT **...261**

Saša Bošnjak, Tatjana Davidov COMPONENT BASED SOFTWARE DEVELOPMENT, THE PAST AND THE FUTURE OF SOFTWARE INDUSTRY	...263
Nataša Đalić, Irena Đalić, Bojana Ristić IMPACT OF INFORMATION TECHNOLOGY ON COMPETITIVE ADVANTAGE ON THE MARKET IN THE GLOBAL CRISIS	...269
Žarko Jokšić, Nebojša Tatomirov BASIC CHARACTERISTICS SQL SERVER TO CREATE A DATABASE	...273
Ljubica Kazi, Dragica Radosav, Biljana Radulović, Zoltan Kazi, Dijana Karuović, Miodrag Ivković, Branko Markoski MODEL OF AN INFORMATION SYSTEM FOR UNIVERSITY SCHOOL MANAGEMENT SUPPORT	...278
Bojan Vukov, Dobrivoje Martinov, Zeljko Velickov HOSPITAL INTRANET PORTAL AS AN ADDITIONAL TOOL FOR INTERNAL KNOWLEDGE MANAGEMENT – A CASE STUDY	...284

Session F: OTHER **...291**

Ali Reza Afshari, Milan Nikolić, Zahra Akbari PERSONNEL SELECTION USING GROUP FUZZY AHP AND SAW METHODS (ABSTRACT)	...293
Ildiko Csapó, József Poór, Tímea Juhász, Andrea Visztenvelt FLEXIBLE EMPLOYMENT FORMS IN DIFFERENT COMPANIES LOCATED IN BUDAPEST (ABSTRACT)	...294
Danilo A. Đurović THE IMPACT OF URBAN-RESTRAINING MARINE SPACE ON THE PSYCHOSOMATIC HEALTH OF SAILORS	...295

Plenary session

Papers (pp. 3-42):

Ali Reza Afshari, Dragan Čočkaló, Mohammad Anisseh FLIGHT ARRIVAL SIMULATION	...3
Mohammad Anisseh, Parvaneh Haghshenas, Ali Reza Afshari BEST SELECTION OF THE MAINTENANCE POLICY IN THE AUTOMOTIVE INDUSTRY WITH ENVIRONMENTAL PROTECTION APPROACH BY USING AHP AND TOPSIS METHODS	...9
Dragan Čočkaló, Dejan Đorđević, Milan Nikolić, Sanja Stanisavljev, Edit Terek DEVELOPMENT OF THE ENTREPRENEURIAL BEHAVIOR AMONG YOUNG PEOPLE - RESEARCH RESULTS FROM THE BANAT REGION	...17
Stevan Mušicki, Dejan Vasović, Goran Janačković FRAMEWORK FOR DISASTER PREPAREDNESS BASED ON EFFICIENT SAFETY RESOURCE MANAGEMENT	...23
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FLIGHT ARRIVAL SIMULATION

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ABSTRACT

This paper presents a model based on the simulation to reduce serious passenger time delays. Based on the characteristic of the flights and the thinking of system optimization, this paper builds up dynamic optimizing models of the flight arrival gates. The Arena software is also used to solve this problem. This model can reduce the spent time of the passengers as much as possible. Data from an airport in Iran has been used to verify the model. The overall purpose of this simulation test is to view and observe the flow of the passengers and their cargo at airport terminal. Another purpose of this simulation test is to know that weather the passengers and their cargo flow in the terminal smoothly.

Keywords: Simulation, Arena, Operation Research, Queuing Theory.

INTRODUCTION

This paper reports the Flight Arrival Simulation (House, 1977) test which was conducted during the period from 20 March to 19 April 2015 of Tehran-Imam Khomeini International Airport (IKIA). The overall purpose of this simulation test was to view and observe the flow of the passengers and their cargo at airport terminal. We want to make sure that, the passengers and the cargo enter and exit the terminal smoothly, the time needed is short, and the length of the queue is reasonable. This report consists of methodology used to conduct the simulation test, the flight data which is provided in the scenario, and recommendations for some observations that were discovered during the test. The flowchart and distribution fitting techniques have been used to help analyze the scenario and evaluate the current situation of the terminal. A number of suggestions have been recommended to enhance the flow of the passengers and their cargo at the Airport.

1. Increase the capacity of each immigration officer by 2.
2. Adding one desk in the non-national queue.
3. Use different rule related to the queue (use circle technique).
4. Use e-check machine for national arrival.
5. Allow passengers from next flights to proceed to the arrival area.

The purpose of this simulation test is to know that weather the passengers and their cargo flow in the terminal smoothly. The evaluation of the terminal is based on the time which is consumed by the passenger during the period from the entrance until the exit from the terminal with the cargo. The evaluation of the terminal will be determined by the length of the queue which is generated in order to check the passenger's passport, go through the custom, and take the luggage. "An airport is an operational system comprising of a framework of infrastructures, facilities, personnel which collectively provide a service to a passenger" (Evans, Kerridge, & Loon, 2013). An airport is composed of different terminals which are divided into different zones. Each zone in the airport has its

own facilities and behaviors. In this case, we will focus only on the terminal area and try to evaluate this area based on the information that is related to our case. The next section includes all information needed to conduct a simulation modeling for passenger and luggage flow inside the airport (Arrival Area).

MATERIAL AND METHODS

This paper reports the Flight Arrival Simulation (House, 1977) test. In the past, there were just a few aircrafts taking off from the airports and landing on the airports ground. The small number of aircrafts made the passenger's flow in the airport simple. The aircrafts are being used for tourism and business. The increase in the aircrafts and passengers numbers has made the flow of passengers inside the airport more difficult. The lack of managing the passenger's flow could lead to serious problems for example lost baggage, missing next flights, error in processing documents such as passports, and passengers and employee dissatisfaction. When the passengers and their luggage do not move through the airport in smooth way, the country, the airport reputation, passenger's satisfaction, and employee satisfaction will be negatively affected. Using simulation modeling technique can help airport operators to avoid all these problems. As it is mentioned above, the increase number in flights made the management of the flow of the passengers and their cargo difficult. A number of problems have appeared as a result of bad management inside the area:

1. Long queue of passengers in arrival check desk.
2. Delay in processing the documents.
3. Delay in delivering the luggage.
4. Lack of utilizing the resources.

The aim of this simulation model is to enhance the service in the arrival area by creating As-Is-Model for the flight arrival.

Objectives:

1. Use flow chart to understand the current scenario.
2. Use distribution fitting.
3. Make sure the passengers and their cargo flow smoothly inside the terminal.
4. Make some assessments for the utilizations of the resources inside the airport such as the employee and machines.
5. Obtain the utilization of all available resources.

To develop a good simulation model, the analyst must identify the components of the simulation model. The simulation model is composed of system entities, activities, attributes, state variables, and events. The event of the system is considered to be the state that makes the system change from idle to busy (AlBazi, 2013). In our scenario, the arrival and the departure of the passengers and their make baggage affect the system and change it from idle to busy or from busy to idle. State variables are variable that define the system state (AL Bazi, 2013). In our case, the state variables are:

- The length of the queue at passport control.
- The length of the queue at custom's zones.
- The length of the queue at carousel.

The flow chart is a diagram that shows the actual system (House, 1977). It shows how the processes are connected to each other. The use of flow chart make helps documenting the business. It also helps analysts to understand the actual system and use it as tool to communicate between each other (House, 1977). In this project, we created the flow chart to:

1. Define the processes in the arrival area.
2. Analyze the processes.
3. Identify the areas than required some improvements.

This is an abstract view of the flight arrival Case. Figure 1 shows the flow of the passengers from the aircrafts to the exit door in the passport control area. As we can see from the chart, the aircraft lands

on the airport first. Immediately the passengers proceed to the arrival area. Every group will have different queue. When the passenger wants to do passport check, he or she has to go one of the three available offices in the national area or one of the two available offices in the foreign area. If the check goes fine, they proceed to baggage hall. Otherwise they will go to border agency.

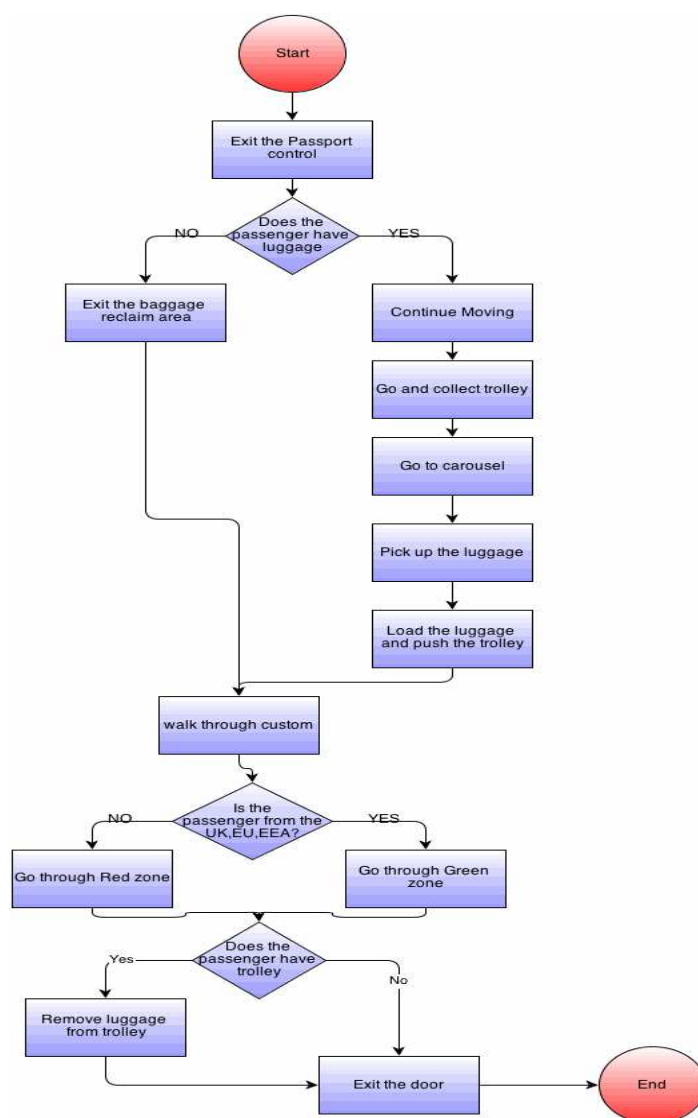


Figure 1: Flow Chart of the Passengers

Distribution fitting test can be defined as the fitting of a probability distribution for specific data. This technique allows us to select distribution that best fits to the random data and deal with uncertainty. In this project, we used distribution fitting technique because we have random data (Process times at Immigration desk). It also helps identifying the distribution that can be used to describe data.

RESULTS OF SIMULATION

First, we used the input analyzer tool to get the distribution fitting. A sample of process time 46 passengers has been collected. The collected data are entered to text file and exported to input analyzer in the Arena to get the distribution of the data. Figure 2 show the random data and the distribution of the data. As we can see BETA has the smallest square error. For that reason, we used it in our model (Santé, García, Miranda, & Crecente, 2010).

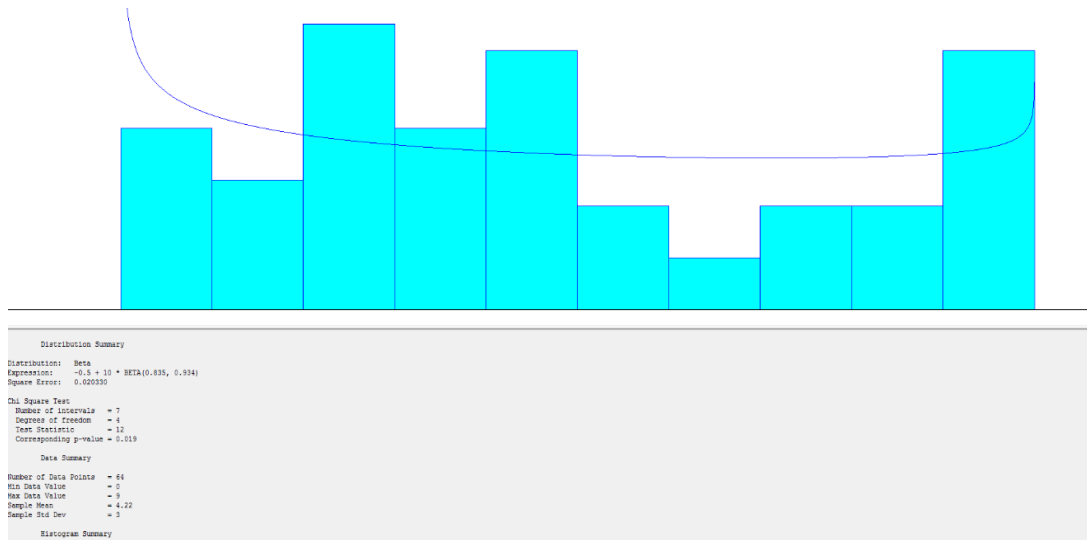


Figure 2: The results of Distribution fitting with Arena

Then, the Arena Software has been used to create the As-Is-Model. Arena allows us simulate and understand the current model by using the objects and available tools such input analyzer. In this project the model is divided into five main sections:

1. **Arrival Gate section:** In this section, the assignment has been used to identify each flight. We also used decision model to space the flights from each other and to have four different flights. Then we used Separate technique to create the passengers for every flight. Before that we create a process to size the arrival area. The graph shows the process at arrival gate section.
2. **Passport Control section:** In this section, we used the assignment to identify the nationality type. This assignment will be used in the decision model to get exactly the correct number of national and non-national from each flight. The decision is made here based on the conditions (assumptions in the case). Decision 3 and decision 4 were used to distribute the passengers between the offices or desks. At the end we created five processes. Each one has immigration officer to check the passport.
3. **Luggage Hall section:** In this section, the decision technique was used to identify the passengers with luggage. We created a process to show that passengers going to take trolley. We also created assignment to identify these passengers. This assignment is used in last section. The last process at this section is (Waiting at carousel). As we can resource has been used in this process.
4. **Custom section:** In this section, we used the decision technique to send distribute the passengers between the zones based on the nationality assignment that we created. This section has two resources that do not consume any resource.
5. **Exit Gate section:** We create decision model to force all passengers with trolley to take one more step before the batch process. In this process, passenger who has a trolley must release it. The last decision model was used to gather all passengers based on the flight number assignment which is created in the previous sections. Last process was created to release the arrival area and allow new passengers to enter the airport.

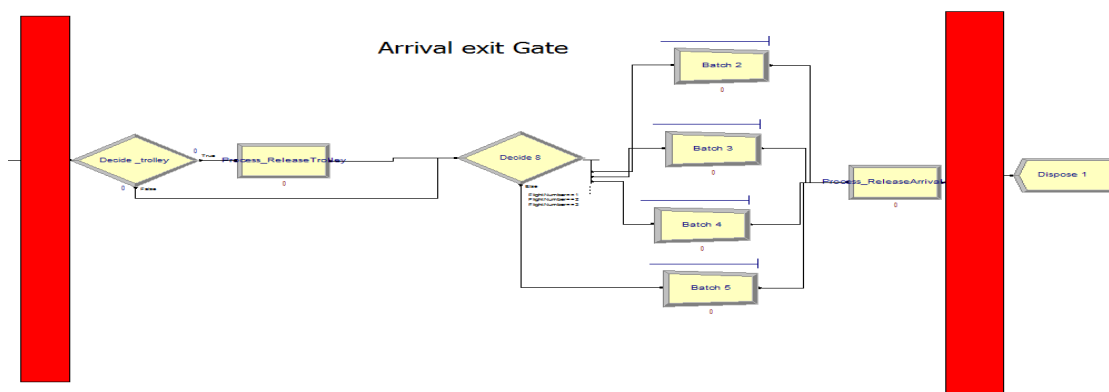


Figure 3: Exit Gate section

Figure 4 shows the waiting time of passengers at different places. As shown in the table, the longest waiting time occurs at process Seize the Arrival Area. A comparison between the five replications National Desks (A1, A2, and A3): The following graph shows the comparison between waiting time. The graph only shows the waiting time at the queues that occur at A1, A2, and A3. As shown in the graph, passengers spend a lot of time at A2 comparing with other desks. This might be due the productivity of the immigration officer at this desk A2.

Queue Detail Summary					
	Waiting Time1	Waiting Time2	Waiting Time3	Waiting Time4	Waiting Time5
A1.Queue	0.36	0.24	0.25	0.21	0.26
A2.Queue	0.34	0.48	0.35	0.35	0.36
A3.Queue	0.34	0.41	0.37	0.46	0.21
Batch 2.Queue	14.27	16.74	15.86	15.17	14.65
Batch 3.Queue	12.12	11.77	10.61	9.19	10.38
Batch 4.Queue	13.08	12.58	15.68	15.45	12.93
Batch 5.Queue	7.74	6.23	7.76	5.88	5.83
I1.Queue	9.09	7.65	8.80	9.53	8.86
I2.Queue	8.16	9.51	8.21	8.47	8.41
Process_SeizeArrival	30.71	32.13	30.91	30.38	30.23
Process_Trolley.Que	0.00	0.00	0.00	0.00	0.00

Figure 4: Queue Details Summary

To improve the service system following scenarios are studied:

Scenario one: Increase the capacity of all Immigration officers by 1 and add another 100 trolley as seen in the picture below. This scenario will reduce the waiting time at each desk. The waiting time has been reduced as a result of increasing the capacity. The following table and graph shows the comparison between As-Is-Model and Scenario One. In this table we used the average for the five replications, and then we compared both averages. As you can see from the graph, the waiting time at A1, A2, and A3 have been reduced to the half by increasing the capacity for each immigration officers.

	As Is	S1
A1.Queue	0.26	0.13
A2.Queue	0.37	0.181
A3.Queue	0.35	0.171

Figure 5: The result of scenario one

Scenario two: In this scenario, we will add extra desk with one immigration officer at non-national part as seen in the below picture. This scenario will improve the resource utilizations. In table, we used the resource utilizations to compare them with As-Is-Model. When we increased extra desk the utilization reduced from 90% to 78% in IO5 and from 86% to 80 in IO6.

	As Is	S2
IO5	0.905	0.787
IO6	0.861	0.801

Figure 6: The result of scenario two

Finally the overall simulation for all scenarios: As we can see from Figure 7, scenario one is the best scenario. In scenario one, the overall simulation time is reduced from about 70 hours about 30 hours.

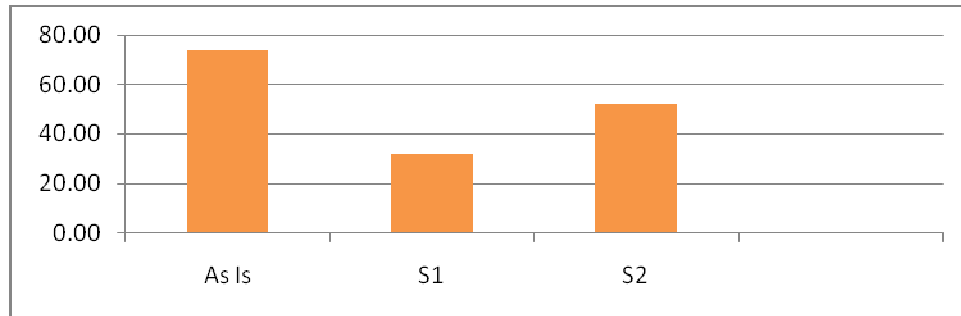


Figure 7: The overall simulation for all scenarios

CONCLUSION

This paper presents a queue simulation and attempt to model for flight serving system to minimal passengers delay. The Arena simulation software is also used to solve this problem. Compared with the traditional flight delay sequence method, this model is effective and easy to implement. It also can reduce the cost and the influence of the delay as much as possible. Additional research is planned to further examine this data. An additional technique that is also being evaluated is to begin the use of system dynamic simulation.

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BEST SELECTION OF THE MAINTENANCE POLICY IN THE AUTOMOTIVE INDUSTRY WITH ENVIRONMENTAL PROTECTION APPROACH BY USING AHP AND TOPSIS METHODS

UDC: 629.3:62-7

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ABSTRACT

Due to the expansion of industry in everyday human life, maintenance is very used in manufacturing today. Systems maintenance has the crucial role in improving the quality of production and protecting the production equipment under standard conditions. One of the main objectives of maintenance strategies is to minimized humans and the environment risks, because of the unexpected equipment failures caused. So, this knowledge can help to preserve the environment and reduce pollution. Therefore, the aim of this paper is to assess the best maintenance policy and risk inspection in the automotive industry using decision-making methods. Hence, the combinations of AHP and TOPSIS models are used in a case study, and its results have been analyzed.

Key words: Maintenance, AHP, TOPSIS, Risk based Inspection.

INTRODUCTION

Maintenance is one of the most important factors in creating a sustainable structure and efficiency in industries. Therefore, an efficient system in this case is important, so development of automation technology in the machinery has increased. On the other hand, high investment and production based on economic quantity, and with acceptable quality, using international standards is quite necessary. In such circumstances, maintenance is faced with a fundamental change and the use of scientific and structured approach has been desired. Today, in large industries without coherent systems use effective at resources is impossible and cannot be achieved productivity. One of the systems that a large share to production programs and improve the efficiency is the maintenance system. Maintenance system with technical and engineering abilities has been supported other systems, particularly systems of production and quality control.

The risk is uncertainty the outcome in a given situation at a particular time. Risk Based Inspection (RBI) is engineering method to identify potential failures, analyze and prioritize the technical inspections in the process of preservation, maintenance and optimal utilization to determine the correct decisions. RBI addresses risks that can be controlled through proper inspections and analysis. Due to unexpected equipment failures caused, one of the main objectives of the maintenance strategies is minimized the risks to humans, and the environment (Kazemian *et al.* 2016). Furthermore, one of the most significant elements of life and economic development is environment. Now this wealth for various reasons, are free and unlimited, is exploited. Transportation is the largest part of environment threatening zones, that annually have high pollution such as air, and audio pollution and created significant economic and environmental costs. Because of the lack of economic benefits were less attention to the role of environmental factors in urban dimension of sustainable development. The

increased investment and costs of industrial machinery and automation, it has to lead the managers and investors to select the strategy that maximize the lifespan and economics' green life cycle of their equipment (Khan et al., 2003).

The main aims of the maintenance engineers are to implement a strategy that ability to access and equipment yield maximum, deterioration and damage control, and minimize the total cost of the operations. This target by adopting a structured approach to the study of equipment failure, design the optimal strategy inspection, and maintenance are obtained. Maintenance management techniques are also experiencing a major transformation in the process. As the focus of the overhaul period to use the monitor in terms of reliability-centered maintenance (RCM) and expert systems, has changed. In addition, risk-based maintenance strategies in recent years, more attention has been paid (Hicks et al., 2000).

Decision making problems are one of the most important issues in all of sciences. Fan and Zhang (2002) and Chuu (2009) stated that human beings are faced with issues of decision making that basically involves choosing the most-preferred alternatives from a limited set of alternatives to obtain certain-predefined objectives. It is the process to find the best alternative from all feasible alternatives (Bashiri & Badri 2010). Decisions in the public and private sector decision-making often involve the assessment and ranking of available alternatives or decision options based on multi-criteria (Hwang & Yoon 1995). Multi criteria decision making (MCDM) in the field is one of the most widely used methods (Yeh & Chang 2008). The MCDM goal is to choose the best alternative from some mutually exclusive options regarding different criteria decided by the decision maker.

Multiple attribute decision making

Multiple attribute decision making (MADM) problems are usually faced in all aspects of daily life. Their goal is to select the best alternative among some options of action in the existence of conflicting multiple attributes and are usually used to solve different decision-making (Tsu *et al.* 2004). This method regularly needs the decision makers to prepare quantitative and qualitative criteria for evaluating the performance of each alternative with regards to each criterion, and the relative importance of the criteria with regards to the overall objective (Mahdavi *et al.* 2008).

Approximately, all the MADM methods need the weight of each criterion. The criterion weight could be pre-defined by the decision makers directly, or specified by the extreme weighted approach, the Linear Programming Techniques for Multidimensional Analysis of Preference (LINMAP) method, the Entropy method, the eigenvector method, etc. The background of the methods can be found in Hwang & Yoon (1981; 1995).

The proposed method

Step 1: Risk based inspection (all equipment division into three levels of risk: high, medium and low) include:

- Scoring all equipment and machinery based on the probability of occurrence
- Scoring all equipment and machinery based on the outcome of occurrence
- Construction of the risk matrix (determination of each equipment and machinery in different levels of risk)

Step 2: Identifying weights of criteria according to Analytic Hierarchy Process (AHP) Method (MADM problem has some criteria that should be recognized in problem by the decision maker in due courses. All MADM methods require information that should be gained based on relative importance of the criterion. This information usually has serial or main scale. Criteria weights can be allocated to each criterion directly by decision maker group or by scientific methods. These weights specify relative importance of each criterion (Anisseh et al., 2007).

The AHP method consists of three levels of hierarchy. The first hierarchy level is the goal of the decision making, the second level of hierarchy is how each of the existing criteria contributes to the

goal achievement, and the last level of hierarchy is to find out how each of the alternatives contributes to each of the criteria. Taylor explains that the steps in decision making by using the AHP method are as follows (Taylor & Bernard 2002):

- Structuring the hierarchy (The approach of the AHP involves the structuring of any complex problem into different hierarchy levels with a view to accomplishing the stated objective of a problem).
- Establishing pairwise comparison matrix for each criterion (Construct a matrix of pair wise comparisons of elements where the entries indicate the strengths with which one element dominates another using a method for scaling of weights of the elements in each of the hierarchy levels with respect to an element of the next higher level. Use these values to determine the priorities of the elements of the hierarchy reflecting the relative importance among entities at the lowest levels of the hierarchy that enables the accomplishment of the objective of the problem. The scale used for comparisons in AHP enables the decision maker to incorporate experience and knowledge intuitively and indicates how many times an element dominates another with respect to the criterion. The decision maker can express his preference between each pair of elements verbally as equally important, moderately more important, strongly more important, very strongly more important, and extremely more important. These descriptive preferences would then be translated into numerical values 1, 3, 5, 7, 9, respectively, with 2, 4, 6 and 8 as intermediate values for comparisons between two successive qualitative judgments.)

According to Taylor , Consistency Index (CI) can be calculated by using formula as follows:

$$CI = \frac{\text{maks. eigenvalue} - n}{n - 1} \quad (1) \qquad \text{maks.eigenvalue} = \sum_i wi.ci \quad (2)$$

After acquiring Consistency Index (CI), the next step is calculating Consistency Ratio (CR) by using formula (3):

$$CR = \frac{CI}{RI} \quad (3)$$

Description: n=Amount of items compared, wi=Weight, ci=Sum of column, CR= Consistency Ratio, CI=Consistency Index, RI=Random Consistency Index

If CR ≥ 10%, the data acquired is inconsistent

If CR < 10%, the data acquired is consistent

Step 3: Normalized decision matrix (At multiple attribute decision making by distance scale for qualitative criteria and relative scale for quantitative criteria is used, For dimensionless r_{ij} (for every j criterion) Euclidean conversion is used (Asgharpour 1992)) is calculated by equation (4).

Step 4: The weighted normalized decision matrix is calculated by equation (5).

Where w_j is the weight of the i_{th} attribute or criterion, and $\sum_{j=1}^n w_j = 1$.

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_{j=1}^m x_{ij}^2}}, \quad (4) \qquad V = N_D \cdot W_{n \times n} = \begin{pmatrix} V_{11}, \dots & V_{1j}, \dots & V_{1n} \\ \vdots & \vdots & \vdots \\ V_{m1}, \dots & V_{mj}, \dots & V_{mn} \end{pmatrix} \quad (5)$$

Step 5: The separation measures are calculated utilizing the n-dimensional Euclidean distance. The separation measure of each alternative from the ideal solution and from the negative ideal solution is presented by equation (6):

Step 6: The relative closeness to the ideal solution is calculated. The relative closeness of the alternative A_j with regard to A^+ is described by equation (7):

$$d_{i^+ \text{ and } i^-} = \left\{ \sum_{j=1}^n (v_{ij} - v_j^+)^2 \right\}^{1/2}, \quad i = 1, 2, \dots, m \quad (6)$$

$$cl_{i^+} = \frac{d_{i^-}}{(d_{i^+} + d_{i^-})}, \quad 0 \leq cl_{i^+} \leq 1, \quad i = 1, 2, \dots, m \quad (7)$$

The alternatives' ranking orders are determined according to the closeness coefficient, and the best alternative is selected between a set of feasible alternatives (Hwang & Yoon 1981).

Case study

This study was performed in Zamyad Company that produces medium and heavy vehicles. In this company maintenance, system has traditionally been done and regardless of risk equipment. The evaluation alternatives are nominated based on maintenance group viewpoints as following: Preventive Maintenance (PM), Corrective Maintenance (CM), Reliability Centered Maintenance (RCM) and Condition Based Maintenance (CBM).

Step 1: Determine a list of all the parts of company equipment, and risk based inspection as follows:

- Scoring all equipment and machinery based on the probability of occurrence as Table 1.
- Scoring all equipment and machinery based on the outcome of occurrence as Table 2.
- Construction of the risk matrix based on Tables 1, and 2 (determination of each equipment and machinery in different levels of risk) as Table 3.

Table 1: Equipment and machinery based on the probability of occurrence

Machine Name	0-15	16-25	26-35	36-50	51-57
Mastic Pump		*			
Industrial Wastewater Pump			*		
Water Circulation Pump	*				
Water Circulation Pump			*		
Water Circulation Pump (The boiling point)					*

Table 2: Equipment and machinery based on the outcome of occurrence

Machine Name	0-19	20-34	35-49	50-79	80>
Mastic Pump			*		
Industrial Wastewater Pump	*				
Water Circulation Pump		*			
Water Circulation Pump				*	
Water Circulation Pump (The boiling point)					*

Table 3: Determine the level of risk based on risk matrix

Machine Name	Low Risk	Medium Risk	High Risk
Mastic Pump		*	
Industrial Wastewater Pump	*		
Water Circulation Pump	*		
Water Circulation Pump		*	
Water Circulation Pump (The boiling point)			*

Step 2: Identified evaluation criteria based on maintenance group viewpoints as following: Safety, Cost, Value added and Green activities. The hierarchical structure of this decision problem is shown as Figure. 1.

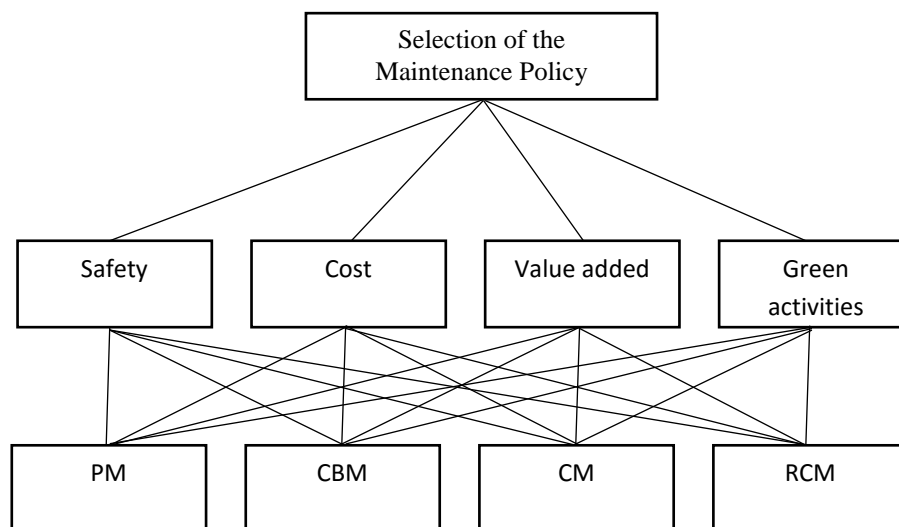


Figure 1: The hierarchical structure

Identifying the weight of criteria based on pairwise comparison matrix for each criterion as following:

Table 4: Pairwise comparison matrix (High Risk)

Criteria	Safety	Cost	Value added	Green activities	Weight
Safety	1	7	2	6	0.506
Cost	0.142857	1	0.142857	0.2	0.047
Value added	0.5	7	1	4	0.319
Green activities	0.66667	5	0.25	1	0.126
Sum	1.809524	20	3.392857	11.2	

Table 5: Pairwise comparison matrix (Medium Risk)

Criteria	Safety	Cost	Value added	Green activities	Weight
Safety	1	7	3	6	0.543
Cost	0.142857	1	0.142857	0.333	0.05
Value added	0.333	7	1	5	0.306
Green activities	0.1666	3	0.2	1	0.098
Sum	1.642857	18	4.342857	12.333	

Table 6: Pairwise comparison matrix (Low Risk)

Criteria	Safety	Cost	Value added	Green activities	Weight
Safety	1	2	1	1	0.273
Cost	0.5	1	0.25	0.5	0.113
Value added	1	4	1	2	0.384
Green activities	1	2	0.5	1	0.227
Sum	3.5	9	2.75	4.5	

The criteria consistency ratios for level of risk (low, medium and high) are 0.09, 0.08, 0.02 and consistent. Likewise, alternative's weights of each risk level achieved, for example, has been one of the tables as follows.

Table 7: Alternative pairwise comparison matrix (Safety)

Alternatives	CM	CBM	PM	RCM	Weight
CM	1	2	1	3	0.338
CBM	0.5	1	1	4	0.253
PM	1	1	1	6	0.333
RCM	0.333	0.25	0.166	1	0.075
Sum	2.833	4.25	3.166	14	

The alternatives' consistency ratios respectively for safety, cost, value added and green activities are 0.05, 0.02, 0.06, 0.04 and consistent.

Step 3: Constructed normalized decision matrix by Eq. 4 is shown in Table 8.

Step 4: Constructed normalized weighted decision matrix by Eq. 5 is shown in Table 9.

Step 5 and 6: Constructed separation measures and relative closeness matrixes by Eq. 6 and Eq. 7 is shown in Table 10.

Table 8: Normalized matrix (High Risk)

Criteria	Safety	Cost	Value added	Green activities
Safety	0.877	0.628	0.887	0.823
Cost	0.125	0.089	0.063	0.027
Value added	0.438	0.628	0.443	0.549
Green activities	0.146	0.449	0.11	0.137

Table 9: Normalized weighted matrix (High Risk)

Criteria	Safety	Cost	Value added	Green activities
Safety	0.444	0.029	0.283	0.104
Cost	0.063	0.004	0.02	0.003
Value added	0.222	0.029	0.141	0.069
Green activities	0.074	0.021	0.035	0.017

Table 10: Separation measures and relative closeness matrix (High Risk)

Criteria	Safety	Cost	Value added	Green activities
d^+	0.4	0.074	0.212	0.039
d^-	0	0.464	0.189	0.382
cl_i	0	0.816	0.471	0.906

Separation measures and relative closeness matrixes are constructed for medium and low risk respectively are shown in Table 11 and Table 12.

Table 11: Separation measures and relative closeness matrix (Medium Risk)

Criteria	Safety	Cost	Value added	Green activities
d^+	0.455	0.041	0.224	0.028
d^-	0.067	0.499	0.242	0.453
cl_i	0.129	0.923	0.519	0.94

Table 12: Separation measures and relative closeness matrix (Low Risk)

Criteria	Safety	Cost	Value added	Green activities
d^+	0.17	0	0.277	0.113
d^-	0.143	0.288	0.028	0.188
cl_i	0.456	1	0.092	0.623

All alternatives were classified on the basis of the proposed algorithm, but regarding the values of the criteria (green activities and cost) in Tables 10, 11, and 12, only the final tables of alternatives based on green activities, and cost are shown as follows:

Table 13: Separation measures and relative closeness matrix based on green activities criterion

Criteria	CM	CBM	PM	RCM
d^+	0.144	0.121	0.179	0.0007
d^-	0.06	0.098	0.062	0.195
cl_i	0.295	0.447	0.258	0.996

Table 14: Separation measures and relative closeness matrix based on cost criterion

Criteria	CM	CBM	PM	RCM
d^+	0.313	0.313	0.171	0
d^-	0	0	0.142	0.313
cl_i	0	0	0.455	1

Therefore, the ranking order of four maintenance policy based on green activities criterion was as follows: RCM>CBM>CM>PM So, reliability centered maintenance (RCM) is the best maintenance policy among the four policies, and preventive maintenance (PM) is the worst policy. Then, the ranking order of four maintenance policy based on cost criterion was as follows: RCM>PM>CM,CBM So, reliability centered maintenance (RCM) is the best maintenance policy among the four policies, and corrective maintenance (CM), and condition based maintenance (CBM) are the worst policies.

CONCLUSION

Regarding the fact that the maintenance is important to the industry and everyday life. It has more benefits such as lengthen the life of equipment and decreased lateral cost in over time. This paper combined AHP and TOPSIS methods to classifying maintenance policies based on environmental approach and risk-based maintenance strategies in automotive industry. The criteria's weights extracted using AHP method and then maintenance policies selected by the integrated approach. The results shown that the green activities' criterion in high and medium risk is more important. However, in the low-risk level cost criterion has higher utility. As a result, reliability centered maintenance (RCM) policy in three levels of risks based on green activities, and cost criterion is the best maintenance policy.

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DEVELOPMENT OF THE ENTREPRENEURIAL BEHAVIOR AMONG YOUNG PEOPLE - RESEARCH RESULTS FROM THE BANAT REGION

UDC: 005.961-053.6(497.113 BANAT)

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ABSTRACT

Unemployment, especially among the young population, represents one of the crucial economic problems. In overcoming this problem of unemployment, all relevant institutions must get involved, in order to stimulate young people towards participating in entrepreneurial processes. Below it will be illustrated an analysis of attitudes of young people in the Banat Region regarding entrepreneurship and starting their own business. Within this research, carried out at the end of 2016 on the sample of 350 examinees, certain data was received about the opinions of students from the universities and higher education institutions oriented towards management and business and the key indicators were analyzed as well. Generally, the research indicates that young people are not stimulated for participating in entrepreneurial processes.

Keywords: unemployment, entrepreneurship, the young as entrepreneurs, starting their own business, regional development.

INTRODUCTION

Creating new job positions, according to the experts from the World Bank (WB), is a necessary step in the development of national economy. Namely, in the report given by the experts from the WB it is stated that it is necessary to create 600 million new job positions until 2020, in order to maintain the economic development, employ young people and decrease potential unrest. Moreover, the demographic structure of the society represents a serious issue, because it has an influence on labor productivity. In some world countries there is a decline in the birth rate which affects the level of working age population for a longer period.

In the World Bank report it is claimed that, in order to return people to work by increasing the number of jobs, countries need to re-establish a momentum for economic and institutional reforms which existed before the crisis so they could: a) establish the foundations for creating jobs for the workers by pushing the reforms in direction of making a friendly environment for the growth of existing companies, increasing their productivity or entering the market in order to activate entrepreneurial potential for the appearance of new companies that will succeed or fail fast without making great costs, b) carry out the policies that will support the workers so they can be prepared to do newly made

jobs by showing their skills, initiative and unimpeded access to work and to be ready to be transferred to the positions with the greatest potential for creating jobs.

Development of entrepreneurial behavior of the young is a complex issue but it is in fact limited to several factors that together create an appropriate ambience for their encouragement. A special attention is paid to gaining knowledge from the field of entrepreneurship related to young people aiming at their professional improvement. There are numerous studies dealing with motivation, for example, (Abbey, 2002) etc.), intentions (for example (Thompson, 2009) etc.) – the elements that affect the development of entrepreneurial behavior and starting business in different ways.

On the other hand, when speaking about new workplace creation and unemployment, the state of the Labor Market in regards to unemployment looks bleak – it is the global trend since the beginning of the crisis. Figures 1 and 2 present these trends for the West Balkan countries from 2010 to 2015. Furthermore, young population (aged 15-24) is the least active age category – the activity rate for Serbia in the observed period is between 27% and 29%. The unemployment rate among this population, in relation to the active part of the population, does not go under 43% for Serbia.

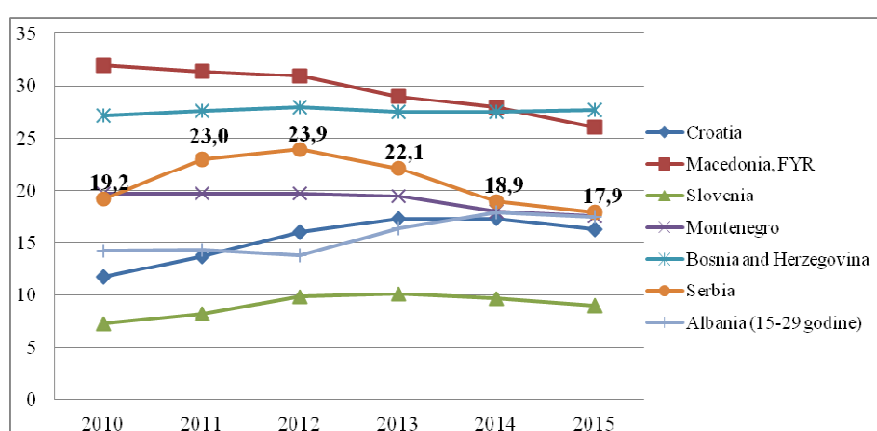


Figure 1: Total unemployment rate (in relation to active population) for the West Balkan countries from 2010-2015.

Source: Data based on Labour Force Survey, taken from Bureaus of Statistics in the West Balkan countries

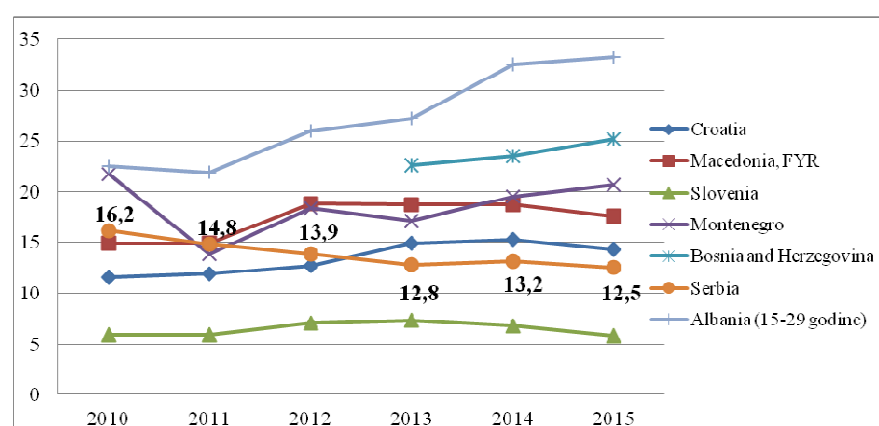


Figure 2: Unemployment rate of the young population (15-24) in relation to total age population for the West Balkan countries for the period from 2010 to 2015.

Source: Data based on Labour Force Survey, taken from Bureaus of Statistics in the West Balkan countries

The models that are imposed with the aim of changing the population situation and creation of new workplaces can go towards encouraging the development of small and mid-size enterprises (SMEs), in other words, towards self-employment. Making the ambience and stimulating measures in harmony to local communities are the key directions of further analysis and the activities of our current project.

Below are presented comparative results of the survey among the young which represent the starting point for researching the attitudes of the young population and their relation towards entrepreneurship.

METHODOLOGY

The survey "The analysis of attitudes and opinions of young population in relation to starting their own business and socially responsible business performance" had for its main objectives to determine the attitudes and opinions of examinees on starting their own business, in other words, on the success of business practice in Serbian enterprises. The participants/examinees of the survey were the students of universities and high schools in Serbia (average age of examinees was about 22), oriented to business and management. The survey was carried out at the end of year, seven years in succession (2010-2016) in the following cities, towns and municipalities: Belgrade, Pančevo, Aleksandrovac, Bačka Palanka, Požarevac, Vršac, Paraćin, Jagodina, Smederevo, Novi Sad, Alibunar, Ivanjica, Nova Varoš, Čačak, Zrenjanin, Kraljevo. The survey was carried out by anonymous, structured questionnaire. The results were published on several occasions (Đorđević et al., 2011; Bogetić et al., 2013; Čočkalović et al., 2013; Bogetić et al., 2014). The total number of examinees is nearly 4000, and, for example, in 2015 survey, 616 examinees were included.

According to the territory on which the results were collected, since 2013 we have also monitored and analyzed the results regarding the place where the examinees studied. These places were grouped in three regions – Vojvodina, Belgrade and Serbia without the provinces (in the results it was named South Serbia). The data from the collected questionnaire were processed and grouped regionally. This paper gives the comparative review of results obtained from the basic and control groups of examinees from the Middle Banat Region (Zrenjanin). It is a base of this research within the framework of the projects funded by Provincial Secretariat for Science and Technological Development, Autonomous Province of Vojvodina. The sample included 350 examinees – 300 active students (200 from Technical Faculty "Mihajlo Pupin", 100 students from the Technical College of Professional Studies) and 50 examinees of the appropriate age who already finished their studies and who are currently unemployed, as a control group.

The questions that will be asked are the following:

- What are the arguments "for and against" entrepreneurship?
- What type of business ambience for starting and performing business do the examinees anticipate?
- How do the examinees find a financial aspect of the business ambience in Serbia?
- Optional: Do they exist and what are the noticeable differences in opinions and attitudes of examinees from the basic and control group?

RESEARCH RESULTS ANALYSIS

The reasons for and against entrepreneurship

Generally and locally, the research showed that the majority of examinees looked affirmatively to private business as well as to starting and doing business. The biggest number of examinees wanted to start their own business: basic group – 79.7%, control group - 80%. Private business is for the examinees equally "risk and uncertainty" (basic – 22.3%, control – 17.7%) and "challenge" (basic – 30.8%, control - 31%). They agreed (basic – 45.5%, control - 22%) or mostly agreed (basic – 35.6%, control - 56%) when asked the question "Do you think that people in our country still do not know legal and business possibilities of private enterprises?" They mostly agreed (basic – 48.7%, control – 55.1%) when asked the question "Do you think that private business is more successful than business in other forms of ownership?"

The main reasons for not starting their own business, according to the examinees from all three regions, are these two: insufficient financial means and insecure political and economic situation. The third reason in the basic group, according to them, was “Lack of a good idea”, and in the control group it was “Not interested” - Table 1.

The lack of knowledge represents one of the factors indirectly linked to other factors that hinder their wish for starting their own business. As a result of the lack of knowledge the young do not have good ideas, they are not self-confident and they do not believe in their ability to manage their own enterprise, which can lead to their indifference for starting their own business. In the Figure 3, it is shown what precise knowledge the examinees most frequently specified as well as deviations related to this question.

Table 1: Most important reasons for non-starting their own business

	Basic group	Control group
Insufficient financial means	19.4%	35.7%
Insecure political and economic situation	19.4%	21.4%
Lack of a good idea	23.1%	0%
Lack of experience	13.4%	7.1%
Lack of good partners for starting business	9.7%	7.1%
Lack of knowledge	8.21%	0%
Not interested	1.94%	28.6%

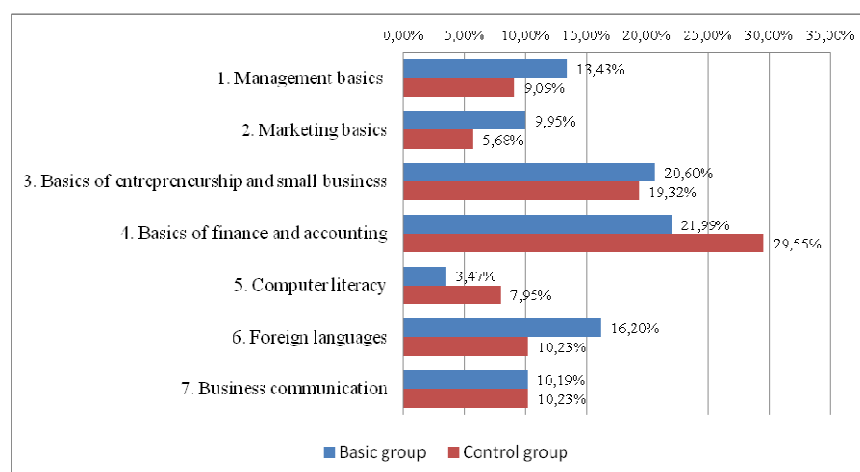


Figure 3: Knowledge that the examinees lack in order to manage their business successfully

The survey has shown that the Basics of finance and accounting and the Basics of entrepreneurship and small business take a dominant position of necessary knowledge - nearly 50% of examinees in both groups gave these questions. Important matches in the examinees' answers, beside in these two answers, can be found at the Management basics. Considerable deviations in the answers can be seen at almost every answer except the Basics of entrepreneurship and small business and the Business communications.

Entrepreneurial ambience

When speaking about the ambience for business start-up, the young (basic- 83.53%, control - 74%) mostly consider that the ambience is not encouraging and that the state has to be the key initiator of this process (basic - 89.3%, control - 96%).

Out of the suggested answers on the question “What are, in your opinion, the biggest limitations for your own business start-up?”, seen from the level of the total sample, three answers were

distinguished: lack of financial means, unstable political and economic situation and too high taxes – Figure 4.

The data in Figure 5 show the necessary encouraging measures for young population for their business start-up. Three key supporting measures are distinguished: more favourable loans, education and laws/regulations related to young entrepreneurs. Market regulation is also high ranked among these measures.

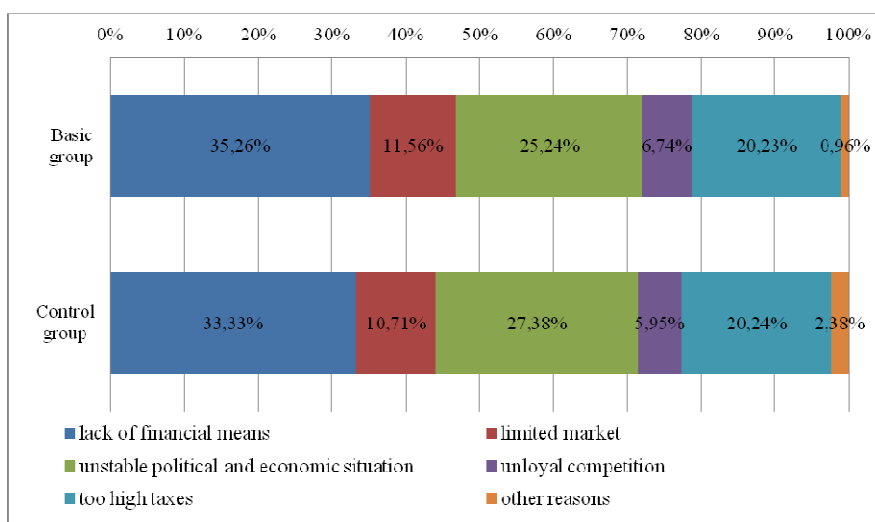


Figure 4: Biggest limitations for business start-up

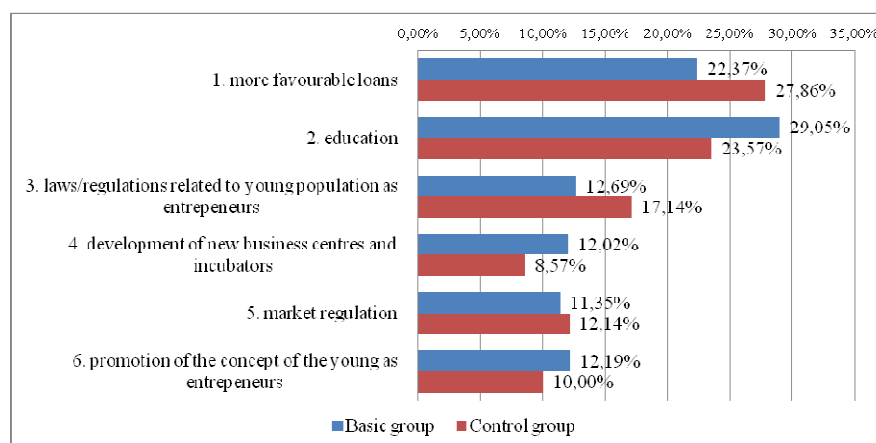


Figure 5: Stimulating measures for business start-up

The aforementioned should serve as a starting point for the state institutions as well as the institutions on the local level/municipalities which deal with the issues of young population and economy in order to find solutions and create the ambience favorable for encouraging the young as entrepreneurs and their own business start-up.

Business finances

The issues of financial support to young entrepreneurs in the form of start-up loans is often mentioned by experts and entrepreneurs themselves as a serious problem both for potential and the current entrepreneurs. The survey has shown that the examinees dominantly relied on their own financial means (basic – 64.1%, control – 53.7%) – out of four offered forms of loans the examinees showed the least interest in bank loans. The reason lies in their distrust in the banking system or bank loan policy towards the economy - Figure 6.

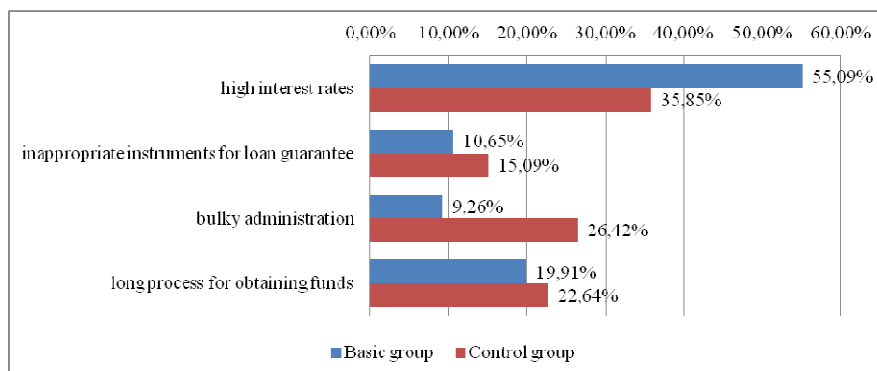


Figure 6: Why start-up bank loans are unfavorable for young entrepreneurs – the reasons

Here we come to the key problem – currently, on domestic market there are not enough offers of loans for start-ups which will help young entrepreneurs. If there are more favorable ways of getting loans, the young are still not informed well about all potential loans (basic – 59.9%, control – 60%).

CONCLUSIONS

The data collected in the survey were provided by the students of management and business so it was expected that the majority of examinees in this sample wanted to start their own business. Therefore, the students wanted to start their own business but most frequently they said that the main disturbing reasons against their desire were lack of finances and experience in managing enterprises, lack of knowledge and good ideas. The results also point at the fact that the situation in the whole Serbia is not stimulating and that attention must be paid to making conditions and encouraging entrepreneurship among young population. All negative factors that hinder the examinees from starting their own business are the results of the absence of an adequate ambience for encouraging entrepreneurship among the young. The facts confirm that almost all previous activities in this field were limited and short-lasting and were most frequently initiated by international organizations (USAID, GiZ, etc.).

ACKNOWLEDGEMENTS

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FRAMEWORK FOR DISASTER PREPAREDNESS BASED ON EFFICIENT SAFETY RESOURCE MANAGEMENT

UDC: 504.4:005.334

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ABSTRACT

During the occurrence of disasters, the most important is effective and timely response that reduces negative effects of disasters on individuals, property and society as a whole. Quick and efficient response requires necessary resources. The amount and allocation of resources is critical for speed of response and effects of reducing adverse consequences. In this paper, the framework that allows efficient preparation to disasters and management of available safety resources is presented.

Key words: Safety resource, Framework, Disaster preparedness.

INTRODUCTION

Disasters can be classified according to different criteria. Some of them are: causes of disasters, speed of propagation, conditions and levels of consequence, capacity of resources deployed in response to a disaster. The greatest practical value has classification of disasters by the nature of phenomena and processes that cause them. According to (Mihailov et al., 1991), there are three groups of disasters: disasters of technical character (in transport accidents, fires, explosions, accidents in industrial, electric power and utility systems, etc.); disasters connected to natural phenomena (floods, earthquakes, landslides, hurricanes, natural fires, epidemics, pandemics, etc.); disasters of ecological character (degradation of natural resources, climate change, temperature inversion, disappearance of plant and animal species, etc.). Groups, according to this classification, are divided into types according to the nature or source of the danger factor. Disasters are classified by types regarding to a place of origin, type of sources of danger or risk factor status.

Disaster management is based on a cycle, which typically consists of four phases: preparedness, response, recovery, and mitigation (Kahn et al., 2008; Ahmed et al., 2008). Each emergency situation management phase threatens certain resources - human, organizational, financial, or natural. In order to adequately respond the occurrence of adverse events, as well as to minimize the effects of adverse events on the functioning of a society, it is necessary to effectively use and protect all available resources, and to have enough knowledge to do that wisely (Janačković et al., 2007; Vasović et al., 2016). During these activities, cooperation, coordination, and collaboration are needed (Janačković, 2008).

This paper analysis activities and resources necessary for disaster management, demonstrating classification criteria and stages of development of the state of emergency, highlighting characteristics of management system and, finally, defining the context and basic management mechanisms to ensure safety on the basis of available resources, which contribute to disaster management effectiveness.

LITERATURE REVIEW

There are different classifications of disasters. In Shaluf (2007), the author classifies disasters into three types: natural, man-made, and hybrid disasters. In a systematic review, Lettieri et al. (2009) emphasized definition of a common theoretical framework, independent by the specific disaster type, as the main contribution to disaster management theory. The identification of main risks and all hazards, and no single ones, makes decision-making more precise making disaster prevention and response more efficient. Different methods and resources are needed in pre-disaster, disaster and post-disaster periods. As described in Lettieri et al. (2009), the following main phases of disaster management are identified: preparedness and mitigation (pre-crisis phase), response (crisis), and recovery (post-crisis).

Disaster risk management is based on risk and vulnerability analysis, as well as applying asset-based approach to mitigation (Vatsa, 2004). The most important in disaster risk reduction is to predict and monitor potential disaster-affected areas. A set of indicators must be included into consideration. If a set of indicators is large, multi-criteria methods must be applied (Janačković et al., 2011). A principal aim of disaster management system is to make all resources potentially available for every incident, no matter how the disaster is large (Perry, 2003). The resource collection and capacity building is connected to outcomes of disaster risk assessment in an area. Scott et al. (2016) defined a generic outcome-based monitoring and evaluation framework for disaster risk management capacity strengthening, based on measuring retained knowledge and behaviour change, improvements in the disaster risk management institutional framework, and creation of an enabling environment.

How to reduce disasters is just one part of the research. The causes of vulnerability and dealing with the outcomes of processes that are not fully understood or controllable the other one are also important (Alexander, 2016). There are some problems that equally exist in developing and developed countries. A society is more vulnerable to disaster if there are inequalities, marginalization and corruption (Alexander, 2016). Resources needed for post-disaster reconstruction are usually not adequate in place, time, or quantity, especially in construction projects (Chang et al., 2012).

Functional and human elements are important during disaster and emergency management, and development of a disaster and emergency system (Moore, 2008). The social factor is also important in disaster management (Tierney, 2014). Moore (2008) emphasized the following external factors influencing this management system: natural environment, societal factors, legal factors, government and political factors, technological factors, and commercial factors. The importance of information sources diversification and emergency services development at different levels (local, regional and national) is also emphasized.

Important aspect during the analysis of local government in managing disasters is its capability to return the society to normal functioning (Kusumasari et al., 2010). Changing conditions in a dynamic environment does not help during disaster management. It makes problems in organization, communication, cooperation, coordination, data exchange, decision making, and work in the field (according to Paton and Jackson, 2002). As the most important local capability requirements and critical factors of disaster management, Kusumasari et al. (2012) identified institutions, human resources, policy, finance, technics (technology), and leadership.

In order to define optimal information flow among different stakeholders, a platform for information exchange can be developed. In Nikolic et al. (2007), the authors stated that the software for the support of collaborative decision making in emergency management was important for efficient decision-making during disasters and technological catastrophes. To make adequate decisions on disasters, timely and complete information on the type and the scale of disasters are needed (Bayrak, 2009; Holdaway, 2001). Monitoring and data collection are the most important activities to adequately respond to a disaster. Modern network technologies can be very helpful. The complexity of these information-communication systems is analysed from technical and technological point of view, but it

is also important to include organizational and human factors of these systems, their reliability, availability, survivability, maintainability, and robustness (Bayrak, 2009).

DISASTER MANAGEMENT LIFECYCLE

The problem of resource management connected to disasters is very important. From the point of reaction, it is important to consider temporal aspect: before, during and after disasters. Different models of disaster management emphasize these phases, and each phase requires certain resources. Table 1 shows some representative models and their basic characteristics.

Table 1: Disaster management models

Model	Characteristics
Integrated community-based disaster management model (Chen et al., 2006)	Community-based disaster mitigation based on cooperation or experts or specialists, planning team, and public agencies, with participation of inhabitants, NGOs, and community organizations. As sources of resources, public agencies are identified.
Traditional model of disaster risk management and mitigation (Ahmed, 2008)	Defines pre-disaster and post disaster activities. Resources are included in every phase, without identifying different stakeholders. It is based on a risk management.
Disaster management cycle (Ulrich, 2008)	Defines phases of prevention and mitigation, preparedness, alert, response, recovery, and post-disaster phase. Every phase is described by a set of activities. As important resource, information is identified.
Disaster risk management cycle diagram (Khan et al., 2008)	Defines pre-disaster phase (risk reduction through mitigation and preparedness), disaster strike phase, disaster response phase (emergency response), and post-disaster recovery phase (reconstruction and rehabilitation). Some most important resources are identified for every phase.

Significant characteristics of all models listed in Table 1 are phases which are defined in relation to the occurrence of a disaster. The importance of phases of a preventive nature, preparedness, organization of protection and rescue system are emphasized. In (Ulrich, 2008), the author stresses the importance of timely and accurate information. Two representative models, describe in Table 1, are presented in Figure 1. Based on these presented models, we propose framework for disaster preparedness, and identify necessary resources for different phases of disaster management.

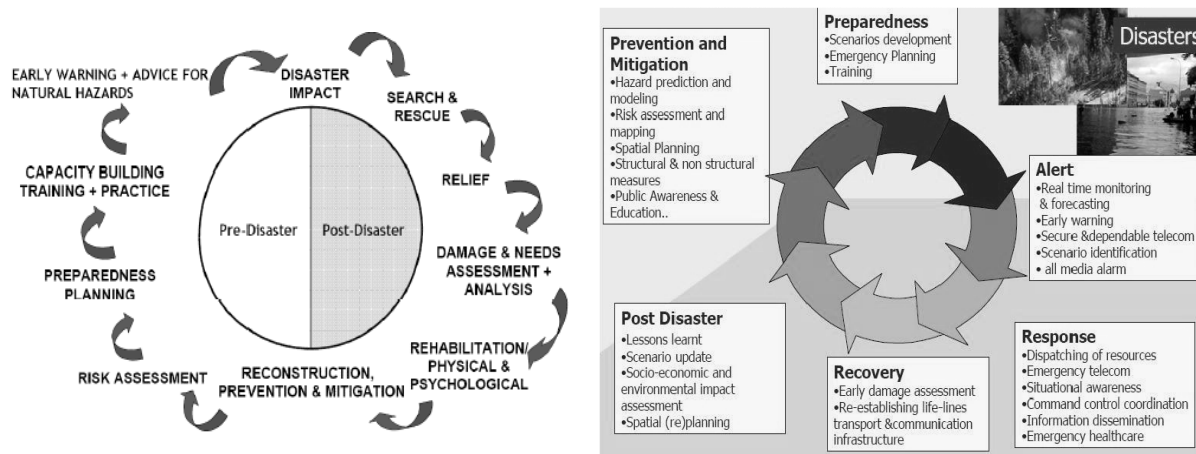


Figure 1: Two representative disaster risk management model (left - Traditional model of disaster risk management and mitigation (Ahmed, 2008); right - Disaster management cycle (Ulrich, 2008))

PROPOSED FRAMEWORK

Resource management enables connecting and combining different resources for the purpose of acquiring and creating competitive advantage of the organization. There is a difference between organizational activities and disaster management activities. Human, material and immaterial (non-material or intangible) resources are important in both situations. Material resources can be considered as realistic and financial resources. Real resources are constant material resources necessary to perform certain functions.

For the purpose of disaster management, the most important are major infrastructure, information and communication channels and supplies. Financial resources are the necessary financial resources for achieving the given protection function. In addition to material resources, there are immaterial resources. Different kinds of prior experience and knowledge are very important when taking appropriate decisions during disasters. Investing in knowledge and the development of new methods contributes to a higher level of protection and effective response to the occurrence of adverse events.

The rate of occurrence of accidents and its duration varies on the type of emergency. For example, in the earthquake, with duration of a few seconds, there is not much time for evacuation or dislocation of resources. If a tidal wave is expected in a day or two, then there it enables to implement preventive actions, such as dislocation of the available resources and application of additional measures.

Based on the process of continuous improvement of safety, it is defined management cycle based on application of available resources. These resources vary according to the type and complexity of a disaster. The proposed framework is shown in Figure 1.

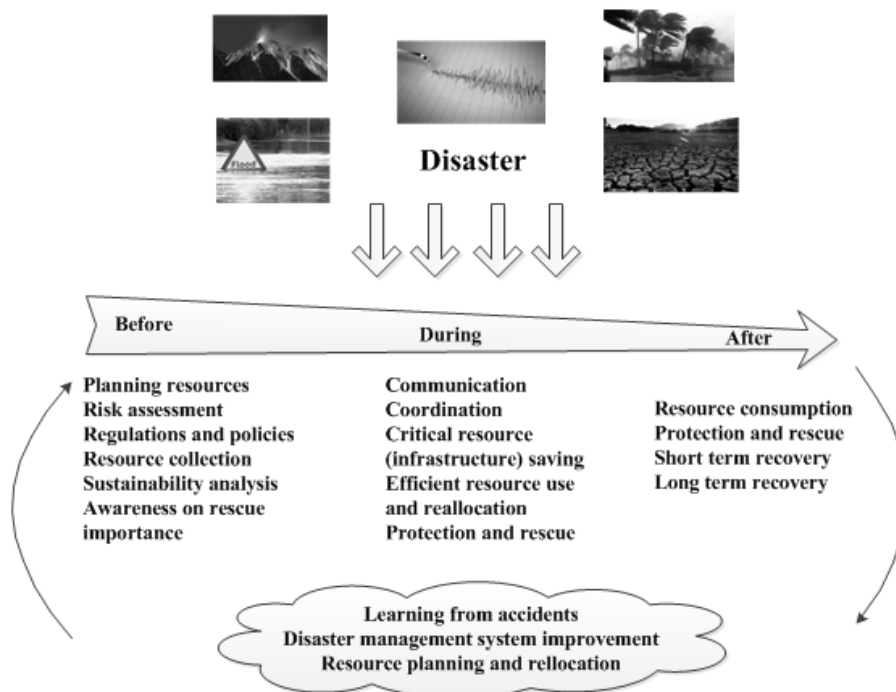


Figure 2: Framework for disaster preparedness

The framework includes consideration of different types of resources: planning resources, sustainability analysis resource, training resources, funds and equipment for operations, human resources, organizational resources, financial resources, communication resources, information sources, protection resources, and rescue resources.

Resources that are necessary before disasters happen are based on previous experience and the need to act preventively to reduce or eliminate adverse effects. First of all, it is a preventive action, and training for the worst situation. For this purpose, it is particularly important the adequate allocation of resources that would be most effectively applied when an adverse event happen, to be able to react quickly.

Algorithm of resource management in a disaster management system is presented in Figure 3. It is based on a framework presented in Figure 2.

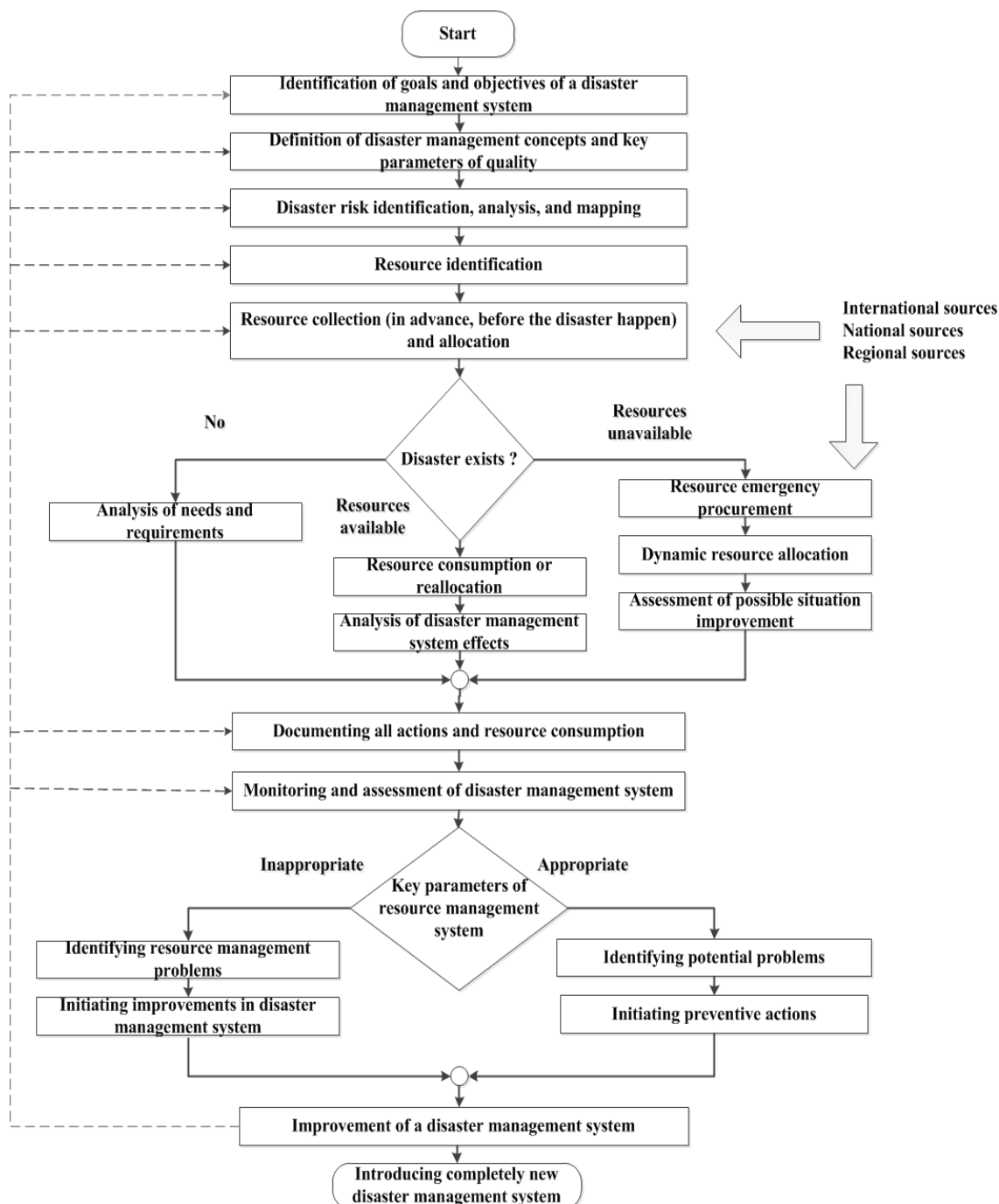


Figure 3: Algorithm for resource management in a disaster management system

There are three basic parts of resource management in a disaster management cycle: before, during and after a disaster happen. First part of the algorithm presents preparation period, consisting of identification of goals and definition of objectives, definition of basic concepts and key parameters of

quality, risk identification, resource identification, collection and allocation. There can be regional, national and international sources of needed resources, if local community does not have enough capacity to collect needed resources for disaster management.

If there is no disaster, the most important is to collect all available data that could be used for prediction or assessment of consequences and needed resources. When disaster happens, there are two situations: resources are not available or resources are available. According to situation assessment, and the complexity of situation, the available resources could be enough or not. Emergency procurement can be from regional, national, or international sources, when local sources are not available.

During the resource consumption, the most important is documenting all activities, monitoring and assessing the quality of disaster management system based on available indicators. Some problems, potential or real, can be identified and preventive actions can be initiated. Based on this assessment, some improvements can be done in a disaster management system or resource management. These results can help to significantly improve the resource consumption, shorten available time to respond, and reduce the suffering of people.

Monitoring and evaluation is very important in conventional supply chains. During disaster management, it is very difficult to analyse the efficiency of the system and response. The most important is to reduce the number of casualties and decrease human suffering. However, identification of key performance indicators makes it possible to pre-define strategic objectives of the disaster logistics. First of all, costs, speed of response, efficiency, effectiveness and quality are considered. Also, accurate information during and after a disaster happen, can be just as important as water and food, because it can prevent even greater adverse effects.

Especially important in the present model is the feedback loop, which is used for improving the existing way of reacting, resource reallocation, and creation of new plans. In fact, corresponding persons must take into consideration main effects of disasters, potential problems, and deficiencies in the existing disaster management system.

During the reaction, short-term effects of disasters are observed: the number of deaths and serious injuries, increases risk of communicable diseases, damage to critical infrastructure (including medical facilities and water supply systems), lack of food, and need for population relocation. Activities during the disaster often overlap, i.e. they are not in a sequence, as shown in most disaster management cycles.

CONCLUSION

In the XXI century, disasters, natural and man-made, are much more frequent than before. This requires considerably more funds and resources to eliminate or mitigate the negative consequences of adverse events. Coping capacity of a local community is often not enough. Therefore, we need a wider social consensus and efficient management of available resources. The proposed framework is based on the efficient management of resources, which allows the analysis performed before, during and after the occurrence of a disaster.

Taking into account two types of accidents, based on their duration, there is possibility of efficient redistribution of resources just before the disaster, if it is predictable. This greatly improves the efficiency of utilization of resources, the protection of specific resources, and more efficient operation to eliminate undesired effects of disasters.

Characteristics of resources are different. In addition to natural resources and material resources, while managing disasters, especially significant are intangible resources. Previous experience, even a mall

one, can be very useful during resource management, and can significantly reduce negative consequences of accidents, especially when it comes to reducing the number of casualties.

The amount of available resources, time complexity, space allocation, total time needed to take a society back to a functional state, are important factors affecting the management of resources in emergency situations. However, disasters often exceed the capabilities of the local community, it is necessary to spread reaction. In these situations, efficient coordination, cooperation, and communication is even more important, to be able to achieve best possible resource consumption and situation control.

As the number of resources whose values are monitored, is large, it is preferable to use a method for selection of the most important resources, and resources that most affect the system to be able to restore to its original state after a disaster. Also, it is important to keep track of resources which are available in limited quantities. For these purposes, appropriate application of computer supported decision-making based on multi-criteria analysis is very useful. Also, support systems for coordination of activities of public institutions, public services, private institutions and the army can significantly simplify the deployment, distribution and efficient use of all available human, organizational and technical resources, especially during disasters and in post-disaster periods.

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SMALL BUSINESSES AND LOCAL GOVERNMENT: REGIONAL HORIZONS

UDC: 334.71:352

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ABSTRACT

The paper identifies general and particular opinion of local government and small businesses on the regional development horizons. Different institutional groups have diverse points of view to the problem of regional development. That is why the compromise in strategy generation (goal- and target setting, methods and instruments assign) has to be reached. Local authorities and small businesses are in special place in the strategy planning system – they depend a lot on other institutional actors. The local authorities' and small businesses' opinions on the problem of regional development are analyzed. Voronezh Region as a target of research is taken. The set of strategic opportunities is formed with the assistance of expert community (regional and local authorities, large and small businesses, social agencies etc.). Weighted analysis of experts' opinions about problems, horizons, incidence and possibility is made by means of fuzzy set method. As the result the particular local authorities' and small businesses' perception of regional development horizons are found out.

Key words: local government, small businesses, region, regional development, challenges and opportunities

INTRODUCTION

One of the most important regional organizational problems is the problem of regional strategic documents' development. The perception of the opportunities and threats for socio-economic development of different territorial subsystems is essential for the problem solution. It is evident that different institutional groups have diverse points of view to the problems of regional development.

The same thing one can say about interconnections between regional subsystems' and country's development. The individual economic behaviour is influenced by institutional group affiliation (Baudrillard, Jaspers, 2014). The objective economic processes valuation is also questionable. The ambiguousness of small businesses, mesic- and macro-environment interaction is presented by different authors (Franovskaya et al., 2015; Franovskaya, Duvanova, 2015). Myasnikova (2012, 2015) illustrates the differences between local socio-economic development particularities and their perception by local government and community. The particularities of different economic agents' behaviour in equal terms are shown by Nikitina (2009, 2011) and Sviridov (2015).

The article has the goal to bring to light the different institutional groups' opinion on regional development opportunities and threats. The beliefs of business, regional and local government, civic institutions as the stakeholders of regional socio-economic development are analyzed.

METHODS

Regional problems and horizons are evaluated on the basis of traditional SWOT-analysis in which the regional development opportunities and threats are presented. The opinions of small businesses and local authorities are recognized by the inquiry form where every factor is evaluated by two characteristics – the power of influence (“potential consequences” for threats) and probability. The opportunities’ power of influence upon the socio-economic development of Voronezh Region is evaluated by the experts on a scale from one to five: 5 – strong influence, 4 – moderate influence, 3 – small, 2 – the lack of influence. The probability is valuated as follows: 5 – the high level, 4 – average probability, 3 – low probability. There is no “lack of probability” value because the presence of the factor is put on paper by the fact of its introduction. The traditional approach of the probability estimate (on a percentage basis) does not apply by virtue of the fact that “probability” term is used by authors in arbitrary way for putting together the power and the probability values. Furthermore, traditionally the probability should to be evaluated by objective characteristics rather than experts’ opinion. The potential consequences and probability of threats are evaluated by experts in the same way.

The weighted average is taken as the overall opportunities’ and threats’ evaluation. Opinion consistency evaluation is made by the means of fuzzy set method (Konysheva, Nazarov, 2011; Nazarov, 2016). In the capacity of experts there were 21 business representatives and 26 local government representatives. The full suite of opportunities is thought of as A-set which contains the fuzzy subset having generic function. The set fragment is presented as X matrix array consisting of 15 columns (in terms of opportunities/threats) and 21 (26) rows (in terms of experts number). Cells contain values from 2 to 5 (see Table 1).

Table 1: Voronezh region development opportunities evaluation matrix (fragment)

Opportunities Experts	1	2	3	...	...	14	15
	1	5	5	5	5	5
2	3	4	4	...	...	5	4
3	3	4	4	...	...	4	4
...
21 (26)	2	5	5	...	....	4	2

The membership function μ_A of A fuzzy set formulation is made in the following way.

The rank value frequency calculation is made by formulae 1, 2.

$$k := 1 \dots 5 \tag{1}$$

$$Z_{k,j} := \sum_{i=1}^{21} \left[\left[\left(X_i^{kj} \right) \right] = k \right], \tag{2}$$

where X_i^{kj} – i element of j subset of X matrix.

This should provide the value frequency matrix Z (see Table 2).

Table 2: Voronezh region development opportunities value frequency matrix (fragment)

Opportunities Values	1	2	3	...	...	14	15
	1	0	1	0	0	0
2	2	0	0	...	...	0	1
3	9	7	4	...	...	4	7
4	5	9	9	...	...	11	6
5	5	4	8	...	...	6	7

To build the fuzzy set of experts' rank values we evaluated the degree of membership of each value to A set (the deal of each value in answers is calculated by formula 3).

$$G = \frac{1}{n} * Z, \tag{3}$$

where n – the quantity of experts.

As a result the fuzzy set of experts' rank values G is received (see Table 3).

Table 3: Voronezh region development opportunities evaluation matrix (fuzzy set, fragment)

Opportunities Values	1	2	3	...	...	14	15
	1	0.0000	0.0476	0.0000	0.0000	0.0000
2	0.0952	0.0000	0.0000	...	...	0.0000	0.0476
3	0.4286	0.3333	0.1905	...	...	0.1905	0.3333
4	0.2381	0.4286	0.4286	...	...	0.5238	0.2857
5	0.2381	0.1905	0.3810	...	...	0.2857	0.3333

For the following analysis the received set was normalized by dividing the values of G set by the highest value in the column. This is necessary for linear separation by Hamming calculation. The highest value of the degree of membership of each value to the fuzzy set however equals 1. The membership function (L) values are shown (fragmentary) in Table 4.

Table 4: Voronezh region development opportunities evaluation matrix (normalized fuzzy set, fragment)

Opportunities Values	1	2	3	...	...	14	15
	1	0.0000	0.1111	0.0000	0.0000	0.0000
2	0.2222	0.0000	0.0000	...	...	0.0000	0.1429
3	1.0000	0.7778	0.4444	...	...	0.3636	1.0000
4	0.5556	1.0000	1.0000	...	...	1.0000	0.8571
5	0.5556	0.4444	0.8889	...	...	0.5455	1.0000

The fuzziness index is calculated with the help of crisp set L_0 , – the closest to examined fuzzy set using the conditional function $if()$:

$$L_{0k,j} := if(L_{k,j} > 0,5, 1, 0) \tag{4}$$

The computations are shown in Table 5.

Table 5: Voronezh region development opportunities evaluation crisp set (fragment)

Opportunities Values	1	2	3	...	...	14	15
	1	0	0	0	0
2	0	0	0	...	...	0	0
3	1	1	0	...	...	1	1
4	1	1	1	...	...	1	1
5	1	0	1	...	...	1	0

The computation of fuzziness index is made by linear metrics (Hamming distance):

$$I_A^L = \frac{2}{n} \sum_{i=1}^n |\mu_A(x_i) - \mu_{A_0}(x_i)|, \tag{5}$$

where:

n – the number of set’s elements,

$\mu_A(x_i)$ – the membership function of fuzzy set,

$\mu_{A_0}(x_i)$ – the membership function of crisp set (the closest to examined fuzzy set).

The computation of moduli of fuzzy set elements deviations from crisp set:

$$L_1 = |L - L_0| \tag{6}$$

The fuzziness index is calculated by means of column values summation:

$$L_3 = \frac{2}{n} \sum_{k=1}^n L_{1 k,j} \tag{7}$$

The computation fragment is presented in Table 6.

Table 6: Voronezh region development opportunities evaluation – fuzziness indexes of experts’ rank values (fragment)

$L_3 =$	Opportunities	1	2	3	...	...	14	15
	Fuzziness index	0.1481	0.1037	0.0741	...	...	0.1091	0.0381

FINDINGS & CONCLUSIONS

By the means of questionnaire, the presented in Table 7 results were received.

Table 7: Voronezh region development opportunities evaluation – the average values

Voronezh region development opportunities	Opportunity power of influence		Opportunity probability	
	Small business	Local authority	Small business	Local authority
1. Steady demand for nickel ore across the national and global markets.	3.62	3.65	3.48	3.62
2. Demand for regional enterprises’ output with the purpose of national material and technical resources’ modernization.	3.71	4.00	3.67	3.88
3. Increasing budgetary funding for regional defence industry complex.	4.19	4.35	4.00	4.00
4. Increasing private funding for regional economic development.	4.29	3.73	3.81	3.65
5. Increasing business participation in regional social problems solving (which includes PPP, social entrepreneurship etc.)	3.95	3.69	3.48	3.85
6. The demand growth for regional agricultural sector output across the global market.	4.09	3.77	4.05	3.81
7. Demand for regional educational services from foreign buyers.	3.71	3.73	3.67	3.73
8. Federal transport infrastructure development projects’ implementing (high-speed highway Moscow-Sochi; toll roads; airport).	4.09	3.77	4.24	4.00
9. Federal imports phase-out programs.	4.09	4.12	4.00	3.88
10. Cluster projects in wide range of economic and social sectors.	4.00	3.69	3.88	3.58
11. The creation of favorable economic terms territories (Special Economic Zones, Priority Development Areas).	4.19	4.15	3.76	4.00
12. Unused regional tourism and recreation resources’ intake.	3.90	3.46	3.62	3.65
13. Bringing out of the capital city major companies departments to regions.	4.00	3.81	3.43	3.77
14. North-South corridor connecting traffic increasing; development of the “transit” economy.	4.09	3.85	3.81	3.77
15. Ghost economy incomes’ into open financial resources conversion.	3.90	4.00	3.52	3.65

Opinion consistency evaluation is made by the means of fuzzy set method (see “Methods” part). The results are presented in Table 8. All opportunities are grouped by dimensions of consistency (fuzziness index).

Table 8: Voronezh region development opportunities – small business opinion consistency evaluation

Fuzziness index interval	Opportunities’ power of influence	Opportunities’ probability
0.45-0.4	Steady demand for nickel ore across the national and global markets. Demand for regional educational services from foreign buyers.	Ghost economy incomes’ into open financial resources conversion.
0.4-0.35	Increasing business participation in regional social problems solving (which includes PPP, social entrepreneurship etc.). The creation of favorable economic terms territories (Special Economic Zones, Priority Development Areas). Unused regional tourism and recreation resources’ intake. Bringing out of the capital city major companies departments to regions.	Increasing private funding for regional economic development. Demand for regional educational services from foreign buyers. Federal imports phase-out programs. The creation of favorable economic terms territories (Special Economic Zones, Priority Development Areas). Unused regional tourism and recreation resources’ intake. Bringing out of the capital city major companies departments to regions. North-South corridor connecting traffic increasing; development of the “transit” economy.
0.35-0.3	Demand for regional enterprises’ output with the purpose of national material and technical resources’ modernization. North-South corridor connecting traffic increasing; development of the “transit” economy.	Increasing budgetary funding for regional defence industry complex. Increasing business participation in regional social problems solving (which includes PPP, social entrepreneurship etc.)
0.3-0.25	The demand growth for regional agricultural sector output across the global market. Federal imports phase-out programs. Cluster projects in wide range of economic and social sectors.	Steady demand for nickel ore across the national and global markets. Demand for regional enterprises’ output with the purpose of national material and technical resources’ modernization. The demand growth for regional agricultural sector output across the global market.
0.25-0.2	Increasing budgetary funding for regional defence industry complex. Federal transport infrastructure development projects’ implementing (high-speed highway Moscow-Sochi; toll roads; airport).	Federal transport infrastructure development projects’ implementing (high-speed highway Moscow-Sochi; toll roads; airport).
0.2-0.15	Increasing private funding for regional economic development.	Cluster projects in wide range of economic and social sectors.
0.15-0.1	Ghost economy incomes’ into open financial resources conversion.	-

The local government opinion consistency is structured in a similar vein (not presented).

As one can see from the Table 7 none of experts groups did not rank any of opportunities (both by power of influence and probability) as high level (more than 4.5). Generally the small business representatives in a greater degree are tend to believe that large business activities are of higher value for regional economic development. Their expectation from government: infrastructural development. Local government representatives are relying upon federal government activities and mobilization of resources into the budget (“ghost economy incomes’ into open financial resources conversion”). The probability of opportunities evaluation by both groups is lower generally than power of influence.

The following opportunities have the most positive influence (in the small business representatives’ opinion): increasing budgetary funding for regional defence industry complex; increasing private funding for regional economic development; the creation of favorable economic terms territories (SEZ, PDA). The probability of these occurrences evaluated as medium and low. The evaluation of influence and probability of “federal transport infrastructure development projects’ implementing”

opportunity is high enough. The experts' opinion consistency about above mentioned points is sufficient (see Table 8).

The small business representatives are reliant a lot on governmental projects for defence and infrastructure. There is large disparity of valuations about state preferences: the influence is evaluated as medium and the probability is evaluated as low.

Local authorities are relying upon federal government activities and mobilization of resources into the budget. The experts' opinion consistency about these opportunities is sufficiently high.

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THE ROLE OF TECHNOLOGY MANAGEMENT FROM THE ASPECT OF A GIVEN ENGINEERING COMPANY

UDC: 004:005

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ABSTRACT

The technology management is the synchronization of technological- and management aspects of enterprises in order that the technology could contribute more to the competitiveness. The coordination of technological changes, the exploitation of technical capabilities and the usage of appropriate management tools are all parts of this area. Nowadays at the development of production systems the claims of connected systems must be also taken into consideration, the companies configure their processes according to this. The configured systems must fulfil the expectation of increasing level of flexibility.

Key words: technology management, technical capabilities

INTRODUCTIONS

Nowadays companies are less capable to monopolize knowledge or keep it within the enterprise, because of the four following reasons:

- the fast development of the information and communication technologies,
- the mobility of the employee,
- venture capital became more important,
- the quality of the work of suppliers improve. (Csath, 2010)

An important goal of the technology design is identifying some of the most important elements of success and focus the strategy and the product design on them. (Vágási et al., 2006)

TECHNOLOGY MANAGEMENT

Technology management is administrative science, linking technical, economic, psychological, legal, patent and managerial subjects in order to achieve strategic and tactical goals of the company as well as planning, development and commercialization of innovations. (Sryamkin – Sryamkina, 2015)

The technology is the expertise- and toolsystem which facilitate the covering of needs. The technology management is the crossfunctional activity which use the technology for the effective and efficient function of the organization. (Pataki, 2005)

The technologies can be defined on three different ways, (Pataki, 2005) (see also Figure 1.) on one hand the role of technology can be considered in case of the competitiveness, within that three categories are distinguished:

- Base technologies: these are the foundations of the activity on a given professional field.
- Key technologies: in a given moment these have the biggest impact on the position in the competitiveness.
- Pacing technologies: their advancement determine the pace of the future development.

On the other hand the connection of the technology to the main point of product can be analyzed, in this case there are also three different types of technologies:

- Core technologies: these determine the essence, the core of the given product.
- Complementary technologies: these are needed to create functions, those increase the use value of the product.
- Peripheral technologies: they are not necessary, but they could contribute to the business success.

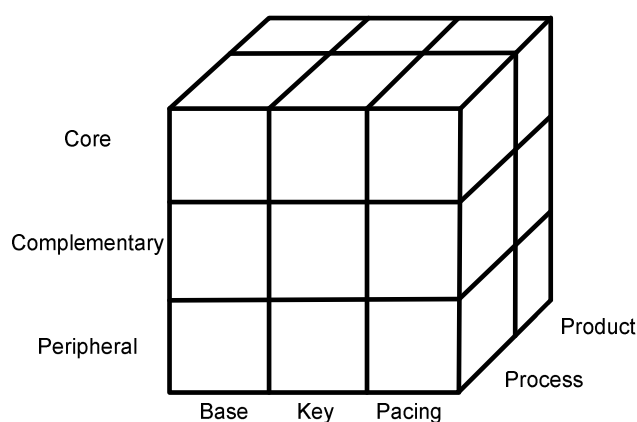


Figure 1: The three types to define technologies (Pataki, 2005)

Kotler et al. (2008) defined 5 product levels: core, generic, expected product, augmented, potential product.

1. Core Product
2. A basic product focusing on the primary purpose for which the product is intended.
3. Generic Product
4. Contains all conformities, related not only related to the basic function.
5. Expected Product
6. Meet all customer expectations.
7. Augmented Product
8. There are features of the product which differentiate it in the competition, special band or image, additional services.
9. Potential Product

There are potential augmentations and transformations that the product may undergo in the future.

IDENTIFICATION AND TECHNOLOGY ACQUISITION

Identification of technology is necessary at all stages of the development and market life cycle. This process must consider market changes as well as technological developments. Identification includes search, auditing, data collection and intelligence processes for technologies and markets. (Cetindamar et al., 2015)

The process of technology acquisition has eight stages:

- Identification of technological needs,
- Obtaining information about alternative sources of technology,
- Dissemination of information,
- Evaluation and selection of the most suitable technology,
- Unpackaging of technology packages,
- Negotiation of the best terms and conditions,
- Adaptation and absorption of the imported technology,
- Optimum exploitation and maximum utilization of the technology. (Sonmezturk Bolatan et al., 2016)

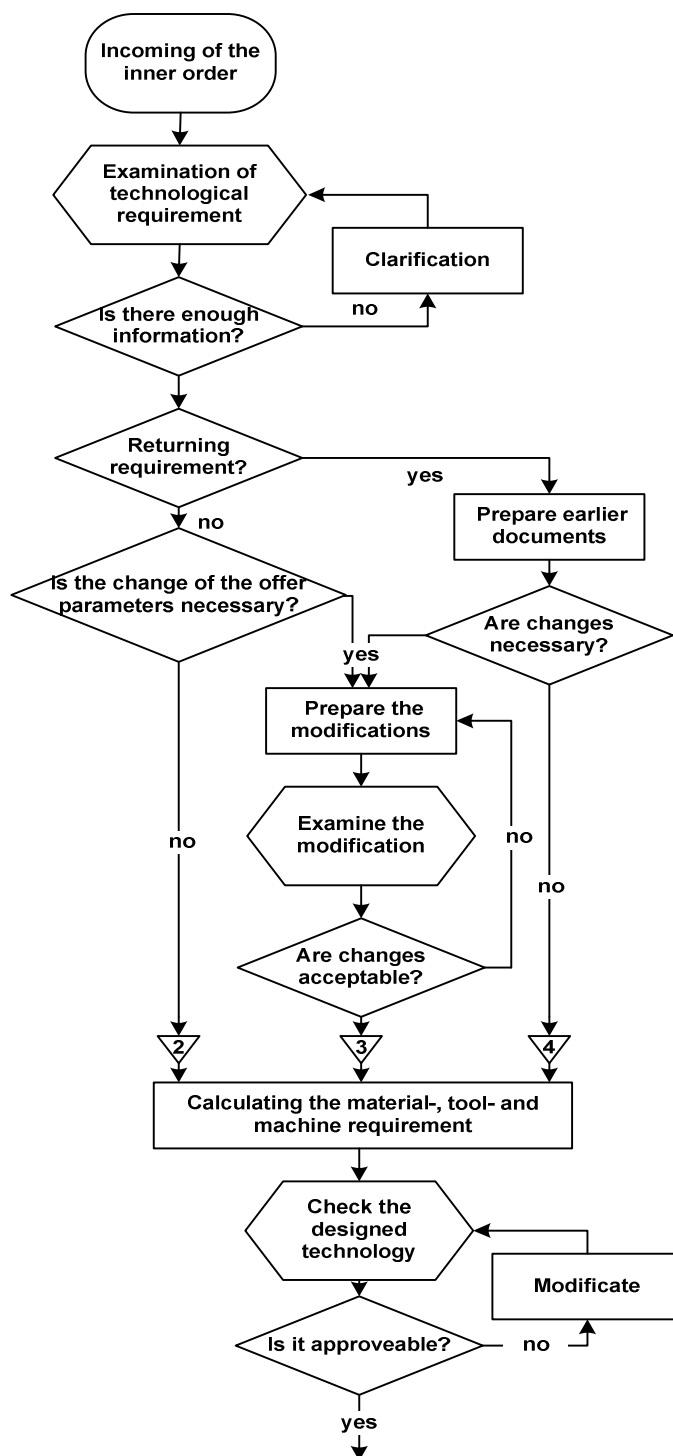


Figure 2: Planning of the production

The special information gaining process of innovative companies is known as technologywatch by the literature. During this, the companies collect scientific, technical and technological informations as well as standards to follow the activity of their present- and potential competitors and R&D organizations. (Buzas, 2007)

It is especially typical to production companies, that they seriously underestimate the strategical significance of the process technologies and the importance of their role in achieving competitive advantage, compared to the product technologies. However a process technology could also basically revolutionise one or more industries and could also drastically change power relations of markets just like a product technology. The service provider companies usually do not make such mistakes, because they are process oriented. (Pataki, 2014)

PLANNING OF THE PRODUCTION

Regarding the design of the product, the technology plays major role. (Figure 2.) Main steps:

- Designing of the technology,
- Calculating the material-, tool- and machine requirement,
- Printing the material order and product following chart,
- Provide the drawings for the production plants,
- Preparing the cut design,
- Plan the quality investigations,
- Preparing the measuring charts.

The investigated company does not do standard design- and development activities because of the character of its products.

The effect of production technology appears already during the design of the concept, this various connection covers the whole life-period of making the product. The goal is, to create a technologically appropriate construction and to find a functionally advantageous, structurally the simplest financially optimal solution. (Dudás, 2009)

There is no use to debate about that which piece of information or activity is the most important. The facts show it clearly, that the thrift of the production is determined by the kind of technology. Some authors doubt the dominance of the technological effect on the thrift, because according to them, the product and its design is more important than the technology itself. The technology became a determining and acclaimed factor of the economical life in the recent decade, because of its elevating effect on the economy. This is proved by the studies about the economies of given countries or country groups. The kind of the technology is one of most considered factor in such analyses. (Prohászka, 2001)

The new production technologies influence the existing safety technology, communication channels, scope of activities, jobs, authorities, connections, power relations, these must be considered at the planning of changes. (Pataki, 1999)

CONCLUSIONS

The accelerated appearance of new technologies and the attainableness of competitive advantage which is gained from the possession of the innovative process highlight the importance of technology management. The foundations of enterprises are still the products and services of the industry. (Szakály, 2002b)

At the same time, the long-continued development of new technologies and the long changing periods up value the reserving of the old technology and provide possibility for the long-drawn- or gradual changes. (Szakály, 2002a)

The role of technology and technology management became more important during the last decades and became a strategic issue.

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Session A: MANAGEMENT AND OPERATION MANAGEMENT

Papers (pp. 45-110):

Srđan Bogetić, Snežana Lekić, Zorana Antić 21st CENTURY CHALLENGES IN STRATEGIC MANAGEMENT	...45
Violeta Cvetkoska THE ROLE OF OPERATIONS RESEARCH IN MANAGERIAL DECISION-MAKING	...51
Slobodan Jankovic, Velimir Petrović MANAGEMENT OF A NEW VEHICLE SHORT-TERM DEVELOPMENT PROCESS BASED ON RTC TEST BED	...57
Stevan Mušicki, Goran Janačković, Dejan Vasović SAFETY CULTURE OBSERVED FROM THE STANDPOINT OF CONTEMPORARY SCIENCE AND PREVIOUS EXPERIENCE	...64
Vladan Paunovic, Miroslav Radojicic, Jasmina Vesic Vasovic, Sanja Puzovic, Aleksandra Jovicic INTEGRATED MCDM APPROACH BASED ON AHP AND PROMETHEE METHODS FOR TOOL SELECTION	...68
Sanja Puzovic, Miroslav Radojicic, Jasmina Vesic Vasovic , Vladan Paunovic USE OF MULTI-CRITERIA DECISION MAKING METHODS IN FUNCTION OF QUALITY IMPROVEMENT	...74
Milan Stajić, Ivan Palinkaš, Igor Kekenj THE IMPORTANCE OF THE FAMILY OF ISO 9000 IN IMPROVING OF PRODUCTION PROCESS	...81
Milan Stajić, Ivan Palinkaš, Draško Kovač, Igor Kekenj EXCELLENCE THROUGH SIX SIGMA SYSTEM	...86
Vesna K. Spasojevic Brkic, Zorica A. Veljkovic, Nada Stanojevic INDUSTRIAL COMPANIES' OPERATIONAL PERFORMANCE: EVIDENCE FROM SERBIA	...90
Sanja Stanisavljev, Mila Kavalić, Dragica Radosav, Branko Markoski, Saša Zec LEAN CONCEPT AND PRODUCTION MANAGEMENT ENTERPRISES IN SERBIA	...95
Mustafa Ertunc Tat, Melih Cemal Kushan IMPACT OF INDUSTRY 4.0 TO AIRCRAFT MAINTENANCE, REPAIR AND OVERHAUL	...101
Miroslav Vulić, Eleonora Desnica, Milan Nikolić MANAGING PROCESS OF END-OF-LIFE VEHICLES TOXIC FLUIDS FROM ENVIRONMENTAL SUSTAINABILITY AND LEGISLATION ASPECT	...106

21st CENTURY CHALLENGES IN STRATEGIC MANAGEMENT

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ABSTRACT

Modern society is faced with serious challenges which have contributed to the negative trends in the economic globalisation. Globalisation is the only economic way for national economies all around the world. The characteristics of economic globalisation are marked by uneven industrial development, intensive application of information and communications technology (ICT), development of innovations, improvement of productivity and the need to increase the level of competitiveness. The intensive application of ICT in business has influenced the emergence of a new business model – sharing economy, but also the users themselves, who are increasingly insisting on the usage of Internet, smart phones and tablets while purchasing goods or services. Developing countries have to follow the trends on the global market, but also create their own national economy growth models.

Key words: strategic management, competitiveness, globalisation, information and communications technology, business strategies.

INTRODUCTION

In global business conditions, national economies are constantly faced with new challenges which make the process of managing an organisation more complex. The emergence of new regional economic leaders (China, India) and the creation of new regional alliances of BRIC countries (Brazil, Russia, India, China) are influencing the new global economic division of power, on the one hand, and a gap which is still present between the rich and poor countries, on the other hand. Solving economic inequalities and creating economic balance is one of the imperatives of the global economic policy. Competitiveness is an imperative in companies' contemporary business practices. Increasing the level of competitiveness of the national economy is an imperative for the countries and all their efforts are concentrated on it. The critics of economic globalisation are in fact those countries which cannot be competitive on the global market and are thus searching for excuses for their failures in big competition and its inequality. National competitiveness cannot be achieved without increasing companies' productivity and efficiency which requires constant improvement of employees' skills, application of new innovative solutions and introduction of new technologies in business. Productivity is the ultimate engine of growth in the global economy. Raising productivity is therefore a fundamental challenge for countries going forward (OECD, 2015). According to Klaus Schwab, restoring global economic growth will be a challenge for leaders. Permanently diminished growth translates into permanently lower living standards: with 5% annual growth, it takes just 14 years to double a country's GDP; with 3% growth, it takes 24 years. If our current stagnation persists, our children and grandchildren might be worse off than their predecessors (Schwab, 2017). However, what brings controversy into global business is the role of a new business model – *sharing economy*. Fundamentally, sharing economy platforms use internet, smartphone, and software technologies to create marketplaces that facilitate transactions between numerous peers – decentralized buyers and sellers who are frequently individuals or small entities. This new business model enables completing

business transactions without intermediaries under favourable financial conditions. Famous consulting house PricewaterhouseCoopers estimates that sharing economy marketplaces focus on five sectors – peer-to-peer finance, online staffing, peer-to-peer accommodation, car sharing, and music/video streaming (Federal Trade Commission, 2016).

Countries in transition have to focus on a couple of areas when creating their strategic economic model which will enable national competitiveness:

- Increasing the productivity of manufacturing companies;
- Applying international standards (ISO 9001, ISO 14001, HACCP, Global Gap and the like);
- Constant improvement of employees' skills;
- Encouraging innovations as the driving force of companies' productivity and competitiveness;
- Developing infrastructure as a prerequisite for successful business operations;
- Developing companies' awareness about the importance of ICT in business;
- Caring for equal economic development with a view to decreasing poverty and economic inequality;
- Creating legal frames which enable a fair market game.

NEW COMPETITIVE RELATIONS

Economic globalisation is the result of social productivity growth, which mostly happened owing to scientific and technological advancement and not owing to any individuals or countries. It is the driving force of global growth and it facilitates the flow of goods and capital, advancements in science, technology and civilisation and interaction between people. The consequences of the global economic impact have been felt equally by both developed and developing countries. The most pressing ongoing task put before the global economic leaders is to steer the global economy out of difficulties. Furthermore, as a result of global economy problems, the gap between the poor and the rich countries, i.e. between the South and the North is widening.

The main causes of global economic problems are three critical issues in the economic sphere which still haven't been effectively addressed (Jiping, 2017): 1) Lack of robust driving forces for global growth makes it difficult to sustain the steady growth of the global economy; 2) Inadequate global economic governance makes it difficult to adapt to new developments in the global economy; 3) Uneven global development makes it difficult to meet people's expectations for better lives. Global economy today is characterised by slow developmental growth and especially by the insufficient growth of the global trade. Reasons for this situation can be found in ineffective short-term policy stimuli and structural reforms which are unfolding too slowly. With a view to solving bad economic indicators, global economy is now searching for new growth drivers, since the traditional engines to drive growth have weakened. New technologies, which were seen as the new sources of growth, still haven't risen up to the task. Estimates show that emerging markets and developing countries contribute to 80 percent of the growth of the global economy. Also, the global economic landscape, characterised by the emergence of new economic leaders (China, Russia, India), regional alliances (BRIC) and rapid development of new technologies, has seriously changed compared to the previous period. Unfortunately, the global governance system has not embraced those new changes which have an influence on insufficient representation and inclusiveness.

According to the founder of the World Economic Forum in Davos, Klaus Schwab, this round of industrial revolution will produce extensive and far-reaching impacts, such as growing inequality, particularly, the possible widening gap between profit and employees' salaries. The richest one percent of the world's population own more wealth than the remaining 99 percent. Inequality in income distribution and uneven development space are worrying. Over 700 million people in the world are still living in extreme poverty. It is also what is behind the social turmoil in some countries (Jiping, 2017). With a view to solving global economy problems, it is necessary to find the driving force for development, but also create a balanced development which will ensure that all people have equal access to opportunities and share in the benefits of development. It is necessary to create an economically balanced model which will satisfy the area of sustainable economic business which incorporates: the issue of excessive influence of capital on the making of key decisions, unemployment, decreasing the technological gap between countries, environmental concerns and the rule of law. Industrial transformation creates new labour opportunities, but also increases the number of risky jobs and lay-offs. Some people blame globalisation for the chaos in the world. They consider it to be the Pandora's Box. Neither the migration crisis nor the financial crisis were caused by globalisation. The financial crisis occurred because of the excessive chase for profit and failures in financial regulations. Globalisation is not the cause of economic problems manifested in the limited industrial growth. Global economy has been slowed down for a long time, and the culprits for this

situation should be sought in the lack of robust driving forces, the lack of governance systems and uneven global growth (Jiping, 2017).

THE ROLE OF NEW TECHNOLOGIES IN CREATING FUTURE BUSINESS STRATEGIES FOR COMPANIES

Global economy market has shown that there is no clear boundary between industrial sectors anymore, since the companies which deal with digital technologies are entering into other sectors suggesting new values. As a result of cooperation between the old and the newly-arrived business partners, the new value has to be redefined through a value chain. Technology is the most dynamic factor of economic development and the achievements in the area of high technology and clean technologies influence the creation of completely new markets or new product applications. Digital technologies have created new markets and unprecedented business opportunities. In Europe, the key challenge is to ensure that such opportunities are fully captured by industry and service companies, leveraging digitalisation to create growth and new jobs (European Commission, 2017). The development of information and communications technology (ICT), as well as the emergence of companies Uber and Airbnb, have used the advantages of applying this industry in business which has led to a new business model known as sharing economy. As a result of that, we have a division on sharing economy sector and traditional rental sector on the global market. A sharing economy marketplace involves three important factors: the platform, which provides the marketplace, the buyers (also referred to in varying contexts as consumers, riders, or renters), and the sellers (also referred to in varying contexts as suppliers, providers, or hosts). The buyers and sellers are typically individuals or small entities who transact over the platform. A platform provides a discrete set of services to the parties using it, facilitating their efforts to transact effectively and efficiently, including searching for potential transacting partners, agreeing to terms with them, and performing the contract. To facilitate transactions, a platform is designed to provide an online marketplace that buyers and sellers can access by employing various internet-connected digital communications devices (e.g. smart phones, tablets and the like).

PricewaterhouseCoopers (PwC) data show that key sharing economy sectors (peer-to-peer finance, online staffing, P2P accommodation, car sharing and music/video streaming) generated \$15 billion in revenues worldwide in 2013. On the other side, the traditional rental sector (equipment rental, B&B and hostels, book rental, car rental and DVD rental) generated \$240 billion. However, it is estimated that by 2025, the sharing economy sector will generate \$335 billion, which will be identical to the traditional rental sector (McCardle Aoife, 2015). The European Union compared to the USA has a big gap when it comes to investments in the ICT area. This is why the European Commission has decided to invest 335 billion euros in this sector with the aim of raising the level of global competitiveness. This investment is considered to be one of the ways in which it is possible to empower existing companies for the new technological period, as well as to reskill their workforce for the technological industry. Strategic Policy Forum on Digital Entrepreneurship has pointed out the existence of a digital skills gap in their research. As a result of computerisation of key technological advances, 54% of European businesses are at risk of closing down. 77% of the overall number of surveyed companies, consider missing digital skills as the key hurdle to their digital transformation. Furthermore, the data which confirms the big digital skills gap between EU companies is that only 4% of companies have ensured that their training efforts are aligned with their overall digital strategy (Strategic Policy Forum on Digital Entrepreneurship, 2016). As a result of the gap in the area of computer skills knowledge, EU economy will have four big problems:

- The lack of competitiveness of companies and national economies of EU member countries;
- The existing (manual) jobs becoming obsolete, which influences the change in the way certain industries do their business, but also the change in the labour market itself (between 30 and 90 million people, i.e. 10% and 30%);
- The process of digitalisation will create new types of skills which will contribute to the need to reskill and re-employ the redundant workforce;
- The average involvement of women in digital industry is only 15% which is unfortunately not enough and makes the solution of the digital gap problem more difficult.

Reskilling the workforce in different EU industrial sectors is a major priority and challenge. The reason for this kind of EU attitude towards new skills lies in the fact that in that way they can mitigate the economic and social risks that will come from failing to prepare the workforce for the digital future. All trainings which could be held with a view to empowering the workforce for the digital industry, have to be connected with the needs of the industry. Unfortunately, the society is still unaware of the problem they're facing, which is confirmed by the fact that employees in the new global business conditions have to be ready to reskill and shift to other industrial sectors (Strategic Policy Forum on Digital Entrepreneurship, 2016).

THE APPLICATION OF NEW BUSINESS STRATEGIES FOR COMPANIES IN TRANSITION COUNTRIES

Since the beginning of the global financial crisis (2008), which lasts even today in certain segments, companies' strategies have mainly focused on lowering costs and creating suitable business models which would enable them to adapt to new market trends. The largest number of companies has used the models of downsizing, outsourcing and integration, with a view to increasing business efficiency, lowering the costs and surviving on the market, but also achieving competitive advantage on the market. When talking about national economy strategies, depending on their economic, political and raw material potential, they can choose from the following three strategies: globalisation (100%), semi-globalisation (10%) and regionalisation. Globalisation (100%) is the strategy used the most by large economic powers like Japan, China, USA and Russia, which are in that way showing their economic and political power. Harvard Business School professor, Pankaj Ghemawat, is of the opinion that semi-globalisation is the real state of the world where borders still matter (Ghemawat, 2010).

When talking about business strategies of transition countries such as the Republic of Serbia, the Federation of Bosnia and Herzegovina, Montenegro, Croatia and Albania, but also countries from other continents similar in economic power, the regionalisation strategy is a good start of business internationalisation. When talking about Western Balkan countries, the regionalisation strategy can be achieved in three directions: joining the European Union (EU), Eurasian countries and the CEFTA Agreement. According to the data of the Statistical Office of the Republic of Serbia (SORS), the biggest export partners of the Republic of Serbia in 2017 are: the European Union \$707.6 million, MEDA (Economic Association of Mediterranean Countries) \$130.2 million and WBCs (Western Balkan Countries + Moldova = members of the CEFTA agreement) \$ 139.8 million, APEC (Asia-Pacific Economic Cooperation) \$91.3 million (SORS, 2017). On 19 December 2006, Serbia became the member of a unique multilateral Free Trade Agreement in South-East Europe, CEFTA 2006, together with eight other countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Moldova, Montenegro, Romania, Serbia and UNMIK/Kosovo as a customs territory in accordance with the Resolution SB OUN n. 1244). CEFTA Agreement defines general obligations relating to the trade of all goods. The general rule is that quantity limitations, customs duties and other import and export duties will be abolished in the trade between the countries in the region and that new limitations will not be introduced (PKS). For the economy of the Republic of Serbia, but also Western Balkan countries, the imperative should be pooling around products or services and a joint appearance on the EU market, i.e. certain member countries, but also certain countries of the Eurasian alliance, such as Belarus, Russia and Kazakhstan. Individual countries themselves do not have enough economic power and potential to appear on the EU or Eurasian market. The data of the Ministry of Finance of the Republic of Serbia show that the EU was the biggest export partner in 2016 (66.1%) which is an increase (0.4%) compared to the previous year (Ministry of Finance, 2017, p. 28). According to the data of the Ministry of Finance of the Republic of Serbia, on the list of 10 biggest foreign trade partners, as many as 7 countries are from the EU market, while the other partners are the Russian Federation, China and Bosnia and Herzegovina. However, when talking about the EU market, we mostly mean the markets of the neighbouring countries – Italy, Germany, Croatia, Slovenia, Hungary, Romania and Poland. Germany and Poland stand out from the others as foreign trade partners.

The first five divisions of export products are: road vehicles (10.2%), electrical machines, apparatus and devices (8.3%), fruits and vegetables (5.4%), cereals and products based on cereals (4.7%) and power-generating machines and devices (4.5%), with the export value of 4,459.3 million euros (33.1% of total export). Agricultural production is the main contributor to the export growth in the fourth quarter, followed by the production of basic metals and electrical equipment. A third of the basic metals export value, is exported by Hesteel Ironworks, while a half of electrical equipment export value is exported by three companies – Simens, Gorenje and Robert Bosch (Ministry of Finance, 2017). On the list of the first 10 products in exports, the first place belongs to ignition wiring sets for planes, vehicles and ships (USD 52 million); the second to diesel cars up to 1500 cm³ (USD 40 million), on the third place is the refined copper export with the value of USD 24 million, followed by

new tyres for passengers' cars, also with the value of USD 24 million; the next one is the export of hot-rolled products in coils (iron and unalloyed steel) which amounted to USD 17 million, which is the same value for the frozen raspberries export; export of cars, candle burning over 1000 but below 1500 cm³ also amounted to USD 17 million, which is also the export value for parts of seats; the export of fresh apples amounted to USD 16 million and the last place belongs to the export of plastic coated paper and cardboard, worth USD 15 million (SORS, 2017). The data from the Ministry of Finance of the Republic of Serbia for 2016 show that the export value of the 15 biggest exporters in 2016 was 3.9 billion euros. As can be seen in table 1, FCA Srbija is the biggest exporter, while other companies are far behind in the export area. The company FCA Srbija from Kragujevac produces road vehicles of the Fiat 500L brand, but the problem is that the company only assembles car parts. The production is mostly done in other countries which has a negative influence on the companies in the machine industry, automotive industry and other industries that would be interested in participating in the production. Only a small number of domestic companies can compete with the FCA Srbija and that only in the production of certain components, such as cables, seats, electro equipment and the like. This example is to show that to the Republic of Serbia, globalisation does not offer the opportunities of a sophisticated production and that we have to aim our strategies in two different directions – the manufacturing industry and the production of components.

Table 1: The first five biggest exporting companies in the Republic of Serbia in 2016

No.	Name of the exporter	Place	Value (mill. Eur)
1.	FCA Srbija d.o.o.	Kragujevac	1,068.3
2.	Hesteel Serbia Iron & Steel d.o.o. Beograd*	Beograd	368.7
3.	Tigar Tyres	Pirot	315.7
4.	Naftna industrija Srbije	Novi Sad	235.8
5.	Philip Morris Operations	Niš	220.2

Source: *Current Macroeconomic Developments*. (2017). Republic of Serbia, Ministry of Finance, Sector for Macroeconomic and Fiscal Analysis and Projections, p. 25

*from July 2016, the company Železara Srbije operates under the new name of Hesteel Serbia Iron & Steel

When talking about production on the market of the Republic of Serbia, it is necessary to point out the activities in the textile industry sector which had 4% in export structure in the previous year, but where the production is mostly based on contract work. This form of business has its good and bad sides. The good side is that when the company does not have a branded product and a market, there is still an opportunity to work and sustain the company on the market. However, the problem is that the company does not have the opportunity to implement innovations in production processes in these activities and thus loses the technological pace with the competition, as well as the motivation of the employees to improve the production processes. Contract work is usually used in countries where workforce engagement is much cheaper than in the developed economies. The research on ICT usage in companies, conducted by the Statistical Office of the Republic of Serbia in 2016, on a representative sample of 1,673 companies, also touched upon the companies' attitude to provide any kind of training for the employees who are not ICT experts, with a view to developing ICT skills. When talking about the industries where the training of employees who are not ICT experts is most prevalent, the most prominent ones are: the sector of accommodation service and food (45.2%) and the sector of information and communications (40.9%). However, if we want to increase the level of ICT skills in domestic companies, it is necessary that the companies get more involved in this area. From the total number of surveyed companies, only 27.5% of companies take care about providing ICT skills for the employees who are not ICT experts which is not enough and presents an additional problem for the application of new technologies in business operations (Kovačević, Pavlović, & Šutić, 2016).

CONCLUSION

In global business conditions, the boundaries between industries and sectors are diminishing by the day and the traditional way of doing business is becoming inefficient. The application of new technologies is becoming the necessary element of companies' developmental strategies. Owing to the

rapid development of ICT, a new economic model known as sharing economy is emerging, which enables the end users to satisfy their new expectations. Compared to the previous period and the traditional way of doing business, the end users today can satisfy their needs in a much more efficient and financially affordable way. The application of ICT has enabled certain business processes to become faster and more efficient, which contributes to certain occupations becoming obsolete which in turn additionally influences the rise of unemployment. Owing to the digitalisation process new types of skills will be created which will contribute to the need for new skills and re-employment of the redundant workforce. The European Union is trying to lower its digital gap with other economies through encouraging the process of retraining in all industrial sectors. Transition countries in the conditions of new global economic currents, have to turn exclusively to the process of regionalisation as the only model applicable in their economies. In the case of the Republic of Serbia, the regionalisation strategy is aimed at three directions – joining the EU, CEFTA Agreement and cooperation with Eurasian countries. It is important that domestic economy cooperates with complementary economies, since it is the only way it can survive on the market. Furthermore, the process of globalisation itself does not offer the opportunities of sophisticated production to the Republic of Serbia, but directs its strategy to the manufacturing industry and the production of components.

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THE ROLE OF OPERATIONS RESEARCH IN MANAGERIAL DECISION-MAKING

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ABSTRACT

Managers in all organizations should take into account the qualitative aspects of the problem they face, but they should also use the solution of quantitative models as a recommendation in order to make a good decision. The field of Operations Research includes a “buffet breakfast” of analytical methods developed to solve real complex problems and to help make better decisions. Operations Research has been applied in diverse areas, such as: agriculture, aviation, construction, education, electronics, finance, healthcare, manufacturing, military, sports, telecommunications, transportation, etc. Operations Research generates powerful benefits for organizations, such as: increased revenue, increased efficiency, reduced cost, optimized resource use, improved customer service, etc. The aim of the paper is to examine the role of Operations Research in managerial decision-making in renowned organizations around the world. Applications of Operations Research in 30 organizations are presented and the annual savings are given.

Key words: managerial decision-making, operations research, analytical methods, benefits

INTRODUCTION

“I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of Science, whatever the matter may be.”

– Lord Kelvin

In every organization it is the managers who make decisions, and while some of them are operational and short-term, others are strategic and long-term. In order to make a good decision in conditions of increased competition, higher client requirements, time pressures, limited resources and swift changes in technology, it is certainly a daunting task. “Operational Research (O.R.) is the discipline of applying appropriate analytical methods to help those who run organizations make better decisions. It's a 'real world' discipline with a focus on *improving* the complex systems and processes that underpin everybody's daily lives - O.R. is the 'science of better'.” (The Science of Better, 2017). Aside from the traditional term of Operations Research, a synonym used for this discipline is the term Management Science (M.S.). For the roots of the discipline of O.R., see Gass and Assad (2005). In fact, the foundation of the activity of O.R. is connected to the military services in the beginnings of World War II (Hillier and Lieberman, 2010, p. 1). During WWII, it was necessary to effectively allocate the limited resources of various military operations, so teams of scientists who were actually the first O.R. teams did research on how to manage the military operations. At that time, scientific and quantitative techniques developed, and they proved to be quite successful, so after the war ended, numerous companies in managerial decision-making and planning started to apply similar techniques (Render et al., 2012, p. 3).

The usual phases of an operations research study are the following six (Hillier and Lieberman, 2010, p. 8): (1) Define the problem of interest and gather relevant data; (2) Formulate a mathematical model to represent the problem; (3) Develop a computer-based procedure for deriving solutions to the problem from the model; (4) Test the model and refine it as needed; (5) Prepare for the ongoing application of the model as prescribed by management; and (6) Implement. These phases are described in detail in Hillier and Lieberman (2010, pp. 8-19). Regarding O.R. models, methods and their application, see: (Albright and Winston, 2016; Anderson et al., 2009; Anderson et al., 2013; Babic, 2011; Goodwin and Wright, 2014; Hillier and Lieberman, 2010; Hillier et al., 2014; Jensen and Bard, 2003; Powel and Baker, 2013; Rardin, 2016; Ravindran, 2008; Render et al., 2012; Taha, 2016; Taylor, 2016; Williams, 2008).

The developed methods and techniques, as well as the computer revolution, have contributed to the rapid growth of the discipline of O.R. Operations research methods may be applied to solve real complex problems in various areas, such as agriculture, aviation industry, education, environmental and energy issues, finance, healthcare, logistics, marketing, military, mining industry, production management, transport, sport, supply chain management, telecommunications and information technology, etc. (Cvetkoska, 2016, p. 350).

The Institute for Operations Research and the Management Sciences (INFORMS) is “the world’s largest professional association dedicated to and promoting best practices and advances in operations research, management science, and analytics to improve operational processes, decision-making, and outcomes” (INFORMS, 2017). It counts 12.500 members and it publishes 14 journals. The journal *Interfaces* is “dedicated to improving the practical application of OR/MS to decisions and policies in today's organizations and industries” (Interfaces, 2017).

Aside from the Introduction, this paper describes the synergy between operations research, management and decision-making, while special attention is paid to the application of operations research in practice, followed at the end with the conclusion.

SYNERGY BETWEEN OPERATIONS RESEARCH, MANAGEMENT AND DECISION-MAKING

“We are all decision makers first, problem solvers second, and creative thinkers third. We are born with the talent of automatic decision making, close to our instincts, in order to survive. Next we have to solve problems we face during survival. Creative thinking is a talent whose degree of practice distinguishes human beings from all other form of life. ... Decision making, along with creative thinking and problem solving, are three areas with which the unconscious mind is partly active.” (Saaty, 2006, p. 207).

Regardless of whether it concerns a small or a large organization, private or rather state, profit or non-profit, managers are constantly faced with the tasks of solving problems and making decisions. Moreover, making a good decision leads to the success of an organization, while making a wrong decision inevitably leads to failure, or to the worst case scenario - the closing of an organization.

The process of solving a problem covers the following seven steps (Anderson et al., 2009 p. 3): (1) Identify and define the problem; (2) Determine the set of alternative solutions; (3) Determine the criterion/criteria that will be used to evaluate the alternatives; (4) Evaluate the alternatives; (5) Choose an alternative; (6) Implement the selected alternative; and (7) Evaluate the results to determine whether a satisfactory solution has been obtained. Making a decision refers to the first five steps of the process of solving a problem, i.e. starts with identifying and defining the problem, and finishes with the selection of an alternative.

When solving the problems, it is necessary for managers to take into consideration both the quantitative and the qualitative aspects. If the manager has had experience with a problem that is similar to the present one or if the problem is relatively simple, then more emphasis can be put on the qualitative analysis, but if his/her experience with related problems is scarce or the problem is quite

complex, then the emphasis is put on quantitative analysis as a scientific approach to managerial decision-making. A clear statement should be formulated for the identified problem, a model representing a simplified picture of the problem should be constructed, with only the important aspects from reality taken into consideration, followed by data collection, then from a “buffet breakfast” of methods and techniques of O.R. the one adequate for solving the model is chosen, but if there is no such method or technique, then it is developed, and with solving the model it is expected for the best (i.e. most optimal) solution to be found, afterwards tested, the gained results analyzed, and implemented in the organization. In order for the O.R. research to be successfully applied in organizations, it is necessary for the O.R. researcher to collaborate with the management.

O.R. can largely help the managers with the specific challenges they face, such as (The Science of Better, About O. R., 2016): to decide where to invest capital in order to grow, to get more value out of Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and other software systems, to figure out the best way to run a call centre, to locate a warehouse or depot to deliver materials over shorter distances at reduced costs, to forecast sales for a new kind of product that has never been marketed before, to solve complex scheduling problems, to decide when to discount, and how much, to get more cycles out of manufacturing equipment, to optimize a portfolio of investments, to decide how large a budget to devote to Internet vs traditional sales, etc.

By using O.R., organizations can benefit differently: decrease of costs in millions, increase of profit, higher market share, better quality, improved processes, productivity, performances, etc.

OPERATIONS RESEARCH IN PRACTICE

"O.R. influences a whole range of decisions. Ours is a complicated business and O.R. thinking is critical to taking the right decisions. O.R. people often bring a different way of thinking about a problem that you don't see for yourself."

- Roger Blackburn (Head of Strategy and Business Planning, British Airways)

3663 First for Foodservice, Air New Zealand, Amazon, American Airlines, AT&T, Bank Hapoalim Group, Bank One Corporation, BMW, British Airways, British Telecommunications, Canadian Pacific Railway, Citibank, Continental Airlines, Crimestoppers, CSAV, Deere & Company, Dell, DHL, Eastman Kodak, EDS, Federal Aviation Administration, Federal Express, General Motors, Hewlett-Packard, IBM, INDEVAL, Jan de Wit, Kellogg, KeyCorp, Kimberly-Clark, Memorial-Sloan Kettering Cancer Center, Merrill Lynch, MISO, Motorola, NASA, Netherlands Railways, Nokia, Peugeot, Procter & Gamble, PSA Peugeot Citroen, Samsung Electronics, Sasol, Swift & Company, Taco Bell, Time Inc., United Airlines, Waste Management, Workers'-Compensation Board. These organizations, with headquarters in different countries, with different sizes, and belonging to various industries, have one thing in common: they all use O.R. to improve their decision-making.

Table 1 shows 30 organizations that have applied O.R., and their annual savings, as well as the reference for each study. DHL and Hewlett-Packard annually have made a savings of 22 and 180 million dollars, respectively. Merrill Lynch and Samsung Electronics annually have made a revenue higher for 50 and 200 million dollars, respectively. PSA Peugeot Citroen annually has made a profit higher for 130 million dollars, etc.

The application of O.R. in marketing and related management problems is presented in Magee (1954). Datta and Bandyopadhyay (1994) have studied the application of O.R. in solving problems in the industry and industrialization in developed countries. The application of O.R. techniques in financial markets is examined in Board et al. (2003). Semini (2011) examines the applicability of O.R. in manufacturing logistics. A review of O.R. studies applied to healthcare is given in Fakhimi and Probert (2013).

Table 1: Applications of Operations Research

	Organization	Annual Savings	Reference
1.	Air New Zealand	\$6.7 million	Butchers et al. (2001)
2.	AT&T	\$750 million more profit	Brigandi et al. (1994)
3.	Bank Hapoalim Group	\$31 million more revenue	Avriel et al. (2004)
4.	Bank One Corporation	\$75 million more profit	Trench et al. (2003)
5.	Canadian Pacific Railway	\$100 million	Ireland et al. (2004)
6.	Continental Airlines	\$40 million	Yu et al. (2003)
7.	CSAV	\$81 million	Epstein et al. (2012)
8.	Deere & Company	\$1 billion less inventory	Troyer et al. (2005)
9.	DHL	\$22 million	Fischer et al. (2011)
10.	Federal Aviation Administration	\$200 million	Sud et al. (2009)
11.	General Motors	\$90 million	Alden et al. (2006)
12.	Hewlett-Packard	\$180 million	Ward et al. (2010)
13.	INDEVAL	\$150 million	Munoz et al. (2011)
14.	KeyCorp	\$20 million	Kotha et al. (1996)
15.	Memorial-Sloan Kettering Cancer Center	\$459 million	Lee and Zaider (2008)
16.	Merrill Lynch	\$50 million more revenue	Altschuler et al. (2002)
17.	MISO	\$700 million	Carlson et al. (2012)
18.	Netherlands Railways	\$105 million	Kroon et al. (2009)
19.	Norwegian Companies	\$140 million	Romo et al. (2009)
20.	Procter & Gamble	\$200 million	Camm et al. (1997)
21.	PSA Peugeot Citroen	\$130 million more profit	Patchong et al. (2003)
22.	Samsung Electronics	\$200 million more revenue	Leachman et al. (2002)
23.	Sasol	\$23 million	Meyer et al. (2011)
24.	Sears	\$42 million	Weigel and Cao (1999)
25.	Swift & Company	\$12 million	Bixby et al. (2006)
26.	Taco Bell	\$13 million	Hueter and Swart (1998)
27.	Time Inc.	\$3.5 million more profit	Koschat et al. (2003)
28.	United Airlines	\$6 million	Holloran and Bryne (1986)
29.	Waste Management	\$100 million	Sahoo et al. (2005)
30.	Workers'-Compensation Board	\$4 million	Urbanovich et al. (2003)

Source: Hillier and Hillier (2014, p. 13), Hillier and Lieberman (2010, p. 4)

Lonnstedt (1973) has examined the use of O.R. in 12 companies quoted on the Stockholm Stock Exchange. The most common areas of use are identified and they are coordination and production problems. Also, the following O.R. techniques were identified as frequently used: simulation and network planning. The degree to which quantitative methods (methods involving strategic planning, formal decision-making methods and operations research methods) are used in management in Serbian companies is examined in Nikolic et al. (2010). The research was conducted through a questionnaire consisting of 12 questions, and the sample was comprised of 30 respondents (senior managers). Based on the obtained results, the average degree to which quantitative methods are used in management in Serbian companies was determined. It was additionally determined that operations research methods (linear programming, transportation problems, network planning techniques, supply management, etc.) are used more often than methods involving strategic planning (SWOT analysis, portfolio analysis, ABC analysis, etc.) and formal decision methods (ELECTRE, PROMETHEE, AHP, TOPSIS, VIKOR, etc.). Time constraints and lack of knowledge are the main issues in the use of quantitative methods at management levels in Serbian companies. Cvetkoska (2016) gives an analysis of using O.R. in making decisions in micro, small and medium-sized enterprises in Macedonia. The survey was conducted via a questionnaire distributed electronically to 100 managers of micro, 100 managers of small, and 100 managers of medium-sized enterprises. It was completely filled in by 93, 73, and 71 managers of micro, small and medium-sized enterprises, respectively. According to the obtained results it was determined that quantitative operations research models for supporting the decision-making process are used by 10% of managers of the micro, 22% of managers of the small, and 45% of managers of the medium-sized enterprises. The benefits achieved in using quantitative models in decision-making are cost reductions, successful coverage of costs, revenue growth, forecasting of sales, predicting fluctuations in expected income, increased exports, production optimization, determining the optimal inventory level, better planning of activities, more efficient allocation of staff, reduction of customer complaints, and improved customer satisfaction. Most of the respondents believe that students at all levels of studies at the Faculties of Economics should study O.R. models and methods and therefore use the acquired knowledge in organizations.

CONCLUSION

Numerous well-known organizations around the world make million-dollar savings annually because they apply O.R. in their operating. The problem that has been identified is clearly defined, a model is developed, the needed data is collected, and a solution which is developed, tested and analyzed, it is implemented in the organization. The solution from the O.R. model should serve as a recommendation to the managers for making better solutions in the organizations.

Decreasing costs, increasing revenues and profit, improving quality, productivity and performances, increasing market share as well as client satisfaction, are only some of the benefits for organizations that use O.R. Lack of knowledge regarding the benefits of using O.R. in the working of the organizations and its methods and techniques are the largest reason why this discipline is not applied in companies in Macedonia at a satisfactory level. The management in companies should have trainings organized for them, through which they will acquire the needed knowledge and skills for applying O.R. in their work, while at the Faculties of Economics this discipline should be taught at every study cycle in order for the students to be prepared for their application in companies.

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MANAGEMENT OF A NEW VEHICLE SHORT-TERM DEVELOPMENT PROCESS BASED ON RTC TEST BED

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ABSTRACT

This study investigates reduction of time possible to be achieved through management of a new vehicle development based on RTC test bed (Real Time CAN test bed). Controller area network (CAN), as defined in ISO 11898, is the dominant standard for networking on various technical systems especially mobile systems i.e. various vehicle. Significant demand for faster and more problem-free development of new technical systems (which incorporate CAN bus), calls for establishing a new test platforms. The paper deals with the project management by using universal test platform which integrates various hardware and software tools for testing and verification of the new mobile systems with controller area networks. The management approach incorporates universal and intelligent gates to the vehicle's network which reduce the amount of data transmitted out of vehicle and, therefore, enables implementation of existing public mobile operator networks for tunnelling data among various, stabile and mobile platform's nodes.

Key words: Management, development.

INTRODUCTION

The RTC test bed (Real Time CAN test bed) is an experimental platform oriented towards research, development and testing activities related to the various mobile technical systems which use CAN (Controller Area Network) to interchange data between their ECUs (Electronic Control Units) and other subsystems. Here MTS ("Mobile Technical Systems") includes various vehicles including construction machinery, agricultural tractors, railway vehicles etc. The more complex monitoring requirements in professional mobile machines (compared to passenger and commercial vehicles) makes the applicability of RTC test bed to various mobile machines (rather than vehicles only) extremely important.

All vehicles with inherent controller area networks are based on the ISO 11898 standard. The standard was established in 1993 mainly for distributed systems and especially for real-time controllers distributed on large technical systems and based on the Open System Interconnection model. The standard defines physical layer and data link layer, only. In spite of the fact that ISO 11898 doesn't define the third and higher media layers and none of the host layers, it has been widely implemented in the internal combustion engine industry, on-road and off-road vehicle industry, construction machinery, agricultural tractors (AGT) and various agricultural machines industry, railway, avionics industry, etc.

The wide application of the ISO 11898 in various industries is based on several advantages which CAN brings. One of the most important property the ISO 11898 is that the bus is based on differential transmission over twisted pair wire, on physical layer which enables the low cost of installation as well as noise immunity. Other important reasons for the wide use of CAN bus are its error checking capability on each frame (CAN specification includes CRC - Cyclic Redundancy Code), inherent message priority as well as the built-in non-destructive and transparent arbitration capability.

Here-in listed features are the key reasons why ISO 11898 became the base for many other higher level protocols widely used in various industries today.

However, the ISO 11898 defines two under most layers, only. Higher-level protocols important for RTC test bed application on the vehicles are mainly those defined by SAE J1939 and ISO 11783. SAE J1939 is older but extremely important since it is accepted by engine producers, truck and bus industry, special vehicle producers, etc. Compared to other high level protocols based on CAN, this standard has the broadest application. Its network layer is directly supported by CAN data link layer while the application layer gives support to various segments of vehicle industry.

From the test platform point of view the important feature of this protocol is the existence of development, diagnostic and network interconnection controller applications (CA). The last mentioned, i.e. the CA, is established to enable interconnection of subnetworks with the same or different protocols on the same vehicle or/and for interconnecting vehicle's network(s) with other, out of vehicle networks. This allows the RTS test bed to be configured in a systematic and widely applicable way i.e. it suits interests of various professional groups – users of the RTS test bed.

A reasonable level of flexibility to other existing protocols similar to SAE 1939 and at least a minimum upgrade flexibility (so as to be capable to serve future protocols which are likely to come after SAE J1939) are of great importance for the test beds.

Another extremely important feature of the RTS testbed platform is an openness to the users interested in a more global approach i.e. using the data available on vehicle data buses for global data management. A good example of this is management of data which can be provided based on the ISO 11783 standard which defines the global concept of interchanging data from agricultural tractors (AGT) and other machineries with users in the food industry.

Consequently, the test bed needs to become a platform for users interested in data from vehicle buses on both the micro and the macro level.

BACKGROUND

The initial work on establishing the RTS test bed stemmed from several different demands from the past, all of which are linked to development and certification activities on new vehicles or/and new vehicles' subsystems.

The common approach to modern development activities is to initially test new vehicles' subsystems on already existing vehicles with similar specifications.

The management also often asks for the market launch of the new system or vehicle to be speed up. This task calls for a tool for reducing functionality testing and reliability testing of the new systems. Many members of the team that established the RTS had previous experience with similar tasks. Mainly, the tasks were related to the diesel engine management systems i.e. development and tuning activities for engine and other vehicle subsystems' electronic controller units (ECU). In the past the common situation was that each team had to invest significant effort in establishing its own test platform. This led to wasting time and other resources. It was obvious that investing more energy in properly defining a common test platform would give significant benefits to various professional groups. Also, it was evident that, once established, the platform could be permanently upgraded in-line with any future demands.

In terms of the test bed's development background, it's important to note the initial tasks were oriented towards ECUs and their software. Fast communication with the vehicle network was found to be an important feature for the platform and it was determined that this feature would have to enable:

- “real time” traffic monitoring on various vehicle’s busses and
- direct approach to the ECUs.

At the beginning, for all vehicle’s engine ECUs development tasks, it was possible to have an engine with computerized dyno as a platform for essential development takes.

However, this solution was not suitable for the ECUs that control vehicles’ dynamic. This required an extension of the platform to the whole vehicle which had to be tested in real service condition. A remote approach to the vehicle network had to be introduced. As long as the testing was performed in the vicinity of the stable test bed platform wireless communication was adequate. But, long time testing in service condition required the platform to be expended with professional wireless communication or with public networks provided by mobile operators. The latter was the more general and more economical solution for further upgrade.

Finally, the requests for development related to V2V (vehicle to vehicle) communication as well as requests related to interchanging vehicle’s data with management systems in production process, asked for an “off-vehicle” infrastructure for data interchanging on the platform (the stabile part of the RTC test bed).

This part of the platform was developed in several successive steps initiated by various groups. The main tasks which initiated various extensions of the RTC test bed platform’s “off-vehicle” part were:

- monitoring construction machines' operational data to boost productivity,
- tracking vehicles’ and machines' location and fuel consumption to maximise availability and reduce operation costs,
- monitoring machines maintenance and service requirements in order to minimise downtime and increase reliability,
- vehicle to vehicle (V2V) interchanging data and other similar technologies,
- intelligent traffic systems (ITS) and traffic management systems (TMS),
- development tools for interchanging data in-line with ISO 11783 as well as
- defining the optimal production strategies based on data interchanged in-line with ISO 11783.

The RTS test bed was established based on all noted above.

TEST BED CONFIGURATION

The RTC test bed is an open-architecture platform for next generation technology development tasks on various vehicles including:

- passenger cars,
- “commercial vehicles” i.e. trucks and similar vehicles and
- AGTs and construction machineries.

On the lowest level it considers intelligent gates to standard vehicles’ communication busses, particularly to:

- controller area network (CAN),
- local interconnect network (LIN) and
- FlexRate.

The gates are built with 151 slots (per gate) which can be independently programed to send or receive data to/from the vehicle bus. Therefore, each gate can operate independently, based on a previously sent program downloaded in the gate’s non-volatile flash memory. The gates are capable of performing basic as well as higher level functions related to communication with ECUs compatible with SAE J1939, ISO-14230 and other higher level protocols. In addition, the gates can communicate with GPS devices based on the NMEA-0183 protocol.

It is extremely important to recognise that the RTC test bed is flexible to higher levels of various protocols used on various vehicles. This is achieved by using the two instruments. Firstly, the hardware is capable of working based on a few various data link layers. The second instrument is related to various software tools developed as “bridges” between different higher-level protocols. This makes the platform extremely flexible and applicable to all vehicles.

The “bridges” i.e. software tools which establish appropriate communication between various network layers and ISO 11898 data link layer are able to perform various advanced tasks. The problem is related to appropriate evaluation of:

- message priority information,
- data page information,
- protocol data unit’s format,
- specific / group data and
- source address information to CAN identifier (ID).

The same transformation has to be enabled in reversed direction. In spite of additional complexity which “bridges” bring with them, they are essential as they allow the test bed to be implemented in all existing as well as new vehicles. In fact, thanks to the aforementioned concept the RTC test bed platform is applicable to all CAN based systems.

The next extremely important subsystem of the test bed is the router with integrated advanced EDGE/GPRS/GSM modem which provides automatic establishment and maintenance of connection to EDGE/GPRS/GSM 850/900/1800/1900MHz mobile networks.

The modem/router is able to transmit in two time slots and to receive in four EGPRS, class 10, slots with maximum bit rate of 236 kbit/s. Since the maximum bit rate of the ISO 11898 bus is 1 Mbit/s this is more than sufficient. It is true that ISO 11898 bus achieves an approximately 4 times higher bit rate. However the set of information that has to be transmitted (from the vehicle’s bus, through the gates and other communication equipment to the teams which use RTC tested platform) is much less than what exist on the vehicle’s bus. As it was already noted the gates are “intelligent” devices which evaluate information from the vehicle bus and extract and evaluate the same to the values requested from the design and testing teams – the platform users. For example remote monitoring of vehicle engine torque doesn’t mean that all data from vehicle’s CAN has to be transferred through the test bed. Furthermore, it would be difficult to stream all data through the mobile operator’s network. Instead of that, the intelligent gate can be programmed to follow CAN traffic and to pull out from the data packet only the byte which has priority level 3, PGN equal to 0x00F004 transmitted from node with address 0. Since all parameters are as per SAE J1939 protocol the “bridge” tool will transfer all of them to ISO 11898’s identifier 0x00DE0400. This will enable the gate to follow the packets that start with the noted identifier and pull out only the second byte from the broadcasted data set. Bearing in mind that the whole packet has 29bits identifiers, several control bits and a minimum of 64 data bits, this reduction of data transfer through the mobile operator network is less than one tenth of the data broadcasted on vehicle’s CAN, or ten times less than 1Mbit/s. This is still at least two times less than what is the bit rate of the mobile modem/router (236 kbit/s).

For tasks related to global management of data, provided from the vehicle’s bus, the platform uses the same infrastructure as mentioned above. In addition, communication through internet is enabled. In this case broadband connection with other global management systems which are also based on vehicle data (GMboMD) node is preferable. The platform gives support to management based on data acquired by using Internet Information Services (IIS). The IIS is used to allow clear graphical, real time data monitoring (RTD), real time alarm status (RTAS), XML file transfer as per ISO 11783, remote administration of test bed (RAT) and automatic reporting (AR).

METRICS OF BENEFITS ACHIEVED WITH NEW PROJECT MANAGEMENT APPROACH BASED ON RTC TEST BED

Qualitative analyses have been focused on several main benefits which RTC test bed enables. The most important of these are:

- Real time monitoring of data on mobile technical system without streaming vast data sets. This is enabled by two components: EDGE modem/router and intelligent, programmable gates which dramatically reduce the size of transferred data without any information losses.
- Establishing and monitoring direct “mobile system to mobile system” (M2M) i.e. vehicle to vehicle communication through RTC test bed. Since each mobile system has one or several nodes (from the mobile operator’s network point of view) and since the communication with all of them is established via GRT tunnelling, all of them can establish vehicles to vehicle (V2V) communication.
- Providing support to various on road/off-road vehicle testing by using mobile operators communication platforms and tunnelling through their network. This is an extremely useful tool for various project groups who are able to use the already established infrastructure i.e. start their projects without investing their resources in establishing specific, dedicated test platforms. This dramatically reduces the number of staff involved in new projects. As a side effect, the RTC test bed has been significantly improved thanks to inputs given from various groups – users of the RTC platform.
- Easier project monitoring progress enabled for management teams: this is achieved through integration of IIS tools and intelligent gates and data transfer through publicly available mobile providers’ infrastructure.
- Supporting groups dealing in global management of available vehicles’ data for other industries. For example a project which integrates data from agricultural machinery in foot processing industry in-line with ISO BUS i.e. ISO 11783 standard.
- Similar to support provided to the agricultural and food processing industry: supporting traffic monitoring and traffic control oriented projects. This is based on platform’s capability to use mobile networks to take data from the vehicles, evaluate it and to transfer the evaluated data to the already established systems for traffic control.

Quantitative measurement of the benefits provided by the RTC test bed was conducted based on data from previous projects, done without support from the new platform and data acquired from various teams which used the new platform for their projects.

In the projects oriented towards monitoring data from vehicles in on-road/off-road service a significant time reduction was found. The time to the beginning of mobile system i.e. the vehicle monitoring was reduced by 15 to 55%. This is due to the fact that an already established RTC test bed enables “ready-made” the whole “off vehicle” infrastructure for various projects. In various projects, data could be provided after responsible extensions of the already existing hardware and software, only.

Three examples are taken into consideration for quantification of time saving. The first one is a project in which the development team had to investigate the effect of changes in engine control unit’s software on vehicle dynamics in real service. Based on frequent requests which come from benchmarking, the vehicle producers have close to permanent testing of their vehicles with new software in the field. Previously, without the RTC test bed the usual practice was to instrument a new vehicle every time. The data loggers had been used for data acquiring and logging during the test and the data had been taken at the end of every day for evaluation. Using intelligent gates to vehicle networks and mobile operators’ network infrastructure enabled close to real time data acquiring and evaluation which in turn allowed for important phenomena to be recognized immediately. Consequently, it was possible to conduct the test over a short time, to upgrade and corrected ECU software as soon as the new version of the same was ready and, immediately after this to repeat a tests. It should be noted that ECU software could be changed remotely i.e. by using tunnels through mobile networks. When compared to the same tests performed without the RTC test bed, tests performed with the platform took up to 55% less time.

Table 1: Time saving with management based on RTC test bed in various projects.

Project type	Time needed without RTC test bed Based on previous experience	Time needed with RTC test bed	Visualisation of time needed with RTC test bed	Time saving with the RTC test bed
Typical projects related to the vehicle's CAN software testing in real service. Project type 1: Project type 2: Project type 3:	~40 h ~120 h ~150 h	~20 h ~ 55 h ~ 68 h		~55%
Typical projects related to the new system certification. Project type 1: Project type 2:	~7000 h ~10000 h	~6000 h ~8500 h		~15%
Typical project related to the integration of vehicle data from agricultural machinery in foot processing industry.	~ 720 h	~470 h		~35%

The second example in which total project time reduction was measured is related to vehicle certification task. Worldwide regulations require the authorities to be able to follow vehicles in regular application, so they could verify deterioration of vehicles' total exhaust emission. This has to be done within extremely long time in the range of 5,000 h. The RTC test bed allowed authorities to follow the vehicle without being permanently present i.e. from their location. This dramatically reduced expenses and to a certain degree, the time needed for certification. Comparison of the time previously needed, to the time needed with the new platform, shows a reduction of 15%.

Finally, the third type of the project is related to the integration of vehicle data from agricultural machinery in foot processing industry where the time reduction was found to be ~35%. This is mainly related to IIS tools used together with intelligent gates and real time data enabled from AG machines in the field. Previously, the transfer of data related to quantity of fertilizers used, pesticide used, etc. was done off-line i.e. based on rough data collected and evaluated manually by the in-field staff. After that, data had to be sent to the food factory. In addition, the dedicated teams in food plants needed significant time to evaluate the received data for their own purposes. The more strict regulations for food industry products make using data from the fields to check many relevant aspects before placing the product on the market, unavoidable. Consequently, a reduction of time for relevant activities is of particular interest.

CONCLUSION

The paper presents global concepts and experiences of new product (vehicle) development management based on RTC test bed developed with.

The approach is based on:

- specially developed, intelligent CAN gates,
- advanced software routines integrated in intelligent gates which enable real time data for reliable short-term management decisions,
- equipment for “tunnelling” data crucial for management decisions through public mobile networks and
- the stable part of the RTC test bed which uses IIS tools to distribute raw or evaluated data to various platform users including the project management team.

The benefits of using the test platform are measured in qualitative and quantitative manners by comparing how the same tasks are performed with and without the RTC test bed. A dramatic reduction in the time needed to perform various tasks when using the new platform was found. Compared with previous experience with the same tasks in question, this reduction ranges between 15% and 55%.

Significant qualitative improvements were also found to be enabled by the test bed. Enabling direct interchanging of data among mobile systems through the platform is particularly important for management decisions. Another significant improvement enabled by the RTC is its support to professional groups from non-vehicle industries who engage in global data management for managing the projects for other industries.

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SAFETY CULTURE OBSERVED FROM THE STANDPOINT OF CONTEMPORARY SCIENCE AND PREVIOUS EXPERIENCE

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ABSTRACT

As a common set of contemporary knowledge and skills in the fields of both civil and military safety, safety culture should be viewed as a tool that simplifies everyday security and safety activities. As ambiguous word, safety culture has the capacity to have different meanings, primarily related to the scientific, economy or military area of usage. Other factor that triggers multidisciplinary nature of safety culture is the multidisciplinary nature of the hazards observed in the fields of national security, emergency situations management, occupational safety, environmental and fire protection issues, and economy. Also, as an indispensable fact there is a human dimension of safety culture, reflecting high level of operator commitment to the topic subjected to protection and the sense of personal responsibility for the actions undertaken. In this sense, the aim of the paperwork is to describe the different approaches, interpretations and definitions of safety culture in a way that considers both the previous experience and contemporary scientific findings.

Key words: safety culture, management, approaches

INTRODUCTION

According to Occupational Safety and Health Administration, “Safety cultures consist of shared beliefs, practices, and attitudes that exist at an establishment. Culture is the atmosphere created by those beliefs, attitudes, etc., which shape our behavior.” (OSHA, 2017).

Both safety and security activity that expresses the readiness of operation and behavior in accordance with the acquired safety knowledge and skills, as well as in accordance with the accepted value judgments is a feature of safety culture (Stanarević, 2009).

According to (Stajić 2005, 2011) there is a set of safety culture factors:

- adopted attitudes,
- knowledge,
- skills and
- regulations in the field of security.

On the other hand, there are studies that precisely analyze the elements of safety culture, as shown on figure 1.

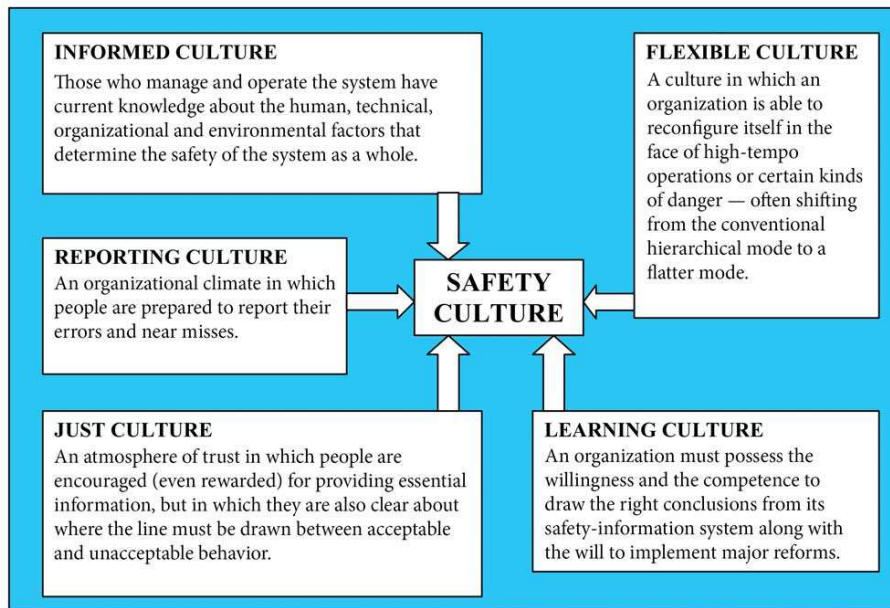


Figure 1: Elements of safety culture (Reason, 1997)

As shown on figure 1., author has suggested that safety culture consists of five elements:

- An informed culture
- A reporting culture
- A learning culture
- A just culture
- A flexible culture

In this sense, an informed culture represents the state when the organization collects and analyses relevant data, and actively disseminates safety information, while the reporting culture means cultivating an atmosphere where people have confidence to report safety concerns without fear of blame. Employees must know that confidentiality will be maintained and that the information they submit will be acted upon, otherwise they will decide that there is no benefit in their reporting. Furthermore, learning culture means that an organization is able to learn from its mistakes and make changes. It will also ensure that people understand the safety management processes at a personal level. In a just culture element errors and unsafe acts will not be punished if the error was unintentional. However, those who act recklessly or take deliberate and unjustifiable risks will still be subject to disciplinary action. A flexible culture is one where the organization and the people in it are capable of adapting effectively to changing demands (Reason, 1997).

Having abovementioned facts in mind, safety culture factors could be manifested as behavior and process of necessary ways and means of personal, social and international values from all sources, sources and nature of hazards, regardless of the place or the time of their appearance. The same authors further potentiate the nature of the safety culture as a process where it is important to work in order to preserve the current state of safety (it sees as its primary goal, taking into account conformity actors) or to create an improved safety sheet (secondary objective in this interpretation). The nature of the process could be explicitly defined by next sentence: “a safety culture is something that is striven for but rarely attained...The process is more important than the product.” (Reason, 1997).

SAFETY CULTURE OBSERVES FROM DIFFERENT STANDPOINTS

Environmental safety

By observing the Millennium project goals it is possible to find a link to definition that represents the environment safety as a continuous sustainability of environmental elements that are essential to sustain life, in terms of:

- prevention or reduction of the impact of military operations on the environment,
- prevention of international conflicts arising from the law on the environment,
- environmental protection as a moral obligation (Millennium project, 1996).

Environmental safety could be interpreted in two ways (Nikolić, 2010). On the one hand the safety of living environment means possible level of danger that comes from the various events in the environment on people and their material goods while at the other side is the level of danger to the environment originating primarily from the regular impact of conflicts between different nations that are triggered by economic activities (Zurlini, 2008; Lietzmann, 1999).

Water safety

Safety of the water resources in the broad sense is defined as acceptable access to the proper amount of both water quality and quantity necessary for the regular functioning of the economy, health needs, satisfying the needs of households but also the needs of aquatic and terrestrial ecosystem. This definition is quite different from definition that was used during the last decades of the twentieth century when term water safety considers only the possibility of a certain nation to enable continued access to drinking water for their population. As well as energy, providing the drinking water is one of the many challenges of modern society, in view of the global population growth rate which is continuously increasing and thus increasing the need for adequate water supply sources, both in quality and quantity. This challenge includes broader (often negative) effects of climate change, urbanization pollution effects to surface and ground water as well as over-exploitation of drinking water resources. In terms of water and environmental safety, a guaranteed minimum flows (ecological minimum) of surface water body is certainly an aspect that should not be ignored (Gray, 2007).

Food safety

Food safety is defined as a measure of securing permanent access to essential foods representing the nutrition basis of a particular society. In a broader sense, food safety is a households opportunity (at the individual level) or the ability of the state (at national level) to ensure its own existence, in terms of immediate access to food or food acceptability and the price that is acceptable. Food safety is also a measure of resistance to possible disruptions in the supply chain, whether these disorders are caused by natural factors such as droughts, floods, fires, etc. or anthropogenic factors as the inter-state conflicts, etc. It is notable that, in the broad sense, food safety partly overlaps with the concept of water safety (FAO, 2006).

Energy security (safety overlapped aspects)

Energy security is a condition that links the security at the national level and the availability of energy resources that must meet the energy needs at the national level (Alhajji, 2007). In relation to the living environment, energy security represents the level of protection of the energy infrastructure from various influences derived from the environment (such as landslides or floods for example) while the safety of the environment in relation to the energy infrastructure represents the level of protection of the environment from various impacts derived from energy infrastructure (either throughout regular work or in emergency situations - characteristic for IPPC/IED and Seveso operators). Given that energy security implies independence or lesser dependence on energy imports, promoting the concept of energy security includes the promotion of renewable energy sources and more efficient use of those resources that already exist which represents the trend of energy-economic models (Kruyt, 2009). Energy security also means continuity in the production and distribution of energy, so the reliance on non-renewable energy sources reduces the level of energy security at the national level. In terms of price, access to relatively cheap energy

is a pillar of economic development, so that a high level of energy security also means low prices, but the absence of price fluctuations. Many countries implements intensive programs in order to promote renewable energy sources and polygeneration systems, primarily in order to reduce dependence on energy imports but also for energy price that will have continuity (Bollen, 2008).

CONCLUSION

The concept of safety and safety culture in the narrow sense represents the degree of protection in terms of preserving the nation, people, or individual persons from certain hazards (both natural and anthropogenic), unwanted damage or malicious crime. Within the concept of safety it is still necessary to consider the interconnectedness with similar concepts such as security, continuity and reliability. The key difference between the concepts of safety and security lies in the fact that when studying the concept of security you must take into account (beside others) the actions of people who deliberately try to provoke the destruction of certain goods. Also, a variety of purposes, and a different context in which the term safety culture is interpreted greatly influence on the conception of the concept of safety culture. In this sense, the information security is entirely different concept compared national security, as is the case with the energy and environmental safety, i.e. safety of the living environment.

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INTEGRATED MCDM APPROACH BASED ON AHP AND PROMETHEE METHODS FOR TOOL SELECTION

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519.816

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ABSTRACT

In the paper, an integrated MCDM approach to making decisions when selecting a tool for monitoring the temperature and humidity of the air in workrooms based on the integration of the AHP and PROMETHEE methods is presented. The AHP method is used in determining the relative weights of criteria, which are then used in the process of the ranking of the considered alternatives by the PROMETHEE method. The goal of the paper is to point to the applicability and efficiency of the proposed model in real conditions, as well as the possibilities of increasing rationality in decision making through a more efficient evaluation of the used criteria and a more objective assessment of the alternatives.

Key words: AHP, PROMETHEE, multi-criteria decision making, tool selection.

INTRODUCTION

In the paper, the optimal model for selecting an adequate tool for monitoring the temperature and humidity of the air in workrooms is developed. As the selection of an adequate tool for monitoring the temperature and humidity of the air in workrooms requires taking into consideration a larger number of qualitative and quantitative factors, and simultaneously such decisions are mainly made by using imprecise and unclear information, it is necessary that MCDM (Multi-Criteria Decision Making) methods should be applied when making a selection.

The specificities and uncertainties of the conditions in which decisions are made limit the applicability of particular MCDM methods in certain conditions, which brings into question the rationality of the decisions made, for which reason numerous authors consider that in order to do a correct and efficient evaluation of the considered alternatives it is necessary that contemporary decision-making models based on the integration of several MCDM methods should be applied in the process of tool selection and similar problem solving in manufacturing. In their study (Nguyen et al., 2015) successfully integrate the fuzzy AHP and the fuzzy COPRAS (Complex Proportional Assessment) for a multi-criteria assessment of alternatives when selecting the most suitable machine equipment, whereas (Dagdeviren et al., 2008) propose using a hybrid approach based on the AHP and PROMETHEE methodologies for solving the same problem. In order to overcome the problem of uncertainty when making a decision on the tool selection, the authors (Samvedia et al., 2012) develop an integrative model of the fuzzy AHP and GRA (Grey Relational Analysis) methods, whereas (Nguyen et al., 2016)

use the MCDM model created through the integration of the fuzzy AHP and the fuzzy ARAS (Additive Ratio Assessment) methods for that purpose. On the other hand, (Taha, 2011) proposed a DSS based on a combination of the AHP and the ANN (Artificial Neural Network) as a powerful tool for the assessment of alternatives when selecting machines to form the structure of a flexible manufacturing cell. When selecting a material, (Lashgari et al., 2012) use a combination of the fuzzy AHP, the fuzzy ANP and fuzzy TOPSIS.

In the paper, the application of an integrated model created by combining the AHP and PROMETHEE methods, where the AHP method is used in the defining and evaluation of criteria for alternative assessment and the PROMETHEE method for the final ranking of the alternatives assessed according to those criteria, is proposed as the optimal solution when selecting a tool for monitoring the temperature and humidity of the air. Although simple to use and reliable, the PROMETHEE method faces difficulties in defining the relative significance of criteria. In the literature, the application of this method in different fields has been developed (Radojičić et al., 2013; Vesić Vasović et al., 2011; Vesić Vasović et al., 2015; Osati et al., 2016; Sedat et al., 2015).

Although it does not exclude subjectivism in decision making, the AHP method can handle the uncertainties and imprecisions of the data which are available to the decision maker when defining and evaluating criteria. The AHP method is suitable due to its ability to break down a complex problem into simpler components. This method has been broadly applied in practice when solving different problems in industrial manufacturing (Dweiri, et al., 2016; Pal et al., 2016; Farhan et al., 2016; Lima Junior et al., 2014). The proposed model represents an optimal solution to decision making in the conditions of uncertainty given the fact that it excludes the subjectivism on the decision maker's part, increases the rationality of the decisions made and can be applicable in different conditions.

INTEGRATION OF THE AHP AND PROMETHEE METHODS FOR THE EVALUATION OF TOOL ALTERNATIVES

The proposed MCDM model based on the integration of the AHP and PROMETHEE methods is illustrated on the example of the evaluation of an alternative when selecting a tool for monitoring the temperature and humidity of the air in the workrooms at an industrial enterprise. The selection was performed between the six alternatives assessed in the system of eight criteria conflicting with one another. As such a decision is made in the conditions of uncertainties and upon imprecise information, a correct evaluation of the considered alternatives requires the application of an integrated MCDM approach. For that purpose, a combination of the AHP and PROMETHEE methods is used in the paper. The AHP method is used when evaluating the criteria used for the assessment of alternatives; the obtained weight coefficients of the criteria are then used in the process of the evaluation of the alternatives by the PROMETHEE method.

The criteria on the basis of which the assessment of the considered alternatives has been done are: K1 – Price, K2 – Temperature Range, K3 – Air Humidity Range, K4 – Air Humidity Measurement Accuracy, K5 – Guarantee Terms, K6 – Servicing Possibilities, K7 – Advanced Options, K8 – Warning Options. The hierarchical structure of the problem developed by the AHP methodology is shown in Figure 1.

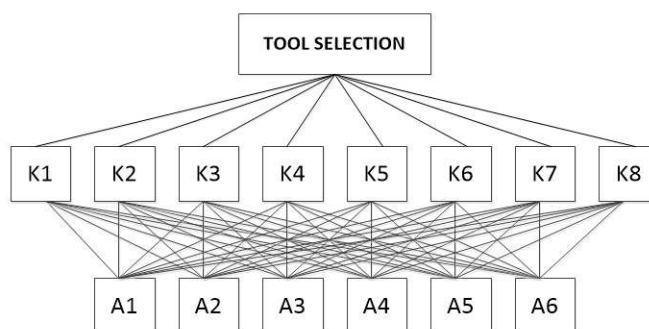


Figure 1: The hierarchy of the decision-making problem

Which criterion will to which extent have an influence on the selection of a tool depends on the subjective assessment made by the decision maker and the real situation in which the decision is being made. That means that any of the criteria can become key in the selection, depending on the situation, and that, also, depending on the criterion used, each one of the alternatives can dominate over the others. In order to do a correct and rational evaluation of the alternatives, it is first of all necessary that an assessment of the relative significance of each individual criterion should be made. The evaluation of the criteria is performed on the basis of Saaty’s Nine-Point Scale. The criteria assessment matrix is given in Table 1. As software support in solving this problem, the Expert Choice, based on the concepts of the AHP methodology and broadly applied in solving semi-structured and unstructured decision-making problems, is used.

Table 1: Matrix for criteria evaluation

	K1	K2	K3	K4	K5	K6	K7	K8
K1		3	3	5	2	6	7	7
K2			1	2	(4)	4	5	5
K3				2	(4)	4	5	5
K4					(5)	5	3	3
K5						3	5	5
K6							2	2
K7								1
K8								

After translating the assessment matrix into the criteria priority scale by normalizing the weight vectors of each individual criterion, the rank of the criteria (Figure 2) according to the priorities of the decision maker in the considered situation and their relative significance are obtained. The results obtained indicate that the “Price” criterion, with its weight coefficient of 0.309, dominates over the other criteria, and according to their importance, the following criteria follow it: “Guarantee Terms” (0.26), “Temperature Range” and “Air Humidity Range” (0.122), “Air Humidity Measurement Accuracy” (0.083), “Servicing Possibilities” (0.44), “Advanced Options” and “Warning Options” (0.3). This has solved the problem of the conflicting criteria and imprecise information for their defining and assessment, and the results obtained have served in a further process of the evaluation of the alternatives by the PROMETHEE method. Figure 2 also shows that the consistency degree $CR=0.06 < 0.1$, which accounts for the fact that the values of the criteria are acceptable.

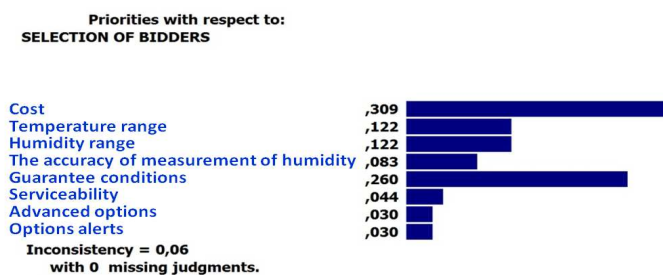


Figure 2: Criteria weight specified using AHP methods

The procedure of the ranking of the considered alternatives according to the PROMETHEE methodology starts with the modelling of the problem, or more correctly with the defining of the decision-making multi-criteria base. The six potential alternatives have been identified, the criteria for their assessment and their relative weights having been established at the previous step by the AHP method.

The determination of the final rank of the alternatives also requires the defining of the type of preferential functions that can best express the specificity of the criterion applied. For each criterion, requirements for maximizing/minimizing, as well as the preference speed parameters, have also been

defined. The decision-making multi-criteria base is shown in Table 2. The assessment of the potential alternatives according to the established criteria is presented in Figure 3.

Table 2: A multicriteria database

	K1	K2	K3	K4	K5	K6	K7	K8
Request	min	max	max	min	max	max	max	max
w _i	0,309	0,122	0,122	0,083	0,26	0,044	0,03	0,03
Type	V-shape	Linear	U-shape	Usual	V-shape	Usual	Usual	Usual
n	1500	10	-	-	10	-	-	-
m	-	20	9	-	-	-	-	-

Unit	Cost	Temperature...	Humidity rang	The accurac...	Guarantee c...	Serviceability	Advanced o...	Options alerts
unit	unit	unit	unit	unit	unit	unit	unit	unit
Cluster/Group	◆	◆	◆	◆	◆	◆	◆	◆
Preferences								
Statistics								
Minimum	1830,00	50,00	70,00	4,00	12,00	0,00	0,00	0,00
Maximum	5300,00	70,00	89,00	5,00	36,00	1,00	1,00	1,00
Average	3205,00	61,67	82,83	4,50	18,00	0,67	0,83	0,83
Standard Dev.	1151,58	8,98	7,01	0,50	9,17	0,47	0,37	0,37
Evaluations								
A1	5300,00	70,00	89,00	4,00	12,00	1,00	1,00	1,00
A2	3800,00	70,00	89,00	4,00	12,00	1,00	1,00	1,00
A3	2900,00	70,00	89,00	4,00	12,00	1,00	1,00	1,00
A4	1830,00	60,00	70,00	5,00	24,00	1,00	1,00	1,00
A5	3300,00	50,00	80,00	5,00	12,00	0,00	1,00	1,00
A6	2100,00	50,00	80,00	5,00	36,00	0,00	0,00	0,00

Figure 3: A multicriteria database

The further procedure of the ranking of the considered alternatives according to the PROMETHEE methodology has been conducted with the help of the VisualPROMETHEE software support. The values of the entering, leaving and net flows for each individual alternative on the basis of which the partial and complete ranking of an alternative is performed are presented in Figure 4.

Rank	action	Phi	Phi+	Phi-
1	A4	0,3781	0,4784	0,1003
2	A6	0,2392	0,4674	0,2282
3	A3	0,0609	0,2425	0,1816
4	A2	-0,0974	0,1888	0,2861
5	A1	-0,2875	0,1268	0,4142
6	A5	-0,2934	0,0947	0,3880

Figure 4: Tabulation of ranked alternatives applying the PROMETHEE method

The final rank of the compared alternatives, defined on the basis of the values of the clean flow, is shown in Figure 5. The results obtained are indicative of the fact that Alternative A4 is singled out as the alternative that to the greatest extent meets the set of the defined criteria, and is followed by the alternatives A6, A3, A2 and, as the lowest ranked, alternatives A1 and A5, whose value of the clean flow is approximate.

A question is posed regarding the rationality of the determined rank of the alternatives, on the basis of which the ultimate decision on the selection is conceived. VisualPROMETHEE offers a series of options for an analysis of the sensitivity of the results in function of change in the weight of the criteria. The GAIA plane is a graphic presentation of the alternatives and their contribution to the criteria, which can also indicate the sensitivity of the results in function of change in the weight of the criteria. In Figures 6 and 7, the analyses of Alternatives A4 and A6 on the basis of the GAIA network are shown and the same are indicative of the suitability of certain alternatives against the criterion used.

The decision maker is incapable of defining and assessing the importance of the criteria on his own and without subjectivism and the PROMETHEE method does not provide a more significant support in this part of the evaluation of the considered alternatives, particularly in situations when the information available to the decision maker are imprecise and decision making is performed in the conditions of uncertainty. The AHP methodology can ensure a correct and reliable evaluation of alternative assessment criteria. In the presented example, the evaluation of the considered alternatives when selecting a tool for measuring the temperature and humidity of the air in workrooms was done in a consistent manner. The further ranking procedure by the PROMETHEE methodology generated the rank of the alternatives that is adopted as a reliable and rational solution to the considered problem.

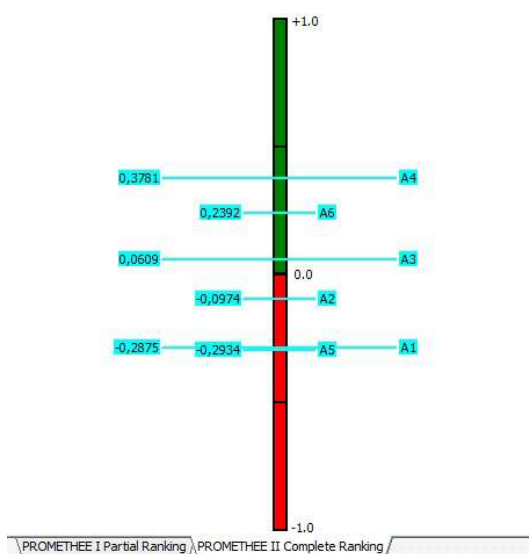


Figure 5: The range of the position of the compared alternatives

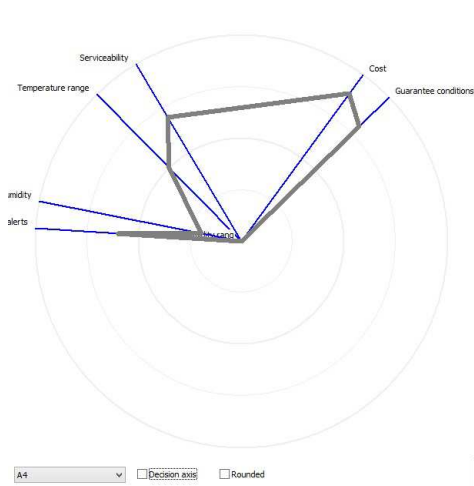


Figure 6: Analysis of alternative P4 based on GAIA Network

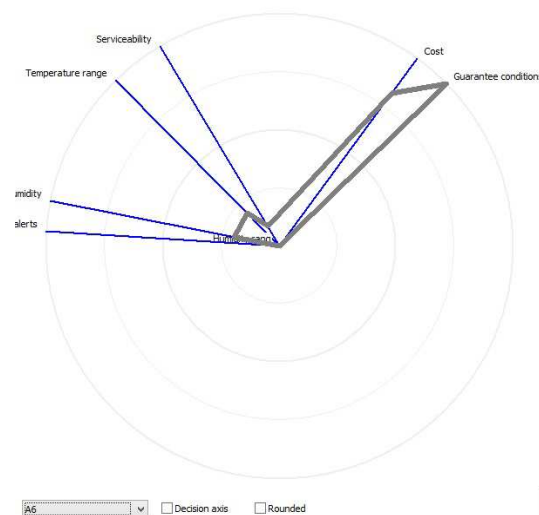


Figure 7: Analysis of alternative P4 based on GAIA Network

CONCLUSION

In the paper, an MCDM approach based on the integration of the AHP and PROMETHEE methods is presented as the optimal solution when selecting a tool. The application of the proposed model is illustrated on the example of the selection of a tool for monitoring the temperature and humidity of the air in the workrooms for the needs of a business entity. The selection was performed between the six proposed alternatives, assessed in the system of eight criteria, with the help of the Expert Choice and

VisualPROMETHEE software packages. In order to reduce subjectivism in decision making, do a more efficient evaluation of the criteria used and increase rationality in decision making, the AHP method was used for the evaluation of the criteria, and the results obtained by applying this method were subsequently implemented into the process of ranking the alternatives by applying the PROMETHEE method.

By evaluating the criteria with the help of the AHP method, the results were obtained, according to which results the “Price” and the “Guarantee Term” Criteria have the highest relative weights against the others, and by taking into consideration those weights in ranking the alternatives by the PROMETHEE method, we obtain the rank of the alternatives according to which Alternative A4 is dominant over the others and followed by the alternatives A6, A3, A2, A1 and A5. By prioritizing some other criteria, the rank of the alternatives changes, which is indicative of the correct and efficient evaluations of the criteria used, which can be achieved by applying the proposed model.

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USE OF MULTI-CRITERIA DECISION MAKING METHODS IN FUNCTION OF QUALITY IMPROVEMENT

UDC: 005.6

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ABSTRACT

In this paper, the effects of the application of MCDM methods in function of achieving the excellence of the decision making process and the improvement of the quality of the overall business operations on the example of selecting a machine equipment that will be installed in a new manufacturing plant of “Kartonpak” d.o.o. (limited liability) Enterprise are discussed. The multi-criteria assessment of the considered alternatives was made by applying the PROMETHEE method, thus obtaining an objective picture of the total suitability of an alternative with respect to the global goal according to a larger number of criteria. By implementing decisions made in this manner, subjectivism in decision making is reduced and the rationality of the decisions so made is increased, which leads to the improvement of the performances of processes, products and services, thus supporting the effects of quality management.

Keywords: quality management, multi-criteria decision making, PROMETHEE method.

INTRODUCTION

The intensifying of global processes, the strengthening of competition and buyers' ever-increasing expectations with respect to the quality of products and services have dramatically changed the business environment. Pursuant to that, companies can no longer rely on the so-far practice in business doing (Zakuan et al., 2009). In order to survive, they must adopt new concepts of business doing, based on quality management (Ebrahimi et al., 2013; Hietschold et al., 2014) as the key success factor. As an integrated philosophy, QM (Quality Management) is directed towards the continuous improvement of the performances of processes, products and services in order to achieve and exceed the goals set (Prajogo et al., 2005).

Numerous practical and theoretical studies are dedicated to the identification of the key areas of business doing, whose improvement through the implementation of quality management concepts can significantly improve companies' performances. The study (Izverciana et al., 2014) researches into the influence of the quality improvement in the domain of human resources management on an organization's performances, whereas in the paper (Abdollahi et al. 2014, Chong et al., 2004) the effects of the introduction of QM concepts in the creation of an enterprise's marketing orientation on organizational performances are determined. In their study, (Yazdani, et al., 2016; Hung et al. 2011) highlight the fact that, by adopting TQM (Total Quality Management) concepts through the introduction of organizational learning, innovative performances of high-technology companies are significantly developed. The authors (Zhong et al., 2016; Vanichchinchai et al., 2011) point out that the development of an efficient supply chain through the establishment of the management of the

quality of each individual link in the chain as an integrated system must be the strategic priority of an enterprise must.

These studies research the connection between QM and organizational performances in different contexts; however, the effects of the quality management of certain aspects of business operations on organizational performances are still incomplete. As certain authors consider business decision making as the essence of management given the fact that it is immanent to each single function of management (Čupić, 1997), a question is posed how can the improvement of the quality of managers' decision making have an influence on organizational performances and contribute to the establishment of sustainable development in a complex and changeable environment? The attitude expressed by numerous authors (Vesić Vasović et al., 2015; Akdere, 2011) is clear – if managers want to ensure their enterprises' survival and prosperity, they must aspire towards the improvement of the quality and excellence of the decision making processes. So, decision making imposes itself as a framework for quality management and an important factor that is necessary to be considered in the process of the implementation of QM concepts in business operations. Authors (Parnell et al., 2013) emphasize the fact that in order for more quality decisions to be made and for them to be implemented faster and more comprehensively, the use of sound and reliable pieces of information, the creation of feasible alternatives, the defining of appropriate frameworks, clear values and compromises, logically correct reasoning and dedication to decision making are of key importance. The decision making quality is defined as the level of the compliance of the decision made with the strategy, competitive conditions, available resources and technological possibilities (Kester et al., 2011) or as a degree to which decisions have been made in a transparent, stable and understandable manner. (Kock et al., 2016).

According to (Rausch, 2007), the quality of decisions depends on thoroughness in which the highest-quality decision outcome is likely to be the one that considers all issues deserving thought with respect to the situation. As quality decision making implies the selection of the best possible solution in compliance with the defined requirements expressed by qualitative and quantitative criteria, in the conditions of limited rationality, uncertainties and risks typical to contemporary conditions of business doing, it is indicative of the fact that the establishment of a quality decision making process is only possible by applying the complex processes and methods that would consider a problem from all relevant aspects. The answer to the challenges of the improvement of the quality of decision making lies in a multi-criteria approach to problem solving in business doing. By applying the MCDM method, an objective comparison of a larger number of alternatives assessed in the system of a larger number of different heterogeneous criteria is enabled. (Vesić Vasović et al., 2015) Criteria may appear in different units and can frequently be of different significance with different maximization or minimization requirements (Radojičić et al., 2013; Vesić Vasović et al., 2011).

APPLICATION OF THE PROMETHEE METHOD IN MACHINE EQUIPMENT SELECTION IN FUNCTION OF QUALITY IMPROVEMENT

The machine equipment selection process is the key question for the companies that aspire towards the improvement of quality given the fact that an inappropriate selection causes many problems that have a negative influence on the company's productivity, flexibility and manufacturing capabilities. In order to solve this complex and long-lasting process, the authors of numerous studies recommend the application of a larger number of the methods from within the group of MCDM methods; some authors consider that in order to perform a correct and efficient evaluation of the considered alternatives in the machine equipment selection process and in solving similar industrial problems it is necessary that contemporary models of decision making based on the integration of several MCDM methods should be applied. In the paper (Samanlioglu et al., 2016), the ANP and PROMETHEE II with fuzzy logic are integrated so as to present a performance analysis of the machine tool selection problem. The authors (Wu et al., 2016) recommend the application of the group of MCDM methods based on the fuzzy VIKOR (Multi-criteria Optimization Compromise Solution) methods for this problem area. In their paper, (Nguyen et al., 2014) present a hybrid approach based on the fuzzy ANP and COPRAS (Complex Proportional Assessment) for a multi-attribute evaluation in the machine equipment selection process taking into consideration the interaction between attributes; for that

purpose (Taha et al., 2013) develop a decision making support system by using a hybrid approach of AHP and PROMETHEE, whereas (Sahu et al., 2015) rely on the application of compromise ranking by using generalized fuzzy numbers, while for that purpose, (Nguyen et al., 2016) use the MCDM model created by the integration of the fuzzy AHP and fuzzy ARAS (Additive Ratio Assessment) methods. In solving these and similar problems in industrial enterprises, the PROMETHEE method has proved as sufficiently efficient and reliable, which is confirmed by numerous studies (Sen et al., 2015; Maity et al., 2015; Radojčić et al., 2013; Vesić Vasović et al., 2015) This method introduces non-linear preferences, thus providing decision makers with greater opportunities for expressing their subjective preferences by selecting the type of the preference function and defining the values of the parameters (Brans, 1985; Brans, 1986). The success of the PROMETHEE method is based on the mathematical characteristics (Brans and Mareschal, 2005) and stability of the results it generates (Samanlioglu et al., 2016).

In the paper, the process of the multi-criteria ranking of the alternatives by applying the PROMETHEE method is illustrated on the example of the selection of the machine equipment for the manufacturing of carton packaging at the installation of a new manufacturing plant at “Kartonpak” d.o.o. Enterprise. The PROMETHEE method enables the identification of the most favorable alternative when selecting machine equipment on the basis of the rank of the alternatives defined according to their total suitability in relation to the global goal according to a larger number of the conflicting criteria, which provides a significant support to the efforts made towards the improvement of the quality of business operations. The modelling of the decision making require the creation of a decision making multi-criteria base as the basis for the multi-criteria ranking of alternatives by the PROMETHEE method. For the creation of a decision making multi-criteria base, potential alternatives and the system of the criteria for their assessment, together with the estimated relative significance by the method of evaluation, are defined, which enables the suppression of subjectivism of the participants in the decision making process. The requirements for maximization or minimization are also defined for each single criterion individually. In the observed example, the alternatives are assessed in the system of seven criteria: the technical performances of the equipment, the price, the duration of assembling, reliability, maintenance suitability, the compliance of the equipment with ecological standards and compliance with the existing technology, thus including all the aspects of the problem significant for finding out an optimal solution.

In order to obtain the final rank of the compared alternatives, it is necessary that the type of the preference functions for each criterion, which can best express the specificities of the criterion used, should be defined. The Preference Function serves to normalize the difference in the values for each pair of the compared alternatives by reduction to the range from 0 to 1. For each of the criteria, the decision maker defines no more than two parameters, depending on the adopted type of the preference function defining the speed of the preference (Table 1).

Table 1: Parametri za kriterijume kreirani od strane donosioca odluke

Criterion	1	2	3	4	5	6	7
Parameters	$\sigma=2$	$\sigma=2$	$\sigma=3$	$p=20$	$\sigma=3$	-	$p=2$

The decision making process was conducted by the interaction between the decision maker and the Visual PROMETHEE decision making support software package. The software is based on the PROMETHEE methodology and provides significant support when modelling a decision making problem, selecting the most favorable solution, presenting and analyzing the obtained results. The software provides the possibilities of analyzing the sensitivity of the results of decision making and their graphical interpretation. The decision making multi-criteria base created by applying Visual PROMETHEE is given in Figure 1.

In Figure 2, the results of the joint ranking of the alternatives by applying the PROMETHEE I and PROMETHEE II methods for the considered decision making problem are presented. The alternatives are represented as the points in the plane defined by the values of the entering and leaving flows. The vertical axis is defined by the values of the net flow. The results of the multi-criteria ranking (Figure

3) indicate that Alternative 3 singles out as the alternative that to the greatest extent satisfies the system of the set criteria, and that it is followed by Alternatives A2, A1 and A4.

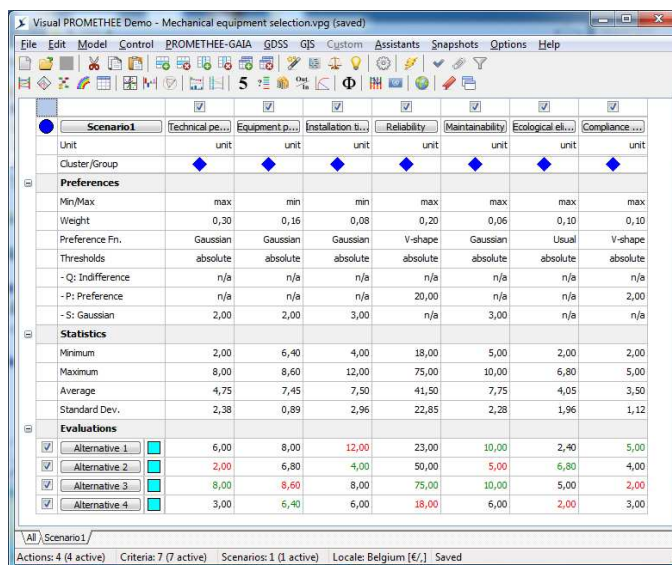


Figure 1: Multicriteria database created by Visual PROMETHEE

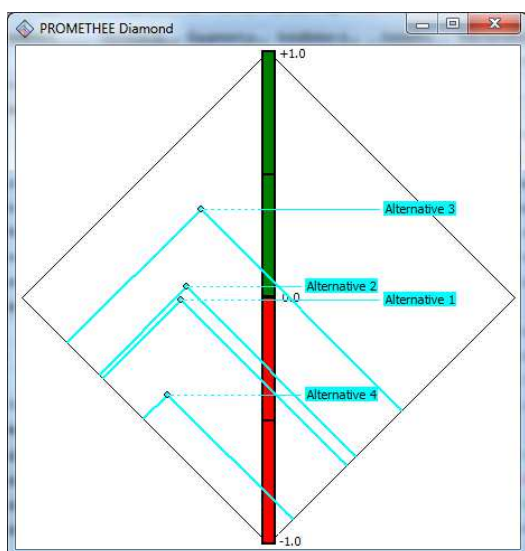


Figure 2: Partial ranking of considered alternatives

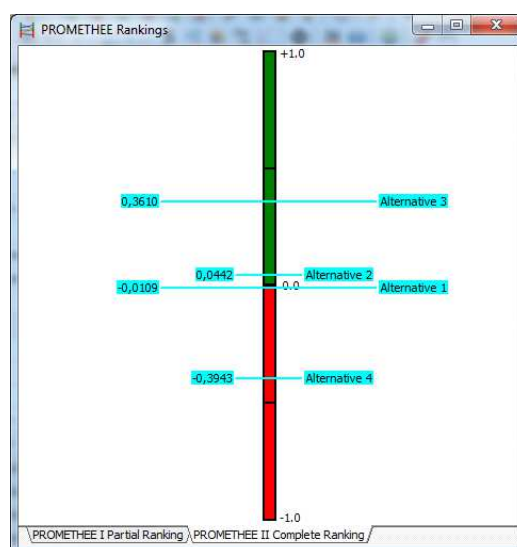


Figure 3: Fully ranking of considered alternatives PROMETHEE method II

In case the criteria are attributed different relative weights, the sensitivity of the rank of the alternatives to the changes in the weights of the criteria is an exceptionally important factor that should be considered when carrying out an analysis of the rationality of the solutions that arise from preferring different participants in decision making. For that purpose, the Visual PROMETHEE software provides support in the form of the *Gaia plane* (Figure 4), which serves to determine whether change in the weights of the criteria more significantly changes the rank of the alternatives.

The sensitivity of the obtained rank of alternatives as against the adopted type of preference functions, the parameters of preference speeds and the relative weights of the criteria can be indicative of the rationality of the decisions made. The analysis of the sensitivity shows that change in the weight of the criteria does not lead to change in the rank of the alternatives due to change in the value of the net flow, so Alternative 3 still remains dominant over the other alternatives according to the considered criteria (Figures 5 and 6), due to which the obtained solution is adopted as sufficiently rational irrespective of the importance of the used criteria.

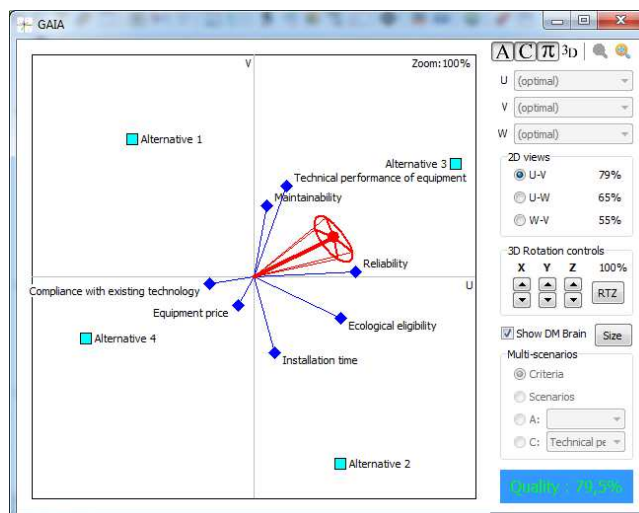


Figure 4: GAIA plane

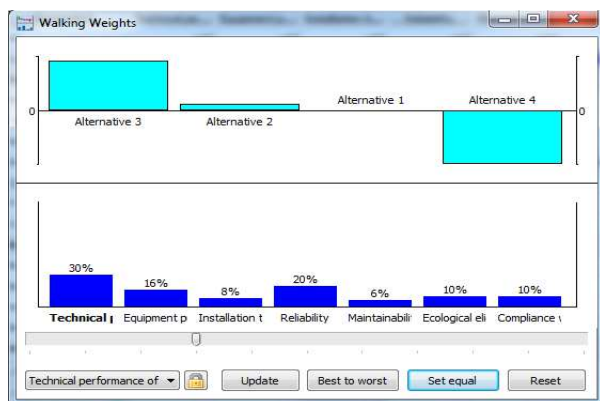


Figure 5: Alternative rang in different weights of criteria

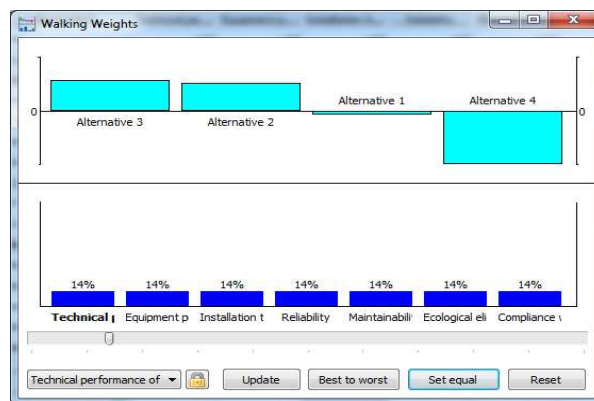


Figure 6: Alternative rang in the same weights of criteria

By applying PROMETHEE when selecting machine equipment it is possible to identify the most favorable alternative as against the goal set according to all the considered criteria, thus meeting the conditions for the manufacturing process to be performed uninterruptedly with maximum performances.

CONCLUSION

By conducting a multi-criteria assessment of the alternatives in the selection of the machine equipment for manufacturing carton packaging at the installation of the new manufacturing plant in “Kartonpak” d.o.o. Enterprise, a selection was made of the optimal solution that to the greatest extent satisfies the goal defined from the aspect of the technological performances of the equipment, its economic and ecological acceptability, reliability, degree of compliance with the existing technology and suitability for maintenance, simultaneously contributing to the greatest extent to the improvement of the quality of business operations. Although there are certain difficulties in the application of the PROMETHEE method when evaluating the criteria and generally when defining them, it enables the ranking of the alternatives without complicated calculations, simultaneously rationally using the time that the decision maker has at his disposal, and also enables us to make a compromise between the conflicting criteria by determining the relative significance and preference function for each one of them. The implementation of the most favorable solution identified by the PROMETHEE method will enable the improvement of the business performances of the enterprise and ensure the quality of business operations, necessary for the establishment of sustainable development.

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THE IMPORTANCE OF THE FAMILY OF ISO 9000 IN IMPROVING OF PRODUCTION PROCESS

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006.83(100)ISO 9000

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ABSTARACT: The family of standards ISO 9000 is with new revision of 2015 has become an even better base for the improvement and maintenance of quality. As a basis for the upgrade, the system management is ideal for initial moves in introducing quality standards in the organization of any size. With the introduced ISO 9001 company can easily handle the most common errors in production and easily implemented other ISO standards and so in a simple manner leave the market competitiveness.

Key words: ISO 9000, Countries in Development, Production quality, Quality management

INTRODUCTION

In order to maintain the competitiveness of companies in the market, it is necessary to continuously improve and develop something that will keep them ahead of their competitors. This may setting the price, additional services or just the brand that has prestige in society and we all want to own. Any of this is difficult to achieve without quality. Competitive price can be achieved effectively with organized production without losses; supplementary service, such as. free service during the warranty period, must be properly implemented by the logistics to work on the product; the brand is built through a lot of satisfaction.

ISO (international standard organization) is an independent non-governmental organization with 161 bodies of national standard members. Through its members, this organization gathers experts to share their knowledge and develop voluntary, market based international standard which supports innovations and gives solutions for global challenges. ISO has more than 21000 standards (up until March 2016) and similar documentation covering almost all kinds of industries, from technological to food safety, throughout agriculture and health organizations.

ABOUT FAMILY OF STANDARD ISO 9000

Family of international standards referrals of management ISO 9000 has gained global reputation as a basis of establishment an efficient system of quality management. The need for international standards is very important, since more and more organizations do business on global economy level selling and buying products and services outside their own market. ISO technical committee ISO/TC 176 is responsible for development and maintaining the ISO 9000 family. Standard support for waypoints and other documents are being developed and updated continually to meet the demands and expectances of the users and the market itself. This chapter represents general picture of the ISO family of standard and explains how is it used to upgrade own systems of quality control. It gives a

general insight in standards and shows how they are grouply formed into a basis for continual upgrade and business excellence.

ISO 9001 is giving precise demands for quality control system that the organization has to fulfill in order to show its capabilities of consistent quality and service control which skyrocket the satisfaction of the clients and fulfill applicable status and regulatory demands. Standard is used for certificatory and agree mental purposes from organizations who seek confirmation from their quality control system. ISO 9001 is organized into format which is adapted into format to easy understanding the user with the terms easily understood by the business sectors. The biggest advantage of the standard is achieved through usage and implementation of all standards in the family. It is advisable to use ISO 9000 to better understand the fundamental concepts, principles and normative vocabulary of the quality control system before applying ISO 9001 to achieve the maximum performance. Case studies explained in ISO 9004 can then be implemented as a system of quality, just like the system controls is applied to further the efficiency. ISO 9001 and ISO 9004 are written so to enable the user and connect them to other systems of control, such is the environmental protection system or other sector demands, like ISO/TS 16949 in automobile industry, AS 9100/EN 9100 in aviation, space travel and protection, tL 9000 in telecommunications, and to help the gain of recognition through acional and regional awarding programs.

ISO 9000, quality control system- basics and vocabulary, gives the fundamental concept, principles and vocabulary used in the entire ISO 9000 family of standards. It sets the conditions of understanding the basic elements of quality control explained in the ISO standards. ISO 9000 represents the users seven basic principles of quality control, just like the usage of possessive approach to achieve continual improvements.

ISO 9001, quality control system- demands, is used when the company wants to establish a system of management quality control which gives safety in the ability of the company to place its products that fulfill the demands and expectations of the users. ISO 9001 precises the demands which help the management quality control system can be certified by a third party. Standards recognizes that terms "Products and services" are worked materiel and software for the users.

ISO 9001, Quality management system - Requirements, is used when an organization wants to establish a quality management system that provides confidence in the organization's ability to deliver products that meet the needs and expectations of users. ISO 9001 specifies requirements with which a quality management system can be certified by a third party. Standard recognizes that the term "goods and services" refers to services, processed material, hardware and software intended for the user.

There are seven clauses in the standard that specify activities that need to be considered in the implementation of standards:

- The context of the organization;
- Leadership;
- Planning;
- Support;
- Operation;
- Evaluation performance;
- Improving.

Requests of all parts of the ISO 9001 are applicable. The organization should provide justification for all the requirements of this International Standard that the organization determines that are not applicable to their field of quality management system. Instructions or other information documents decide how to meet the ISO 9001 requirements for the organization.

ISO 9001 defines what needs to be taken to the organization continuously producing a product that meets customer expectations and applicable statutory and regulatory requirements. In addition,

organizations should strive for continuous improvement of pleasures users improving the quality management system. ISO standards apply a process approach. Processes consist of one or more linked activities that require resources and which must be managed to achieve predetermined output. The output of one process may directly from the input for the next process and the final product is often the result of network or system processes.

Further instructions are contained in ISO 9001: 2015 and the introduction of a package of support that is saved subcommittee SC 2, Quality systems, ISO / TC 176, which provides the instructions:

- The list of changes;
- Implementation;
- Documentation required;
- Process approach;
- Reflection on the basis of risk;
- Frequently Asked Questions;
- Change Management;
- Correlation between ISO 9001: 2008 and ISO 9001: 2015

ISO 9004, management of sustainable success of the organization - Access to quality management, are used to get from the expanded range of ISO 9001 to all stakeholders in, or affected by, the operation of the organization. The stakeholders include employees, owners, suppliers, partners and society in general.

ISO 9004 gives guidance on a wider range of objectives of a quality management system ISO 9001, particularly in the management of long-term success of the organization. ISO 9004 is recommended as a guide for organizations whose top management wishes to extend the benefits of ISO 9001 in pursuit of systematic and continual improvement of overall organizational performance. But is not intended for standardization or contractual purposes.

ISO 19011, Guidelines for auditing management systems, covering part of the audit quality management system and environmental management system. Provide guidelines for auditing programs, the way relationships to internal and external auditors, and information about the competence revised. ISO 19011 provides a review of the handling of auditors and audit management systems need to be done. Effective auditors must ensure that the implemented QMS fortune requirements specified in ISO 9001 standard.

Nature of the organization and its specific needs will determine how the standard applied in order to achieve the objectives. Useful advice and instructions for the conduct of audits were developed by the ISO 9001 group for the implementation of the audit (Auditing Practice Group). Information on the review of the third party also made a joint effort by the ISO-IAF (International Accreditation Forum (International Accreditation Forum)) accredited group for the implementation of the audit (Accreditation Auditing Practice Group).

ISO 9000 IN PRODUCTION

Implementation processes are important in achieving the full benefits of a quality management system (Quality Management System - QMS). Most new users will gain measurable results early in the implementation process.

- QMS is a dynamic system that eventually evolves through periods of improvement;
- Important is to determine which activities already exist and their subtlety within the context of the organization;
- The formal QMS presents a framework for planning, implementing, monitoring and improving the performance of the quality system is activated;

- In developing the QMS fundamental concepts and principles given in ISO 9000 can provide valuable advice;
- A successful QMS must correspond to the organization. Following steps, steps are useful guidelines:
 1. Engage top management to:
 - Agree regarding the reasons for the implementation of QMS;
 - Do the context of the organization's strategic objectives and business processes;
 - Determine the needs and expectations of customers and stakeholders;
 - Understand the basic principles of the quality system as described in ISO 9000;
 - Consider the implications of thinking on the basis of risk;
 - It defines the objectives of the organization;
 - Describe the scope of the impact of the QMS;
 - Defines the business policy;
 - Determine quality goals.
 2. Identify key processes:
 - Identifying the processes necessary to deliver products and services;
 - Understanding the demands set by the standard ISO 9001;
 - Determination of the risk and the nature applicable to the process of admission.
 3. Planning a QMS, organizations:
 - Identification of gaps in the existing system in comparison with the requirements of the QMS;
 - Identification of the necessary process control;
 - Defining the necessary working space;
 - Defining the necessary skills and facilities.
 4. Documenting the QMS, organizations:
 - Documenting processes, activities and the necessary controls;
 - Preparation of information documents (procedures and records) to the standard required in accordance with needs;
 - Ensure that the QMS in accordance with the requirements of ISO 9001 standard.
 5. Implementation of the QMS:
 - Process management
 - Management of monitoring and measuring equipment;
 - Training employees;
 - Confirm the effective functioning of the process.
 6. Management QMS:
 - Monitoring and performance measurement;
 - The audit process efficiency;
 - Focus on customer satisfaction;
 - Management system and operational changes;
 - Review the management.
 7. Training QMS:
 - The request for certification / registration third party for QMS;
 - Striving to improve referring to ISO 9004;
 - Consideration of implementation of the model of business excellence within the company's operations.

CONCLUSION

It is necessary to constantly work on improving the quality in order to maintain the necessary level of quality, and thus achieve and maintain competitive advantage. ISO like to review their standards to match a change in the world and maintain the quality level of quality standards. We recognize the PDCA cycle as a basis for quality improvement and its implementation in the process of quality management. The result is a constant work and constant certain adjustments and adapting to market needs and thus exercising and maintaining a competitive advantage in the market.

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EXCELLENCE THROUGH SIX SIGMA SYSTEM

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ABSTRACT

Six Sigma is one of the best quality systems in the market. Its main feature is the scrap reduction to each unit of production on virtually no significant digits. The implementation of this system in the company is not an easy job, naive and therefore rare that a company based in a country in transition can achieve it. This paper will highlight the many advantages and disadvantages of this quality system.

Key words: Standard quality, six sigma, statistical skills, creative approach

INTRODUCTION

Six Sigma is a quality standard that delivers the best results and minimal manufacturing defects, as well as in the service business. Possibility of Six Sigma to reduce errors is such that when properly implemented, it can miss only a single-digit number of defects per million opportunities. This is one reason why they use the agency where passenger safety plays a major role, such as for example the agency for control and servicing of aircraft before takeoff.

The most competitive companies in the global market achieved its competitive advantage thanks to the high quality and excellent management. Fortune 500 companies celebrate their success at a high level of quality and how to maintain that level at a high level. One way of doing this is to implement six sigma system. Six sigma system is the system which is implemented when there is already a quality system in the company, because this quality system is very difficult to implement when starting from scratch. Many companies have heard of this system, but it is necessary to invest a lot of resources in order to have an advantage. Jet the biggest advantage is that the employee become very creative during the proper process in implementation of this system in the company.

EXCELLENCE THROUGH SIX SIGMA SYSTEM

Six sigma is often mentioned in the literature as a system that enabled the business and financial renaissance of the world's largest companies. Using Six Sigma methodology dates back to the eighties of the last century and is linked mainly to large US corporations such as Motorola, General Electric, Boeing, Dupont, Raytheon or large companies around the world: Sony, Toshiba, etc. The fact that the listed companies significantly contributed to popularizing Six Sigma methodology is related mainly to the exorbitant cost savings realized through implementation. Therefore it is necessary to point out that the methodology Six Sigma is one of the most effective methods when it comes to continuous cost-

cutting at all levels.

Six sigma can have several meanings of metrics, methodologies up to the management system. Each of these areas is equally important for organizations that wish to improve their business performance must be paid to all aspects of equal attention. The only rule at the same time it is worth mentioning is how the system should build on the foundation of metrics and methodologies. In other words, the mastering of basic statistical skills that are at the base of business process management, and after checking a number of improvement projects according to the standardized methodology are essential preconditions for the creation of a quality management system that carries the name of Six Sigma.

One of the most popular requests of this methodology is the requirement according to which the key processes of the organization have functions at the level of 3.4 errors per million opportunities (eng. Defects per Million Opportunities - DPMO). Satisfying the above requirement means almost perfect functioning of the process which eventually reflected in customer satisfaction, but also the realized costs and revenues. However, in practice the realization of the above claims often seen as a vision of the business, rather than the actual situation. The main reason for that is that often the process of bringing this level requires excessive investment and requires a very great effort and initiative of employees and management.

The rapid development of the market, the company imposed the obligation to introduce permanent improvements in their systems did not opt for the training of its experts, in order to be competent for establishing new methods in the area of quality improvement processes. Improving the process has become an important factor in gaining competitive advantage. In today's race for higher profits and the struggle for survival in times of global crisis, the available money and time for improvement is less and therefore need new ideas. Response to the new circumstances imposed by the market can be found in Lean Six Sigma concept. Lean Six Sigma concept demands constant change and constant improvement. The emphasis is on employee involvement and teamwork, measurement and systematization of processes, reducing variation, defects and shortening the duration of the process. Constant improvements are required for the project organization, or perhaps the only way to gain competitive advantage and survival in the market.

In short, the Six Sigma methodology is based on continuous improvement projects carried out by using an appropriate multifunctional teams at the same time clearly defined hierarchy of roles. Direct goal of each of these projects is to eliminate the variations of the basic processes and reducing them to a level of functioning that corresponds to the demand of 3.4 DMO, while indirect goal even more important and mainly based on cutting costs and improving overall business performance. When it comes to the goals of Six Sigma methodology, they do not differ from the common goals of quality management systems and are generally based on satisfying and delighting customers. One of the key aspects of Six Sigma system is the selection of appropriate projects and improve their relationship with the global strategy of the organization.

As a quality management system Six Sigma is its major goals is not significantly different from other quality management systems. However, what sets this system apart from the rest is the primary way in which its objectives are achieved.

Schroeder and his colleagues Six sigma quality management system define an organized, parallel structure of the organization targeted reduction of variation in organizational processes through the use of specialists, structured methods and performance indicators, and overall targeted achievement of strategic objectives.

Breyfogle Six sigma is defined as a methodology for achieving the continuous improvement of customer satisfaction and profits that goes beyond the reduction of defects and stresses successfully improved the business process.

Quack and his colleagues report that the six sigma project-oriented system management system

focused on improving products, services and processes of the organization through continuous reduction of defects in the organization. It is a business strategy aimed at improving the understanding of customer requirements, operating system, productivity and financial performance.

Zu and colleagues point out three practices as key to Six Sigma concepts:

- Structured roles: Six sigma system uses a group of experts for improvement which include champions, master black belts, black belts and green belts. The hierarchy and the roles of individual participants in the process of improving the pre-specify and clear to everyone.
- Structured process improvement: Six Sigma uses the structured approach to achieving process improvement which is known as DMAIC (Define, Measure, Analyze, Improve, Control) and structured approach to product improvements and services known as DMADV (Define, Measure, Analyze, Design, Verify).
- Focus on metrics: Six Sigma emphasizes the use of the full range of quantitative indicators in the process of improvement, such as indicators of process sigma level, critical indicators of quality, defect rates and the rates of improvement, in addition to the above the usual quality indicators such as process capability indices.

Schroeder and colleagues (2008) have identified five principles underlying the Six Sigma system and they are:

- The involvement of management in Six Sigma functions such as: selection of a specialist, the selection of projects for improvement etc. One of the ways in which managers seek to be more involved in Six sigma projects is the requirement according to which they must become certified green belts.
- Specialists are trained to improve and develop different competencies (known hierarchy of roles based on the black and green belts).
- Metrics for measuring performance based on cost, quality and deadlines.
- Existence of systematic procedures to improve known as DMAIC.
- The prioritization of improvement projects is an important part of the six sigma system, a ranking determined by many criteria such as cost or the Pareto index importance.

ADVANTAGES AND DISADVANTAGES OF THE CONCEPT OF SIX SIGMA

In the literature it is possible to find a whole series of benefits that the implementation of six sigma method allows. Some of the most important advantages are the following:

- Six sigma utilizes a holistic and systematic multi-dimensional approach to understanding the problems and offer solutions to these problems. In this way, the close relationship between organizational competence, customer satisfaction and continuous improvement.
- The way to implement the Six Sigma represents a new approach to organizational improvements.
- There are authors who point out that the application of the concept of six sigma quality means a return to their roots since this methodology is very grounded in engineering and statistical analysis.

Although there is a whole series of large companies that stand out as Six Sigma has enabled revolutionary savings in their business, there are authors who highlight some of the shortcomings in the implementation of this system. Kumar and colleagues report that among the airlines that have implemented Six Sigma programs of less than 50% expressed satisfaction with the results, about 20% were partially satisfied, while as many as 30% of companies are not satisfied with the results achieved. Some of the disadvantages are:

- In general, Six Sigma insists on the return of selected financial indicators of projects highlighting both their short-term character. Although there are authors who claim that certain projects initiated solely because of the strategic objectives still dominated by a strict emphasis on short-time refund.
- Philosophy and the tools used by Six Sigma are identical to other quality management systems.

CONCLUSION

Six sigma is a system that is very grateful to deploy and use. It is a holistic system, and all who are in contact with it, both inside and outside the company that owns it, are the winners. Attitude and mindset that this system awakens among those who use it are in many ways different from other quality systems. The main difference is that the others are trying to cut costs and losses, and six sigma system to be implemented through a desire for improvement and development. Searching for creative solutions is so complex that when understood becomes a game causing "avalanche" of new ideas for improvement and all employees are in some way involved in it.

The main success of this system is that it changes the way you are experiencing a problem. Not along with a rejection as an obstacle standing in the way of success, but rather as an opportunity to strengthen the company overcome the problems. A company with this way of thinking has no competition in the market, it has only opportunities for advancement

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INDUSTRIAL COMPANIES' OPERATIONAL PERFORMANCE: EVIDENCE FROM SERBIA

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ABSTRACT

Due to new practices in transitional economies it is necessary to track performance measures on company level. The most frequently studied types of performance in the available literature are quality performance, operational performance, market and financial performance, employee performance, customer satisfaction, innovation performance, project performance and aggregate firm performance. This study empirically examines operational performance on a sample of 113 Serbian industrial firms through 5 dimensions. After data collection through questionnaire usage, descriptive statistics, factor and reliability analysis were used to check if operational performance description could be done using 5 proposed dimensions in statistically significant way. Customer satisfaction, the share of defective products in relation to the volume of production, the cost of the warranty period as compared to total sales, quality costs in relation to total revenue and proportion of timely deliveries in total deliveries have been proved and valid and reliable dimensions of operational performance of Serbian industrial companies as a construct.

Key words: operational performance, companies, Serbia.

INTRODUCTION

Changes in ownership structure, for long time presents a major phenomenon both for the companies in developed as well as the developing countries. Large number of resources shows that private companies are more efficient than public ones in competitive environments and that competition may actually be a extremely important factor in realized performance levels.

A large portion of the world economy, involving the countries of the former USSR, Bulgaria, Romania, Hungary, and also countries developed after dismemberment of former Yugoslavia, including Serbia, are in the transition processes. It means that companies in those countries are in phase of introduction of new trade procedures and new legislatives, with wide foreign investments in domestic companies results. It results in high demand for radical organizational changes due to new business ambient and survival on the market (Živkovic et al. 2009; Dondur et al. 2011).

Due to implementation of new practices it is necessary to track performance measures at company level. The most frequently studied types of performance in the available literature are: quality performance, operational performance, market and financial performance, employee performance, customer satisfaction, innovation performance, project performance and aggregate firm performance (Sadikoglu and Zehir 2010).

Operational performance of the company is one of most important types of firm's performance that measures results of the company against standard or prescribed indicators of effectiveness, and efficiency such as cycle time, productivity, quality, waste reduction and regulatory compliance.

For those reasons, it is crucial to analyze companies' operational performance. Empirical study on the sample of 113 Serbian industrial companies is the main aim of this survey in order to determine evidences that come on companies' operational performance.

LITERATURE REVIEW

Review of business performance has been tracked from available literature sources in different ways, as can be seen in Table 1. It can be noticed that operational performance is one of the most important performance measures. There are also other important measures such as financial, market, employees' and other measures.

Table 1. Business performances in previous research

AUTHOR	PERFORMANCE MEASURES
Fuentes et al. (2004)	<ul style="list-style-type: none"> ▪ financial (total revenue, profitability) ▪ operational (defective products, rework, customer satisfaction) ▪ employee performance (employee satisfaction, absence from work)
Demirbag et al. (2006)	<ul style="list-style-type: none"> ▪ financial (total revenue, net profit, profit/expense ratio) ▪ non-financial (investment in research and development, extension in capacities, new product development, larger market share, expansion on new markets)
Lai (2003)	<ul style="list-style-type: none"> ▪ motivational (employee earnings and benefits, employee trainings, employee satisfaction, job security, work safety) ▪ market (development and innovation of new and existing products, competitive product price, costumer complains) ▪ productivity (efficiency in material, work force, capacities usage) ▪ societal (benefits for society and community)
Samson and Terziovski (1999)	<ul style="list-style-type: none"> ▪ market (customer expectations fulfillment) ▪ employee contentment (employees' moral and satisfaction) ▪ operational (share of defective products, costs in the warranty period, quality costs, share of timely deliveries)
Everet et al. (1997)	<ul style="list-style-type: none"> ▪ financial ▪ operational ▪ employees performance
Tari and Sabater (2004)	<ul style="list-style-type: none"> ▪ customer satisfaction ▪ employees satisfaction ▪ societal benefits ▪ operational performances

In the context of operational measures certain previous works should be mentioned. Hendricks and Singhal (1997) have explored the impact of effective Total Quality Management - TQM implementation on operational performance and resulting with conclusion that firms winning quality awards outperformed those in a matched control sample without such awards. Sharma (2005), Samson and Terziovski (1999), and Lemak et al. (1997) have concluded that quality improvement practices improve business performance, too. They also presented significant proves for financial and operational performance improvement. Spasojevic Brkic et al. (2013), Spasojevic Brkic et al. (2011), Sadikoglu and Zehir (2010) and Samson and Terziovski (1999) for measuring operational performance determined the following five crucial dimensions:

- Customer Satisfaction
- The share of defective products in relation to the volume of production
- The cost of the warranty period as compared to total sales
- Quality costs in relation to total revenue
- Proportion of timely deliveries in total deliveries.

METHODOLOGY AND RESULTS

Data for study of industrial enterprises in Serbia were collected using a questionnaire formed for this purpose. Respondents were required to mark the value of operational performance rating for all five crucial dimensions, at a scale from 1 to 5. Performance concepts and dimensions are discussed in detail in Spasojevic Brkic et al. (2011), while the performance measurements are consistent with previous research (Nair 2006).

The survey population consists of 969 ISO 9001 certified industrial companies. Based on the experience of other researchers, in order to represent population in good manner, 250 industrial companies were chosen for the survey, including 40 large, 80 medium-sized and 130 small companies.

Responses were received from 119 industrial certified companies, which comprise more than 10% of the Serbian industrial company population. There was a 47.6% response rate. Answers have come from persons employed in domestic industrial companies with an average of 16.98 years work experience. The 41% of persons that answered were quality department directors, 32% were directors of other technical departments, 22% employees work in quality departments or quality representatives and 5% from other managerial positions. Since this survey is part of larger survey, it is important to note that data about operational performance is obtained from 113 companies, due to missing data.

Table 2 presents the descriptive statistics for operational business performance collected data.

Table 2. Descriptive statistics for operational business performance in Serbian industrial companies

Operational performance dimensions	N	Min.	Max.	Mean	Stand. Devi.
Customer satisfaction	113	1	5	3.71	0.873
The share of defective products in relation to the volume of production	104	1	5	3.73	1.201
The cost of the warranty period as compared to total sales	101	1	5	3.64	1.339
Quality costs in relation to total revenue	97	1	5	3.91	1.071
Proportion of timely deliveries in total deliveries	103	1	5	3.77	1.156

After descriptive statistics, data are underwent to factor and reliability analysis to check if they are useful in operational performance description in statistically significant way.

Reliability is the degree to which the observed variable measures the "true" value and is "error free" (Hair J. et.al. 1998). For this study reliability was estimated though Cronbach's α coefficient as an indicator of the amount of present random error in the scale used for measurement (Kaynak H. and Hartley J. 2006). The value 0.60 has been adopted for the lower level of Cronbach α acceptability. Nunnally (Spasojević Brkić V. 2009) suggests the value 0.70 for the lower level, with a large number of researchers adopt this value (Spasojević Brkić V. 2009; Handfield et al. 1999). However, values lower than 0.70 can also be seen in numerous studies (Spasojević Brkić V. 2010; Singh P. 2008; Conca et al. 2004; Tari J. and Sabater V. 2004; Lai K. 2003). A coefficient value of 1 means perfect reliability (Hair et al. 1998). In this survey all 5 examined operational performance dimensions are above or very close (0.595) to value of 0.6.

Explorative factor analysis is a statistical method used to uncover the underlying structure of a certain set of variables. Explorative factor analysis is conducted using principal components with Varimax rotation on obtained data. Only those factors that accounted for variances greater than one, i.e. with eigenvalues > 1 , were extracted. Also, for interpreting the factors relating to sample size, only those items which had factor loadings greater than 0.5 were included (Hair et al., 1998). As can be seen in Table 3 two factors which accounted for 72.08% of the total variation in the observed variables were extracted. All factors have loading above 0.5.

Explorative factor analysis and reliability analysis for all operational performance dimensions are presented in Tables 3 and 4, respectively.

Table 3. Explorative factor analysis for operational performance dimensions

Operational performance dimensions	Factors	
	Factor 1	Factor 2
Customer satisfaction	0.641	0.437
The share of defective products in relation to the volume of production	0.897	0.012
The cost of the warranty period as compared to total sales	0.779	-0.337
Quality costs in relation to total revenue	0.526	-0.692
Proportion of timely deliveries in total deliveries	0.530	0.656
Eigenvalues	2.380	1.224
Values of explained variance (%)	24.480	47.598
Cumulative values of explained variance (%)	24.480	72.078

Table 4. Reliability analysis of operational performance dimensions

Factor with "items"	Corrected item - total correlation	Cronbach's alpha coefficient with if item is deleted
Customer satisfaction	0.421	0.796
The share of defective products in relation to the volume of production	0.733	0.421
The cost of the warranty period as compared to total sales	0.595	0.638
Quality costs in relation to total revenue	0.623	0.378
Proportion of timely deliveries in total deliveries	0.715	0.407

CONCLUSIONS

Presented study leads to the conclusion that it is possible to classify operational performance of Serbian companies into pattern described in this paper using factor and reliability analysis. Accordingly, customer satisfaction, the share of defective products in relation to the volume of production, the cost of the warranty period as compared to total sales, quality costs in relation to total revenue and proportion of timely deliveries in total deliveries have been proved and valid and reliable dimensions of operational performance of Serbian industrial companies as a construct.

Our results comply with those within the framework proposed in previous research done in other countries and contexts. In further studies reliability of dimension ``cost of the warranty period as compared to total sales`` as a part of construct operational performance should be checked.

The limitation of this study lies in the fact that this research is a cross sectional study.

Future research could consist of a longitudinal study. A suggestion for future studies would be an examination of this relation in other Serbian industrial sectors, too.

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LEAN CONCEPT AND PRODUCTION MANAGEMENT ENTERPRISES IN SERBIA

UDC: 658.5.012.2(497.11)

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ABSTRACT

The paper presents lean concept and production management enterprises in Serbia. The production cycle (PC) time, as a very important economic indicator of freezing current assets, involves the time needed to make a unit or a series of units from putting them into production until their storage, and is rarely discussed in literature, although it should be also analyzed and as short as possible. One of the most important organizational-technical indicators of production successfulness is the production cycle. The differences are significant enough that manufacturing engineers working in a process environment face challenges unique to those operations, and must adapt traditional Lean tools to apply them successfully. A large number of studies devoted to the management of manufacturing processes, lean manufacturing aspirations. One of the projects is dedicated to shortening the total length of the production cycle in the production of precisely detecting and eliminating, shortening of time and unnecessary delays in production processes. Authors present some of the results obtained by surveying result in a company in Serbia.

Keywords: lean concept, production cycle, elements of production cycle time, just in time production system.

INTRODUCTION

Today, in the corporate business world, the term lean is used to refer to a modern, successful business philosophy, ie. producing world-class characteristic of the modern era of business. The benefits of implementing Lean can be broken down into three broad categories; operational, administrative, and strategic Improvements.

This having been said, for many companies the major focus of lean implementation is still the shop floor and their search for competitive advantage has yet to rely on the more recent lean integrative approaches. Indeed, the car industry, the "mother of lean thinking", is still largely in this shop-floor dimension and has focused largely on optimising the car assembler and first tier supplier tier (Holweg and Jones, 2001). The paradoxical situation of piecemeal lean application is that the most productive car plants in Europe produce into the highest level of finished stocks in Europe.

Production function is that part of an organization, which is concerned with the transformation of a range of inputs into the required outputs (products) having the requisite quality level. Production is defined as "the step-by-step conversion of one form of material into another form through chemical or

mechanical process to create or enhance the utility of the product to the user.” Thus production is a value addition process. At each stage of processing, there will be value addition.

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

The technological capability and national innovation systems approach reveals a different channel through which firm behavior affects export performance. Focusing on innovation and learning processes in developing countries, proponents emphasize the acquisition of technological capabilities as a major source of export advantage at firm-level (Bell and Pavitt 1993; Lall 1992; Iammarino et al. 2008). The underlying evolutionary theory of technical change emphasizes that difficult firm-specific processes and complex interactions with institutions are needed to absorb imported technologies efficiently (Nelson and Winter 1992)

According to Gits (Gits,1992) production is one of the key and primary function of the organization.

TOYOTA PRODUCTION SYSTEM

The *wastes* noted above are commonly referred to as non-valued-added activities, and are known to Lean practitioners as the Eight Wastes. Taiichi Ohno (co-developer of the Toyota Production System) suggests that these account for up to 95% of all costs in *non-Lean* manufacturing environments. These wastes are :

- Overproduction – Producing more than the customer demands. The corresponding Lean principle is to manufacture based upon a pull system, or producing products just as customers order them. Anything produced beyond this (buffer or safety stocks, work-in-process inventories, etc.) ties up valuable labor and material resources that might otherwise be used to respond to customer demand.
- Waiting – This includes waiting for material, information, equipment, tools, etc. Lean demands that all resources are provided on a *just-in-time* (JIT) basis – not too soon, not too late.
- Transportation – Material should be delivered to its point of use. Instead of raw materials being shipped from the vendor to a receiving location, processed, moved into a warehouse, and then transported to the assembly line, Lean demands that the material be shipped directly from the vendor to the location in the assembly line where it will be used. The Lean term for this technique is called *point-of-use-storage* (POUS).
- Non-Value-Added-Processing – Some of the more common examples of this are *reworking* (the product or service should have been done correctly the first time), *deburring* (parts should have been produced without burrs, with properly designed and maintained tooling), and *inspecting* (parts should have been produced using statistical process control techniques to eliminate or minimize the amount of inspection required). A technique called *Value Stream Mapping* is frequently used to help identify non-valued-added steps in the process (for both manufacturers and service organizations).
- Excess Inventory – Related to Overproduction, inventory beyond that needed to meet customer demands negatively impacts cash flow and uses valuable floor space. One of the most important benefits for implementing Lean Principles in manufacturing organizations is the elimination or postponement of plans for expansion of warehouse space.
- Defects – Production defects and service errors waste resources in four ways. First, materials are consumed. Second, the labor used to produce the part (or provide the service) the first time cannot be recovered. Third, labor is required to rework the product (or redo the service). Fourth, labor is required to address any forthcoming customer complaints.

- Excess Motion – Unnecessary motion is caused by poor workflow, poor layout, housekeeping, and inconsistent or undocumented work methods. *Value Stream Mapping* (see above) is also used to identify this type of waste.
- Underutilized People – This includes underutilization of mental, creative, *and* physical skills and abilities, where *non-Lean* environments only recognize underutilization of physical attributes. Some of the more common causes for this waste include – poor workflow, organizational culture, inadequate hiring practices, poor or non-existent training, and high employee turnover (Kilpatrick, 2003).

LEAN CONCEPT

The origins of lean thinking can be found on the shop-floors of Japanese manufacturers and, in particular, innovations at Toyota Motor Corporation (Shingo, 1981, 1988; Monden, 1983; Ohno, 1988). These innovations, resulting from a scarcity of resources and intense domestic competition in the Japanese market for automobiles, included the just-in-time (JIT) production system, the kanban method of pull production, respect for employees and high levels of employee problem-solving/automated mistake proofing. This lean operations management design approach focused on the elimination of waste and excess from the tactical product flows at Toyota (the Toyota “seven wastes”) and represented an alternative model to that of capital-intense mass production (with its large batch sizes, dedicated assets and “hidden wastes”). For a full account of these systems, methods, processes and techniques see Monden (1983). Much of the early work at Toyota was applied under the leadership of Taiichi Ohno to car engine manufacturing during the 1950s, later to vehicle assembly (1960s), and the wider supply chain (1970s). It was only at this latter point that supplier manuals were produced and the “secrets” of this lean approach were shared with companies outside Toyota for the first time. These manuals were written in Japanese, and it took almost another decade before the first English literature was available (e.g. Shingo, 1981; Schonberger, 1982; Hall, 1983; Monden, 1983; Sandras, 1989) (Hines et al., 2004).

The roots of lean manufacturing originate with early automobile manufacturing. The master craftsmen that first built individual cars possessed a wide range of skills and, but with low efficiency and at high cost. Henry Ford recognized these limitations and broke the assembly process down into 30-second tasks, which were performed almost a thousand times a day (Krafcik, 1988). In the 1950’s, Eiji Toyoda and Taiichi Ohno merged the knowledge and skill of master craftsmen with the standardization and efficiency of the moving assembly line and added the concept of teamwork to create the Toyota Production System (TPS) (Womack et al., 1990). John Krafcik introduced the term “lean production system” in 1988 in his review of the Toyota Production System, and the term “lean manufacturing” was popularized by Womack et al. (1990), in *The Machine that Changed the World*.

Lean is one of the most influential new paradigms in manufacturing, and has expanded beyond the original application on the shop floor of vehicle manufacturers and component suppliers in the auto industry, ranging from “heavy” industries such as primary metals (notably Alcoa’s production system see www.alcoa.com) to aerospace businesses (Financial Post, 1999; Womack and Jones, 1996). In particular when applied to sectors outside the high-volume repetitive manufacturing environment, lean production has reached its limitations, and a range of other approaches to counter variability, volatility and variety have been suggested. Here, the often quoted lean-agile debate is applicable, discussing whether an agile or a lean strategy, or even a hybrid approach is most suitable (Naylor et al., 1999; Christopher and Towill, 2001.)

Key tools and techniques within the ‘lean’ system, included:

- Kanban—a visual signal to support flow by ‘pulling’ product through the manufacturing process as required by the customer.
- 5 S’s—a visual housekeeping technique which devolved control to the shopfloor.
- Visual control—a method of measuring performance at the ‘shop floor’ which was visual and owned by the operator team.

- Poke yoke—an ‘error-proofing’ technique.
- SMED (single minute exchange of dies)—a changeover reduction technique

LEAN CONCEPT AND PRODUCTION MANAGEMENT ENTERPRISES IN SERBIA

The benefits of implementing Lean can be broken down into three broad categories; operational, administrative, and strategic Improvements. Some of Lean’s benefits, operational improvements :

- Lead Time (Cycle Time) reduced by 90%
- Productivity increased by 50%
- Work-In-Process Inventory reduced by 80%
- Quality improved by 80%
- Space Utilization reduced by 75%

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

Practical application of establishing the mentioned elements of PC time is reduced to instantaneous observations of time elements, where the object of labor is moving through the production operations list. A series of units is distinctly marked by this document and an analyst (recorder) can readily identify it.

In this paper we present some of the results obtained by surveying result in a car company in Serbia. The company has 210 employees. Research was conducted in the same period 2014, 2015 and 2016. for the purpose of monitoring and comparative presentation of results.

The diagram 1 gives an overview of elements of time for recording cycle, 32 cycles with observations, elements of productions cycle time in car industry in 2015. Diagram 2 shows the elements of productions cycle time in the same car industry in 2016.

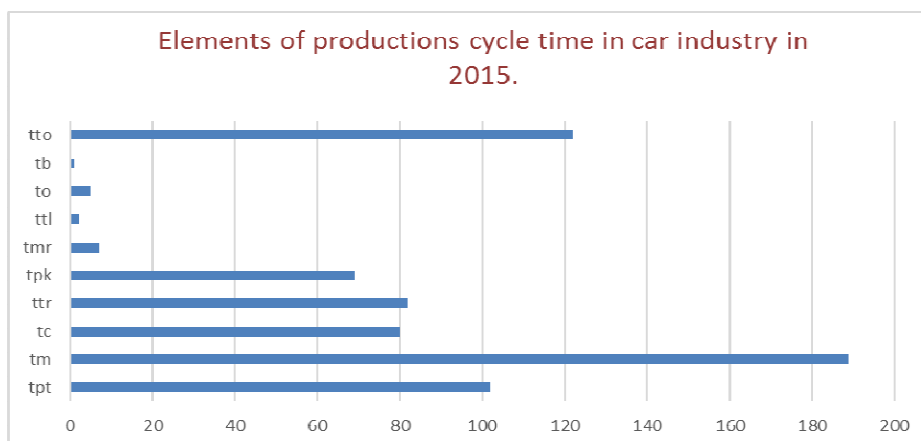


Diagram 1. Elements of time production in 2015 year

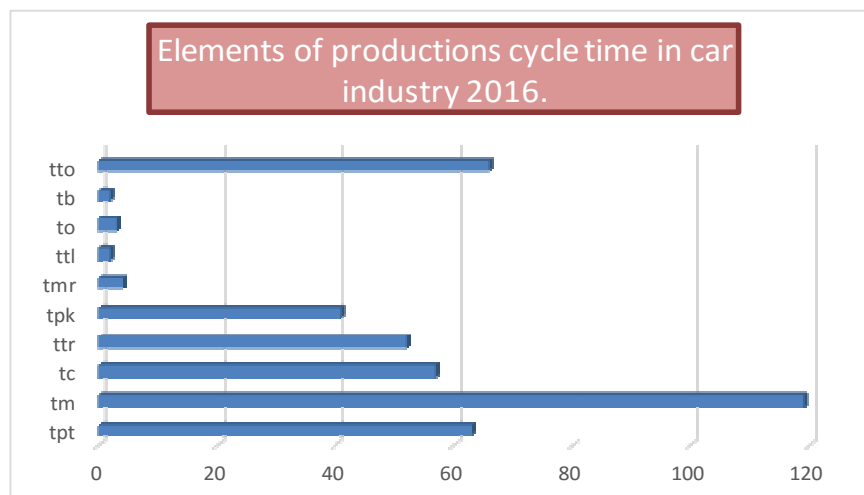


Diagram 1. Elements of time production in 2016 year

For the 2014 year a total time of 43 production cycles is 14.526 min . , After a production cycle is $14,526 / 43 = 338$ min. For the year 2015, 32 production cycles is 10296 minutes per production cycle 321 minutes. We conclude that despite the large series production in the total duration per cycle reduction with 338 to 321 minutes in 2015 year. It can be concluded that in spite of large series production in the total duration per cycle is reduced from 338 minutes to 321 in 2015, to 2016: 316 min. Comparison of results showing all changes such as those that there has been a change in production time.

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

Lean manufacturing, an approach that depends greatly on flexibility and workplace organization, is an excellent starting point for companies wanting to take a fresh look at their current manufacturing methods. Lean techniques are also worthy of investigation because they eliminate large capital outlays for dedicated machinery until automation becomes absolutely necessary.

CONCLUSION

Lean Production is an integrated set of activities designed to achieve high-volume production using minimal inventories. Lean thinking is applicable to all business processes within the process industries. The challenge, if we decide we want to be lean, is whether we know enough about our ways of working, what customers of the business processes truly value, and how our businesses operate and need to operate.

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

The goal is, in general, to reduce the total production cycle time, especially that associated with different types of stoppage and the optimization of lead time and machine time within the sphere of machine capacity utilization. Additionally, the optimization of time for transport, control, and packing

is also of importance for the production cycle. Reduced cycle time can be translated into increased customer satisfaction. Quick response companies are able to launch new products earlier, penetrate new markets faster, meet changing demand, and make rapid and timely deliveries. They can also offer their customers lower costs because quick response companies have streamlined processes with low inventory and less obsolete stock. The PC is the most significant technical-technological indicator in production and it is necessary to steadily monitor and reduce it: PC reduction is possible by influencing the factors related to the duration of individual working time elements.

Lean manufacturing is very closely related to Total Quality Management and derives from the Toyota production model. It involves a reconceptualization of the entire production process as a closely interconnected system from which buffers are removed. Complete implementation of the lean manufacturing system involves considerable organizational change.

ACKNOWLEDGEMENTS

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IMPACT OF INDUSTRY 4.0 TO AIRCRAFT MAINTENANCE, REPAIR AND OVERHAUL

UDC: 656.7:005

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ABSTRACT

Digital transformation has become the overarching megatrend in commerce and industry in recent years. Neither the Industry 4.0 nor the Internet of things is possible without digital transformation. The essential prerequisites are digital technologies deployed in a targeted way to reshape or replace existing value-creation processes. Major aircraft maintenance companies in the world grasped this trend very early and now wants to continue its consistent progress on multiple levels in the digitalization of processes within the maintenance, repair and overhaul (MRO) industry. Many varied innovations have recently been launched for this purpose. We have studied these innovations in our work.

Key words: Industry 4.0, MRO for airliner, predictive maintenance, maintenance engineering, repair in aviation.

INTRODUCTION

We are about to reach fourth industrial revolution. A revolution which is going to merge the worlds of production and network connectivity in an “Internet of Things”.

Today's world we know, is the result of three major technological revolutions. The first Industrial Revolution was began in the UK at the end of the 18th century and ending in the mid-19th century, represented a radical change from an agrarian economy to mechanical production methods (Figure 1).

The second Industrial Revolution was began at the start of the 20th century. It was a the birth of modern factorys with production lines and radical transformation with the advence of industrial production. It did an age of affordable consumer products for mass consumption. In the late 1960s, the use of electronics and Programable Logic Controlers in industrial processes opened the door to a new age of optimized and automated production. That is called the Third Industrial Revolution.

The Internet of Things and Services, Big Data, can now be added to the historical list of forces (mechanization, electricity, and information technology) powering industrial change. The changes being wrought by Industry 4.0 will see it become the global language of production. Industry 4.0 promises to increase manufacturing productivity levels by up to 50 percent – and halve the amount of resources required.

A digital revolution is taking place in factories, where the lines between the physical and digital are converging. This revolution has been labelled to Industry 4.0, but there is still confusion about what exactly it is and how it can support MRO services.

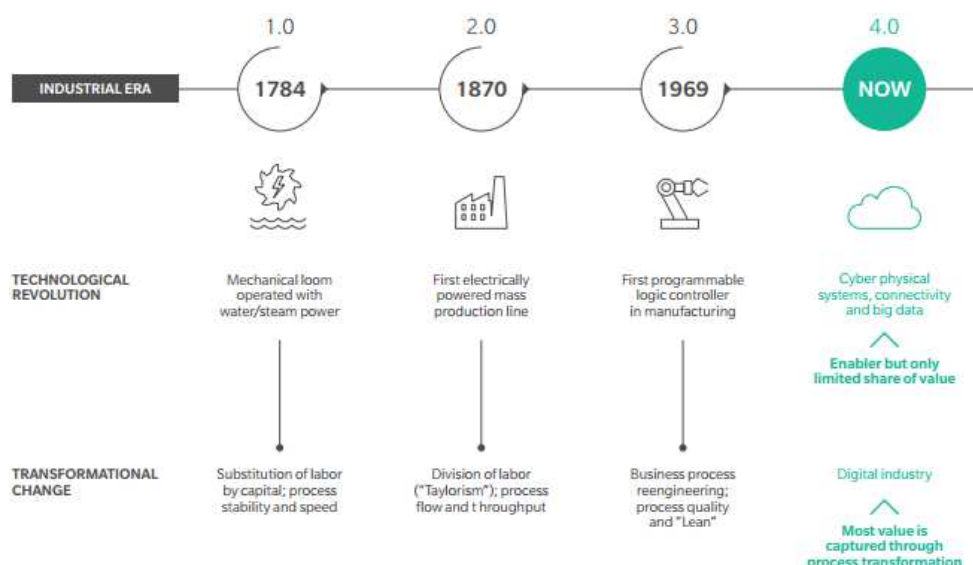


Figure 1: Industry 1.0 to Industry 4.0

The development of the smart factory has the potential to really benefit the MRO sector; at a time when the growth of the aerospace sector and subsequent increasing demand on manufacturers has exacerbated the need for the sector to improve its operational efficiency, time to market and proficiency.

The growth of predictive maintenance, such as the use of sensors and the Internet of Things to allow aircraft components to be replaced before visible defects appear, provides a pertinent example of how conventional working practices around MRO can be transformed by the smart factory.

At the heart of the smart factory is the integration of technologies. The connected enterprise utilises technology advances, such as data analytics from big data and remote monitoring, to help factories to increase productivity, create a secure environment and maintain safe operations. The development of embedded software and intelligent devices in products and factory infrastructure therefore increases automation and allows for better control and optimisation of MRO processes.

Although it is an ambitious goal, manufacturers today can improve profitability and customer delivery if different components in the hangar are integrated in real-time with the MRO providers' 'shop floor' system; whereby operations could react and adapt to unforeseen market changes such as a cancellation, a modification or a rush of an order.

The importance of data in the MRO industry cannot be underestimated, it provides valuable knowledge which can consequently support informed decisions and create a competitive advantage. In the factory of the future, the data-driven decision-making process can be improved by establishing an optimised data backbone across functions and domains; strengthening the bridge between manufacturing and operations and MRO by leveraging machine learning and trusted data.

Visualisation also helps to create this seamless and agile MRO ecosystem. For example, virtual 3D validation helps to reduce operational and design errors by testing the product or process and by running simulations, all prior to committing to physical prototypes. This further reduces the operational costs and time to market for the aircraft manufacturers and their supply chain.

With such advancements in technology it is easy to see how manufacturers are struggling to keep up with the pace of change. The evolution towards Industry 4.0 should be seen today as an industry upgrade for the MRO sector, an aggregation of existing technologies as opposed to a complex concept too difficult to understand and adopt. Much of the progress associated with Industry 4.0 is in fact readily accessible today and significant steps can be made by embracing 'Industry 3.x.' This is the

progressive upgrade of the manufacturing environment: using ‘here and now’ technologies, providing the opportunities to immediately improve the optimisation of operations.

The technology should be the enabler, not the destination. This is the smart approach to capitalise on the changes and opportunities that the digital revolution is bringing about and develop your own factory of the future.

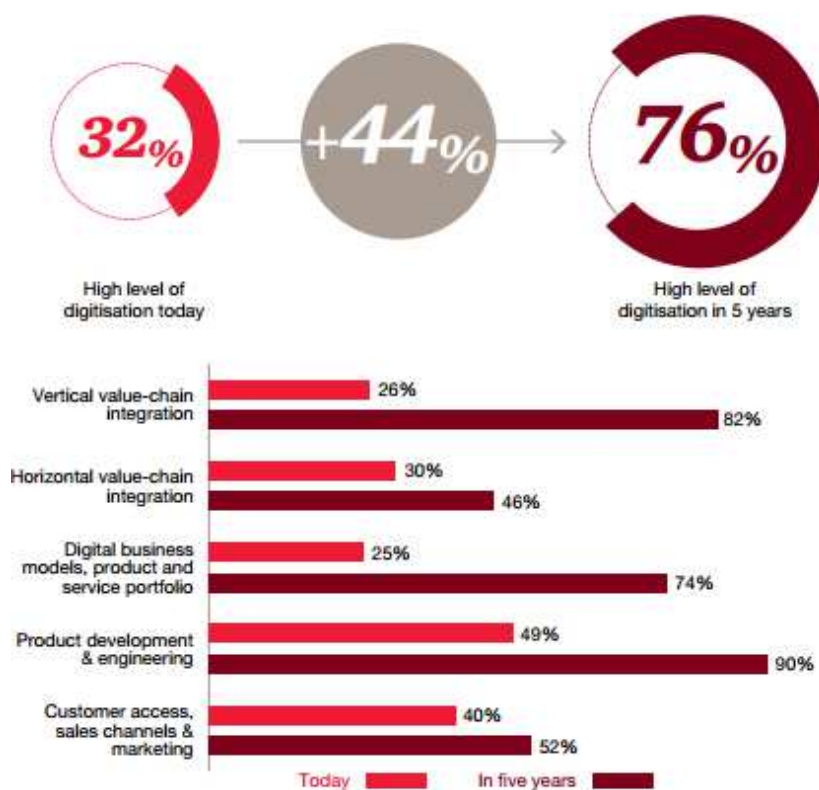
The revolution is already well underway and will grow exponentially in the coming years. The development of new technologies will change the skills and processes in all industries, which, in turn, will need to be adapted. Although we are increasingly recognising the need to change, traditional obstacles to a successful transformation will remain. Leadership agenda priorities, identifying viable business cases, clear governance to drive transformation and developing employee skills will be more than ever key success factors.

MAINTENANCE, REPAIR AND OVERHAUL (MRO) PROCESSES

Maintenance, Repair and Overhaul (MRO) processes have a major impact on life cycle costs and thus play an important role in life cycle engineering. The purpose of MRO is to keep machines and facilities running without loss of efficiency. In case of old machines, a decision should be given for replacement or modernization at the right time. MRO operations are not successful when they are performed by machine owners or third party companies which have little knowledge about machine configuration and functionality. A maintenance plan is generally considered to be confidential. Repair processes are in general unique processes, because of different failure cases. e.g. a crack on a engine part has a certain depth, length and shape. Whereas little cracks can be repaired bigger ones require exchange by a spare turbine blade which is either in stock, must be ordered or remanufactured. This process includes a lot of manual work with measurement technologies, diagnosis and decision making. New inspection technologies are needed to digitally capture, interpret and unambiguously describe product condition to enable decision making. In many cases IT systems in the MRO sector like ERP (Enterprise Resource Planning), PDM (Product Data Management), DMS (Document Management System) and CMMS (Computerized Maintenance Management System) are neither integrated horizontally with customers, suppliers and OEMs nor integrated vertically with MES (Manufacturing Execution System), SCADA (Supervisory Control and Data Acquisition) or PLC (Programmable Logic Controller). Beside there is a lack of information and data exchange between design and MRO phase within the life cycle. This makes traceability of product configuration changes during life time a difficult task and has to be considered in a holistic configuration management approach. These difficulties prevent MRO process automation and induce huge costs for machine downtimes. New IT concepts and PSS solutions are needed to close the digital life cycle chain. The innovation field MRO Planning and Digital Support of Fraunhofer’s Innovationcluster MRO addresses these issues and aims for improvement through digital MRO support by innovative information and communication technologies as well as 3D data generation and visualization. Focus lies on digital assistance and functional validation, adaptive MRO scheduling, information and configuration management, collaboration tools, virtual training and augmented reality.

In Industry 4.0, MRO systems will make it possible to execute all the administration, planning, and organization of operation and maintenance work, including documentation, in a single integrated system. This means that any changes due to service bulletins and maintenance operations will be communicated through the digital thread, in real time, to both engineering and services departments. Safety will also be improved through “virtual training” that also optimizes maintenance work.

Aviation Voice cites three major trends for 2017; The Internet of Things (IoT) driving adoption of Aircraft Health Monitoring System (AHMS) health checks and condition-based maintenance. Expect to see a rise in the number of operators adopting AHMS, driven by affordable IoT-enabled sensors, powerful data processing systems, and machine learning—all enabling airlines to make processes smarter and maintenance leaner.



Shown: Percentage of companies reporting advanced levels of digitisation and integration

Figure 2: Industry 4.0 is beyond the hype – it is has arrived at the strategic and operational core of many aerospace, defence and security companies

Going beyond predictive maintenance per se to describing the solution: prescriptive maintenance. Prescriptive maintenance is the next step beyond simply predicting the status of an asset. While predictive analytics answer the “what will happen, when, and why,” prescriptive goes one step further, allowing operators to not only predict what will happen, but offer “what if” scenarios to show how each possible event will impact operations. Prescriptive maintenance will revolutionize MRO. IDC predicts that 50 percent of all business analytics software will incorporate prescriptive capabilities by 2020.

Resource shortages hindering growth in the Asia-Pacific region. The rapid expansion of this market has the potential to be hindered due to a lack of MRO capacity, lack of indigenous training capabilities, and lack of skilled workforce in the region. There are currently not enough fully qualified, trained, and certified maintenance personnel to meet the needs of the Asia-Pacific region.

Industry Has Moved From Talk To Action

The buzz around Industry 4.0 has moved from what some had earlier seen as hype to investment and real results today. The aerospace, defence and security participants in our survey plan to invest 5% of annual revenue in digital operations solutions over the next five years, in line with the level of investment reported across all the industries that we surveyed.

It is a significant amount in the context of a sector where margins can be tight. Although the commercial aerospace side of the industry has the benefit of a very long-term order book and production horizon, it also has the need for very tight near-term delivery discipline. Investing in capacity-boosting innovation carries risk and uncertainty, particularly for smaller and medium-sized companies below tier one level. And on the military side, investment continues to be framed by constraints and uncertainties in government spending.

But there is no lack of ambition about digitisation. Nearly a third of aerospace, defence and security survey respondents report they have already reached an advanced level of digitisation and integration, and three quarters expect to be at such a level in five years' time (Figure 2)

CONCLUSION

Over the last three hundred years, we've seen the evolution from Industry 1.0 to 4.0. Never before in human history has innovation come so rapidly. From the advent of the steam engine to advanced robotics, industries have grown by leaps and bounds to improve performance.

Now we've arrived at the fourth iteration of the industrial revolution: Industry 4.0. Thanks to digitalization and the IoT, carriers are shifting their focus toward an integrated supply chain ecosystem. This means a deeper understanding of every step in the supply chain process to streamline processes and eradicate inefficiencies.

Data analytics is at the forefront of this movement and can lead to huge savings and increased revenue. How much of a difference can big data make? In a recent study, participants expected to reap 3.6% in cost reductions every year until 2020, while increasing revenue by \$493 billion USD annually. From order fulfillment to deliveries, a streamlined ecosystem connected by data platforms could improve logistical challenges and customer satisfaction for airlines.

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MANAGING PROCESS OF END-OF-LIFE VEHICLES TOXIC FLUIDS FROM ENVIRONMENTAL SUSTAINABILITY AND LEGISLATION ASPECT

UDC: 629.33:502.1:[34

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ABSTRACT

Recycling of motor vehicles which comes to the ELV presents ecological and economical activity in sustainability system of developed countries. Like the other European countries Republic of Serbia (RS) needs to improve the rate of ELV recycling process in the aim of environmental protection and to fulfill requirement minimum of European Union (EU) which as a potential member should fulfill. Because of that, quality detoxification as a integral part of successfully recycling ELV process is very important. Inadequate managing of material flow which arise from ELV detoxification process, damage natural values and environmental which would dramatically increase pollution in the future. Paper shows potential harmful materies which come from ELV detoxification process and which require special treatment and managing and equipment which is in use and which could be used in the aim of adequate treatment bothon the nationally and on a broader level. Paper also shows some of the legislative norms of RS and EU.

Key words: environmental protection, sustainability, ELV, recycling, detoxification.

INTRODUCTION

The growth in automotive production has increased the number of ELV annually (Tian et al., 2014). Each year, the lives of 8 million vehicles in Europe come to the end (Farel et al., 2013), and about 75% of end-of-life vehicles, mainly metals, are recyclable in the European Union. The rest, 25%, of the vehicles is considered waste and generally goes to lanfills (Kanali et al., 2003). Some of that waste are fluids which are hazardous and which need adequate treatment.

This paper deals statistical data of quantities of fluids form ELVs, equipment for their treatment and legislative norms.

CONTENT AND QUANTITIES OF HAZARDOUS FLUIDS FROM ELV

According to the latest data of Statistical office of the Republic of Serbia, it is estimated that in Republic of Serbia has a little less than 2 million registered passenger cars (Statistical office of the Republic of Serbia) whose average age is about 17 years (Pavlović, A., 2016).

Table 1. shows number of registered passengers cars for period of five years, 2010.-2014. In the Republic of Serbia.

Table 1: The number of registered vehicles in the Republic of Serbia for period of five years, 2010-2014 (Statistical office of the Republic of Serbia)

Year →	2010	2011	2012	2013	2014
Republic of Serbia (total)	1565550	1677510	1726190	1770162	1797252
Region of Belgrade	469234	489449	479685	490802	560853
Region of Vojvodina	404308	440898	442157	451875	459437
Region of Šumadija i West Serbia	415444	452498	452139	466713	474952
Region of South and East Serbia	260068	276521	336804	346257	288589
Region of Kosovo i Metohija	16417	18144	15405	14515	13421

For minimum number of ELVs considered 4% of total number registered motor vehicles while the maximum number of ELV take 6,7%. Average number of ELVs of total number is 5,35%. Table 2. shows minimum, maximum and average number of ELVs in the Republic of Serbia according to the regions for period of 5 years, 2010.-2014.

Table 2: The number of ELVs in the Republic of Serbia for period of five years, 2010-2014

Year →	2010	2011	2012	2013	2014
Republika Srbija (ukupno) – min.	62622	67100	69048	70806	71890
Max.	104892	112393	115655	118601	120416
Average	83757	89747	92352	94704	96153
Beogradski region – min.	18770	19578	19188	19633	22435
Max.	31439	32794	32139	32884	37578
Average	25105	26186	25664	26258	30006
Region Vojvodine – min.	16173	17636	17687	18075	18378
Max.	27089	29541	29625	30376	30783
Average	21631	23589	23656	24176	24580
Reg. Šumadije i Zapadne S. – min.	16618	18100	18086	18669	18999
Max.	27835	30318	30294	31270	31822
Average	22227	24209	24190	24969	25410
Region Južne i Istočne Srbije – min.	10403	11061	13473	13851	11544
Max.	17425	18527	22566	23200	19336
Average	13914	14794	18020	18525	15440
Region Kosovo i Metohija – min.	657	726	617	581	537
Max.	1100	1216	1033	973	900
Average	879	971	825	777	719

On the basis of the number of registered passenger cars and vehicles that come to the ELV, Republic of Serbia will faces with the problem caused with quantities of waste materials of different types which include hazardous substances. Table 3. shows types of fluids in the motor vehicle Zastava.

Table 3: Content of fluids in the motor vehicle Zastava Skala 101 (www.zastava.net)

Fuel, working fluids	Amount per car	Fuel consumption and replacement of the working fluids
Petrol (full tank)	38 l	7-9 l / 100 km
Petrol reserve	4,5-7 l	/
Engine coolant	6,5 l	Replacement every two years
Motor oil	4,25 l	Replacement after every 10000 km
Transmission oil	3,25 l	Replacement after every 30000 km
Brake fluid	oko 0,5 l	Replacement every two years
Windshield washer fluid	oko 1 l	/
Sulfuric acid	oko 2,5 l	/

Analyzing the Table 2. evident is that the average number of registered passenger cars which comes to the ELV in Serbia for period 2010.-2014. is about 90000 per year. When all this compare with the Table 3. we obtain significant quantities of fluid that are highly polluting and which require a special treatment and adequate detoxification in the aim of environmental protection and increasing the level of quality of life.

Additionally, if it include the amounts which is used during the year in the exploitation of motor vehicles then it is obtaining a total amount of fluid in Serbia which should be collected, transported and recycled (Table 4.) (Milivojević et al., 2011).

Table 4: Amount of used working fluids from motor vehicles in the Republic of Serbia (Milivojević et al., 2011)

Fuel, working fluids	Amount from working fluids from ELV for one year		Amount from working fluids from ELV + used fluids in exploitation for one year	
	Minimum 60000	Maximum 120000	Minimum 30000	Maximum 120000
Fuel (petrol, diesel)	900 t	1800 t	450 t	1800 t
Engine coolant	390 t	780 t	7530 t	8125 t
Motor oil	255 t	510 t	8490 t	8870 t
Transmission oil	195 t	390 t	2375 t	2665 t
Brake fluid	30 t	60 t	465 t	510 t
Windshield washer fluid	60 t	120 t	4430 t	4910 t
Sulfuric acid	150 t	300 t	1075 t	1300 t

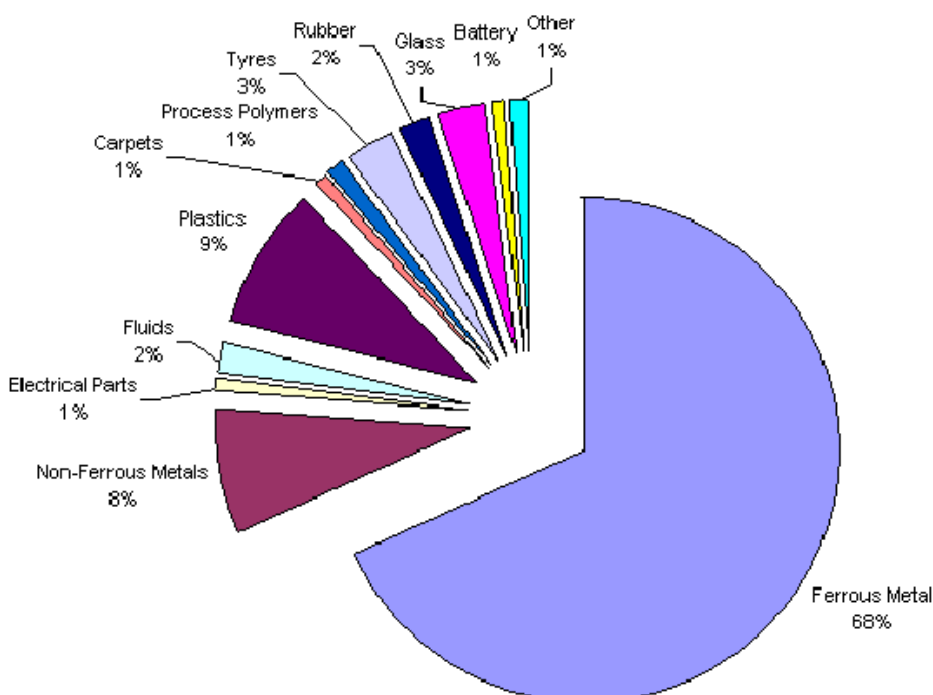


Figure 1: Material breakdown for an average vehicle (Krstić, 2005)

The most of hazardous materials, plastics parts and the other nonmetal parts are not adequately treated regarding to their risk on the environment and they are spreading on the green areas and waste. Their average quantites per car are shown by Figure 1.

All this induces that the process of discharging this fluid from a motor vehicle must be done with reliable detoxification equipment, on a high level and with high level of safety, to prevent adverse effects. (Vulić et al., 2015).

EQUIPMENT FOR ELV DETOXIFICATION

Every recycling possibility of some of materials from process of detoxification, additionally would increase saving of raw resources, whereby it would prevent in flow these toxic substances in process of usage (Vulić et al., 2016).

The specialized equipment for ELV detoxification process has already been available on the marked for a while. The widely known producers are Vortex and SEDA (Figure 2), while the national metal

processing industry and academic institutions try to design competitive equipment (Pavlović et al., 2016).



Figure 2: SEDA Single Station drainage system (www.seda-international.com)

One of the available technologies for detoxification vehicles in the Republic of Serbia is Technical solution “Plant model for discharging liquids from vehicles in the process of ELV” developed under the project TR 35033, which is a fixed station for combined removal of all vehicle fluids with minimum influence on the environment, as shown on the Figure 3.

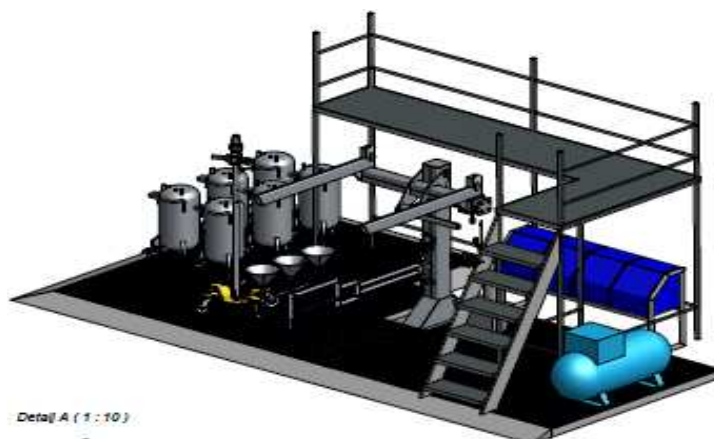


Figure 3: Plant model for discharging liquids from vehicles in the process of ELV (Pavlović, et al., 2013)

By discharging fluids from the vehicle, vehicle becomes to have a treatment as dangerous waste which results to higher level of safety of environmental protection.

After elimination of the toxic waste materials from the vehicle which leads to further elimination and recycling of the metal parts of the vehicles which are carrying out the biggest part (Pavlović, et al., 2015).

HARMONIZATION OF NATIONAL AND EUROPEAN LEGISLATION

National Waste Management Strategy – with the program of approaching to European Union adopted on July 4, 2003 by the Government of the Republic of Serbia. It is a basic document that provides conditions for the rational and sustainable waste management at the national level.

The strategy is based on:

- In accordance with the directions of economic development;
- Directions in accordance what the requirements and plans of the European Union;
- Hierarchy of possible options;
- Activities in the process of harmonization with EU legislations;
- Responsibilities;

- Goals;
- Assignments.

The implementation strategy is achieved by a large number of targets of interest for all levels of government – from local government to the national level. Most importantly it has to be:

- the protection and improvement of the environment,
- protection of human health,
- the achievement of the principles of sustainable waste management,
- changing attitudes towards environmental protection and waste, as one of its segments,
- increasing the level of the public awareness.

The process of joining the European Union and the harmonization of national and European legislation in the field of waste covered are basic principles that are applied in order to improve the waste management system on the territory of our country.

ACKNOWLEDGEMENT

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Session B: HUMAN RESOURCE MANAGEMENT

Papers (pp. 113-170):

Nemanja Berber, Agneš Slavić A RESEARCH OF THE CSR AND SUSTAINABLE DEVELOPMENT TROUGH THE PRACTICE OF HUMAN RESOURCE MANAGEMENT IN SERBIA	...113
Aleksandra Felbab, Dragica Ivin, Natalia Lerik, Maša Magzan JOB SATISFACTION AS THE BEST WAY OF ORGANIZING AND MANAGING A COMPANY AIMED AT BUSINESS OBJECTIVES FULFILLMENT	...119
Eleonora Desnica, Francisc Popescu , Milan Nikolić, Miroslav Vulić EDUCATION STRATEGY ANALYSIS AND DEVELOPMENT OF HUMAN RESOURCES IN THE FIELD OF ELV RECYCLING	...124
Bojana Gligorović, Katarina Zorić THE IMPORTANCE OF LOCUS OF CONTROL IN BUSINESS SETTINGS AND ITS RELATION TO VARIOUS WORK OUTCOMES	...129
Žarko Jokšić SURVEY ON JOB SATISFACTION AND MOTIVATION OF EMPLOYEES IN THE EVENT OF A HIGHER EDUCATION INSTITUTIONS AND CONSTRUCTION COMPANY	...135
Mina Paunović, Vesna Marić, Nataša Đalić, Milica Milojević ANALYSIS OF THE IMPACT STRESS ON MOTIVATION IN THE WORK ENVIRONMENT	...139
Nikola Petrović, Nebojša Tatomirov, Danka Joksimović LEADERSHIP AS A PREREQUISITE IMPROVING THE QUALITY OF DOMESTIC ENTERPRISES	...145
Dragana Sajfert, Jesa Kreiner, Škrinjarić Zoran, Nikola Jančev BEHAVIOR OF BIG FIVE PERSONALITY FACTORS ON GENERAL JOB SATISFACTION	...150
Dijana Tadić FEAR OF PUBLIC PERFORMANCES AND ITS OVERCOMING	...155
Dijana Tadić, Edit Terek, Edin Strukan THE GROWING IMPORTANCE OF INTERNAL COMMUNIACTION ON BUSINESS SUCCESS	...159
Katarina Zorić, Tamara Zorić, Bojana Gligorović COMPENSATIONS AND BENEFITS IN ORGANIZATIONS IN SERBIA	...165

A RESEARCH OF THE CSR AND SUSTAINABLE DEVELOPMENT THROUGH THE PRACTICE OF HUMAN RESOURCE MANAGEMENT IN SERBIA

UDC: 005.35:005.96(497.11)

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ABSTRACT

Corporate social responsibility (CSR) and sustainable development are concepts that are balancing between economic, social and environmental goals. CSR is consisted of its external and internal dimensions. Inside the internal dimension, human resource management (HRM) takes very important part, as it refers to the people who are engaged in the organizations, and who are considered as one of the most important resources in each organization. The aim of this study is the exploration of the relations between the CSR and sustainable development, on one hand, and HRM, on the other. The subjects of the research are the concepts of CSR, sustainable development and HRM, as well as empirical analysis of the data from the CRANET research in Serbia, with the total of 158 organizations. The methodology of the paper included theoretical analysis of the mentioned concepts and the analysis of the empirical data on CSR, sustainable development and HRM. A research is based on the CRANET database, obtained in research period in 2015/2016.

Key words: Corporate social responsibility, sustainable development, human resource management, Serbia, CRANET.

INTRODUCTION

Sustainability entails “the preservation, regeneration, and development of the ecological, economic, and social resources of a system, and that a firm controls its impact on various economic, social and ecological environments” (Ehnert et al. 2016, p. 89). In relation with sustainable development (SD) the concept of CSR is usually defined as the concept that includes four kinds of responsibilities: the economic, legal, ethical, and philanthropic (Carroll, 1991, p. 40). CSR can be understood as a modern management philosophy and tool of marketing for achieving success in the market and as a management concept that creates a balance between economic, social and environmental objectives. It is a decision-making model that takes into account the strategic positioning of the organization (Vasconcelos et al., 2012). CSR is perceived as an indicator of operating performance and as an opportunity to achieve sustainable competitive advantage in business and the wider environment (Berber et al., 2014). CSR consists of its internal and external dimensions. Within the internal dimension of CSR, special attention is paid to HRM, health and safety at work, adapting to changes, management of environmental impacts, and natural resources (Slavić & Berber, 2015).

The aim of this study is the exploration of the relations between the CSR and SD, on one hand, and HRM, on the other. The subjects of the research are the concepts of CSR, SD and HRM, as well as empirical analysis of the data from the CRANET research in Serbia, with the total of 158 organizations. The methodology of the paper included theoretical analysis of the mentioned concepts and the analysis of the empirical data on CSR, SD and HRM based on the CRANET data, obtained in research 2015/2016 period.

THEORETICAL BACKGROUND – RELATION BETWEEN CSR-HRM-SD

Researches on the relationship between the concept of HRM, CSR and sustainable development are becoming increasingly important and very common in contemporary literature worldwide (Buciuniene & Kazlauskaitė, 2012; Renwick et al., 2013; Paillé et al., 2014; Slavić & Berber, 2015; Haddock-Millar et al., 2016).

The authors Paillé et al. (2014) investigated the relationship between strategic human resource management, internal environmental care, organizational citizenship behavior, and environmental protection in China. Data included the examination of 151 members of the top management team, executives and workers. The main results showed that organizational citizenship behavior for the environment fully mediates the relationship between strategic human resource management and environmental performance, and that the internal environmental care moderates the effects of strategic human resource management on organizational citizenship behavior for the environment. Since one of the tasks of the company is to reduce the level of damage to the environment, it is necessary to involve all employees by adopting appropriate practices of HRM at the strategic level.

Lis (2012) explored the importance of CSR in the selection process of potential employers by analyzing the impact of four different CSR dimensions: product, environment, diversity and employee relations in Germany. The results show that CSR has a positive effect on the way in which potential employees can see the attractiveness of the organization in which they are applying for a job. In addition, certain dimensions of CSR have different effects on staff estimates. Variables of diversity and employee relations have the strongest impact on organizational attractiveness. The author points out that it is possible that respondents emphasized these factors as they significantly affect the daily work and life of employees. In this regard, fair and responsible work conditions are associated with a high degree of diversity and relationships among the employees. This study reveals that CSR is an effective tool to attract potential employees. Lis said that CSR and sustainability reports are useful and appropriate communication channels, compiled mainly on a voluntary basis. Companies can publish reports with corporate performance indicators like costs of staff training, development plans, recruitment and employment plans for vulnerable groups.

Based on the Cranet data for Lithuania, Buciuniene and Kazlauskaitė (2012) have performed an analysis of HRM and CSR in terms of research on the relationship and connection between HRM, CSR and corporate performance. According to the survey it was found that companies with better-developed HRM and position of HRM managers in the company have better developed and implemented CSR policies (Buciuniene & Kazlauskaitė, 2012). Regarding the use of HR practices related to CSR in Lithuania, it is still quite limited. Organizations rarely use some of these CSR practice: action programs to improve the participation of vulnerable groups in the labor force, flexible management of working time and job rotation, profit sharing and share ownership for employees. One of the most important results of this research is that organizations that are socially responsible and that follow strategic approach to HRM have higher levels of organizational performance, especially in terms of profitability.

Slavić and Berber (2015) explored the connection between HRM and sustainable development based on data CRANET 2008 survey for three V4 countries (Czech Republic, Slovakia, and Hungary) and Serbia. They found that there is a positive correlation between the existence of the business strategy, human resources strategy, and CSR statement. Positive significant correlations were found between CSR statements and recruitment, career development and training plans for special categories of workers (minorities, older workers, people with disabilities, women, low-skilled workforce, as well as for younger workers). Better developed CSR statements have a positive correlation with the flow of information on strategic issues in organizations, plans for distribution of shares to employees, the use of flexible benefits for employees, use of job rotation, and higher investments in personnel training.

One more interesting research is one of Haddock-Millar et al. (2016) who explored the term green human resource management (GHRM) as a concept concerned with the “systemic, planned alignment

of typical human resource management practices with the organizations environmental goals” (Haddock-Millar et al., 2016, p. 192). But, Renwick et al. (2013) emphasize that organizations are not using the full range of GHRM practices, which can limit the effectiveness of environmental protection.

Based on the above presented, the authors proposed two research hypotheses:

H0: Organizations with better developed CSR practices achieve higher level of environmental performances than organizations with poor CSR.

H1: Organizations with developed CSR have better developed socially responsible HRM practice.

METHODOLOGY

The authors used the methodology of CRANET research. Cranet is a network of scientific institutions from different countries that collect unique and mutually comparable data on the policies and practices of HRM. This network, which was founded in 1989, conducts the largest survey of HRM practice around the world, and has a current picture of the state of the practice in Member States. Coordination of activities is carried out by Centre of European HRM in Cranfield School of Management in the UK. Currently, the organization has about 40 members worldwide (Slavić & Berber, 2016). Faculty of Economics in Subotica conducted this research in Serbia for the second time. As the only member of the international scientific network in this country, Faculty of Economics in 2008 participated in Cranet project for the first time with 50 analyzed organizations. In 2015 the authors examined 158 organizations from the territory of Serbia. The answers to the questionnaire were given by HR managers or executives in organizations with more than 50 employees (Leković et al., 2015).

The largest share of the sample in Serbia in 2015 was SME sector, 60%. There are 27% of large organizations and 13% of very large, with more than 1000 employees. The sample of 2015 research consisted mainly from organizations from private (66%) sector. About 37% of analyzed organizations were from production sector, and 63% of organizations are from service sector. The majority of analyzed organizations are from food production, trade, telecommunication, and IT (Leković et al., 2015).

RESULTS

The following tables present the usage of several HR practices that are recognized as socially responsible. Table 1 presents the share of employees that are employed under the flexible working time. According to the table 1, an alternative model of working time is not implemented to a greater extent in Serbian organizations, since 72% of employees are not employed under this working regime.

Table 1: The share of employees that are employed under the flexible working time (%)

Not used	5%>	6-10%	11-15%	16-20%	21-50%	>50%	Total
72	10	3	0	2	5	6	99%

Source: Authors' analysis based on Cranet research data

Companies in Serbia use job rotation to a lesser extent, as a method for reducing the monotony of workers and career development. According to the data from table 2, it is evident that about 44% of organizations do not use this method, while only 12% use job rotation to a greater extent.

Table 2: The level of the usage of job rotation (%)

0 - Not at all	1	2	3	4 - To a very great extent
44	24	18	6	6

Source: Authors' analysis based on Cranet research data

Since employees are different, and generally there is no person or group that will match the same incentive package. Therefore organizations are creating different benefit packages for different employees. This approach is called *cafeteria - self-service approach*.

Table 3: The usage of flexible benefits (%)

	Yes	No
Flexible/cafeteria benefits (% organizations)	19	81

Source: Authors' analysis based on Cranet research data

According to the data from table 3, organizations in Serbia use flexible benefits in a very small scale for their employees, only 19% of organizations. The largest number, 81%, does not provide such benefits to their employees.

Table 4: Spearman Chi-square test - the relationship between CSR and HR strategy in organizations in Serbia

		The existence of CSR statement		Total
		No	Yes	
The existence of HR strategy	No	76.9%	23.1%	100.0%
	Yes	31.5%	68.5%	100.0%
Total		50.3%	49.7%	100.0%
TEST		Value	Asymp. Sig. (2-sided)	Phi
Pearson Chi-Square		31.406a	0,000	0,447

Source: Authors' analysis based on Cranet research data

According to the data from table 4 it can be concluded that there is a positive correlation between the existence of a written HR strategy and written statements of CSR in organizations in Serbia. If organizations have written HR strategy they will have a written statement of CSR, 68.5% of them. The connection that exists between these two variable is statistically significant, measured by Chi-square test, $\phi=0.447$ ($p<0.01$).

Table 5 shows the results of Spearman's Chi-square test that is used to explore the connection between the existence of CSR statements and HRM activities that are considered to be socially responsible. The analysis was done for variables related to staffing, training and career development of specific (vulnerable) groups of employees.

In the case of recruitment, as the activity of the staffing processes, organizations in Serbia use specific action programs for national minorities, persons with disabilities, women, women returning to the labor market and young workers more if they have a written CSR statement (share of the organization is higher if they have a written CSR statement, statistically significant relationship $\phi < 0.05$). In the case of training for specific groups of the workforce, organizations in Serbia use specific action programs for national minorities, older workers, people with disabilities and women returning to the labor market more if they have a written CSR statement (share organization is higher if they have a written CSR statement, statistically significant relationship $\phi < 0.05$). In the case of career development, organizations in Serbia use specific action programs more only for national minorities and young workers if they have a written CSR statement (share of the organization is higher if they have a written CSR statement, statistically significant relationship $\phi < 0.05$).

The next part of the research included the application of the t-test to determine the differences between organizations that have CSR statements and those that do not have that statement, in terms of achieved environmental performance.

According to the data in table 6 it can be concluded that organizations that have a written statement of CSR achieve a higher level of environmental performance ($M=3.92$, $SD=0.962$) than organizations that do not have this statement ($M=3.21$; $SD=0.843$). These differences in the mean values of ratios of environmental performance of the two groups are statistically significant ($t(150)=4.873$; $p<0.01$).

Table 5: Relations between CSR and HR activities in organizations in Serbia

THE EXISTENCE OF CSR STATEMENT	RECRUITMENT (%)		TRAINING (%)		CAREER DEVELOPMENT (%)	
	Minorities		Minorities		Minorities	
No	10,1	X²=6.447 p=0.011 Phi=0.203	8,9	X²=4.262 p=0.039 Phi=0.165	5,1	X²=6.420 p=0.011 Phi=0.202
Yes	25,6		20,5		17,9	
Total	17,8		14,6		11,5	
	Older workers		Older workers		Older workers	
No	12,7	X ² =0.071 p=0.819 Phi=0.021	11,4	X²=6.125 p=0.013 Phi=0.198	11,4	X ² =0.001 p=0.977 Phi=0.002
Yes	14,1		26,9		11,5	
Total	13,4		19,1		11,5	
	People with disabilities		People with disabilities		People with disabilities	
No	20,3	X²=5.499 p=0.019 Phi=0.187	11,4	X²=10.907 p=0.001 Phi=0.264	11,4	X ² =0.906 p=0.341 Phi=0.076
Yes	37,2		33,3		16,7	
Total	28,7		22,3		14,0	
	Women		Women		Women	
No	13,9	X²=10.150 p=0.001 Phi=0.254	21,5	X ² =0.625 p=0.429 Phi=0.063	22,8	X ² =0.054 p=0.816 Phi=0.019
Yes	35,9		26,9		24,4	
Total	24,8		24,2		23,6	
	Women returners to labor market		Women returners to labor market		Women returners to labor market	
No	7,6	X²=3.785 p=0.052 Phi=0.155	6,3	X²=4.132 p=0.042 Phi=0.162	8,9	X ² =0.637 p=0.425 Phi=0.064
Yes	17,9		16,7		12,8	
Total	12,7		11,5		10,8	
	Less qualified workers		Less qualified workers		Less qualified workers	
No	8,9	X ² =0.637 p=0.425 Phi=0.064	16,5	X ² =3.128 p=0.077 Phi=0.141	3,	X ² =0.554 p=0.457 Phi=0.059
Yes	12,8		28,2		6,4	
Total	10,8		22,3		5,1	
	Young workers		Young workers		Young workers	
No	19,0	X²=9.088 p=0.003 Phi=0.241	36,7	X ² =1.854 p=0.173 Phi=0.109	19,0	X²=4.186 p=0.041 Phi=0.163
Yes	41,0		47,4		33,3	
Total	29,9		42,0		26,1	

Source: Authors' analysis based on Cranet research data

Table 6: The results of T-test of the difference in the level of environmental performance in relation to the existence of CSR statements in organizations in Serbia

	The existence of a written CSR statement	N	Mean	Std. Deviation	Std. Error Mean
The level of environmental performances	No	78	3.21	.843	.095
	Yes	74	3.92	.962	.112

Source: Authors' analysis based on Cranet research data

CONCLUSION

The research in this study was dedicated to the exploration of the connections and the level of development between the three different, but at the same time related, concepts: HRM, SD, and CSR. The study was based on available literature and empirical data on HRM, CSR and environmental performance of organizations in Serbia in 2015. Based on data from CRANET research, the authors analyze the level of development of these concepts and the relationship that exists between them. Both proposed hypotheses are proved. Based on the results obtained during the analysis it is possible provide a number of conclusions which would be relevant for modern organizations that have a desire to achieve sustainable development on the principles of social responsibility:

- An alternative way of organizing working time in the form of flexible working hours has not found an adequate implementation in Serbian organizations.
- Companies in Serbia use job rotation to a lesser extent, as a method for reducing the monotony of work and career development.
- Organizations in Serbia use of flexible benefits for their employees in a very small scale, only 19% of organizations.
- There is a positive correlation between the existence of a written HR strategy and written CSR statements in organizations in Serbia. If organizations have written HR strategy they will have a written statement of CSR, too.

- In the case of recruitment, training and career development as activities of HRM, organizations in Serbia will use specific action programs for vulnerable groups of employees more if they have a written CSR statement.
- Organizations that have a written statement of CSR achieve a higher level of environmental performance than organizations that do not have such a statement.

The authors formulated few recommendations that are related to the implementation of HRM activities. One relates to the formulation and implementation of HR strategy that would contain elements of CSR and sustainability. Since the HRM is an internal dimension of CSR, it is important to note that those activities could affect the improvement of the situation of employees - especially for vulnerable groups. For example, the introduction of flexible working hours allows increased work-life balance of workers and they can combine work time with personal needs. The introduction of these and similar activities, which do not necessarily require an extreme increase in costs for the organization, increase the overall level of job satisfaction. Also, it is necessary to define the specific CSR standards and reporting requirements that are on a voluntary basis, but indicate the organization's commitment to the social responsibility and sustainable development. Some of the biggest companies in Serbia compile such reports for years (Telenor, NIS Gazprom Neft, Hemofarm, Coca-Cola, etc.). Besides documentation, promotional and philanthropic activities, it is important to establish a control functions for CSR and sustainability issues, in order to actually implement and monitor adopted strategies and standards. Namely, the common practice in domestic organizations is that policies and rules exist on the paper, but they are not implemented or monitored. From the standpoint of CSR, the authors of this paper emphasize the HRM department as a way to implement CSR into practice, at least in the part that binds to the social dimension of CSR.

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JOB SATISFACTION AS THE BEST WAY OF ORGANIZING AND MANAGING A COMPANY AIMED AT BUSINESS OBJECTIVES FULFILLMENT

UDC: 005.96:331.101.32

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ABSTRACT

This paper defines the role of a leader at organizing business activities. By this paper we want to represent how to manage a company, both manufacturing and service activities. Possible strategies which can improve business through employees satisfaction are defined, too. Job satisfaction is a dimension which represents the key for success as well as a reward satisfaction which are employees given for their job fulfillment. The reward for the job well done is of high significance for success of every company. Good motivation can also be the result of a reward and is observed both in manufacturing and service activities. These assumptions have been confirmed by this research in which the majority of examinees expressed their agreement. The key for success is in job satisfaction. On the other hand, the reward system should be honest and fair and it has to involve every individual contribution and realized result. The sample of the survey includes the examinees of different age, qualifications and positions in manufacturing and non-manufacturing activities on the territory of Zrenjanin. The research has confirmed the hypotheses postulated at the beginning. It can be concluded that it is of high significance to establish a harmonious atmosphere at all levels within a company and also to reward every employee with a recognition according to his/her contribution in order to realize business objectives successfully.

Key words: satisfaction, motivators, business objectives, leader's role, relation to work.

INTRODUCTION

The role of a man in work activities has changed and until, in time, it has not become the main factor an organization experienced several phases. During the industrialization era and along with the development of revolutionary technical inventions, the science studied the role of a man in the work process more and more. In the first phase a man was neglected and the focus was on machines and technology because it was possible to produce more goods by means of machines than by man power. People were considered only as helpers of machines so they had to adjust to them. Physical man power was used to the maximum and job satisfaction was not the part of that process.

Job satisfaction represents the key of success as well as the pleasure resulted by rewarding the work well done. Beside work conditions, a creative and interesting job also affects job satisfaction. It is necessary here to mention Adams' theory of fairness which is related to close relationship between motivation and successful work performance. Leaders must be able to continually monitor the signals from employees, especially the negative ones which are the results of employees' dissatisfaction in

order to decrease or eliminate their causes. In this way they act positively on motivation and labour output (Bahtijarević, 1999). The topic – human needs management through motivation and its influence on labour output – has been the focus of various researches in which the authors distinguished the importance of job satisfaction and its general impact on the results of a company. According to the modern comprehension of human potential management through motivation, it is understood that certain types of behaviour must be satisfied in the quality motivation way, that an organization should attract and keep the best people in order to become an absolute leader on the market. First of all, it is necessary to encourage creativity and innovativeness of employees and in this way the fulfillment of objectives and development of the whole organization (Varga, 2011). The research which also confirms this assumption that job satisfaction considerably affects the behaviour of employees was carried out in Pakistan. The employees which showed greater satisfaction with their job also expressed a positive attitude to work and work environment (Rizwan, Khan, Tariq, Ghaffar, Anjum, Bajwa, 2012). Another research carried out in Germany in 2014 was related to the job satisfaction of the employed in media service. This research showed a domination of employees' internal motivation. This type of motivation was significant because the employees thought it gave them a possibility for progress and improvement through various seminars and trainings. Further training would, according to their opinions, enable the progress of the whole company. (Kaiser, 2014.)

Object and problem of research

The key of every success lies in the feeling of being satisfied with the job that an individual does. Job satisfaction can be expressed in different ways. Some people are satisfied with the work atmosphere, the others are pleased with the project they are involved in or the contracts they sign. The aim of every organization is to make a good atmosphere in order to achieve better success. For all these reasons it is important to work on permanent improvement of all employee so they could feel satisfaction at work. On the other hand, when bad work atmosphere is present, the employees are increasingly uninterested in work and job satisfaction is reduced to minimum. As one of the main problems can be bad positioning of companies where job satisfaction is at very low level. In other words, the low level of satisfaction results in decreased productivity and profitability which leads to general bad success of the whole company.

Research objective

The research of the influence of job satisfaction on the company's success showed that every employee should have an open approach to work and therefore he/she must be satisfied with the job. The objective of the research is to determine in what extent the years spent on work can affect the examinees attitudes to work.

Research hypotheses

Main hypothesis – It is possible to observe the difference in the attitudes of examinees depending on the years of work spent in an organization.

Hypothesis 1 – The examinees with more than 15 years of work responded that they were stimulated for better work performance by money reward while those with fewer than 15 years of work considered a creative and interesting job more stimulating.

Hypothesis 2 – The examinees with fewer than 15 years of work thought that success was the result of their ability to be persistent in doing their job while those with more than 15 years of work did not consider persistence significant.

Hypothesis 3 – The examinees under 15 years of work experience in greater extent agreed that the increased satisfaction by the job represented the key for success unlike their older colleagues who did not believe that job satisfaction was significant for the company's success.

Research methodology

The research involved the survey of employees regarding different age and different years of work experience spent on various positions within an organization. The survey included the questions related to job satisfaction and the attitudes of employees to work. Therefore, the research dealt with employees' contribution to their organization, their persistence and creativity which represent the key for every company success. The examinees' attitudes were measured by Likert scale. This scale represents a five-degree-scale so the five degrees of agreeing or disagreeing were expressed. The scale included the following assumptions: Strongly disagree – 1, Disagree – 2, Undecided – 3, Agree – 4, Strongly agree – 5.

Analysis of results

It is necessary to differentiate the terms *stimulant* and *motive*. Stimulant stays for an exterior factor which affects people and encourages or forces them to carry out certain activities, while motive is an internal initiator which moves, directs and in the end stops the activities (Ilić, 1988). Maslow's theory about the hierarchy of needs is well known, which tells that every individual's aim is self-actualization which is natural and inborn. Self-actualization is only possible if the other needs on a lower level are reconciled. Physiologic needs are placed on the bottom of the hierarchical ranking, followed by safety needs, social needs, esteem needs, and on the top is self-actualization (Maslov, 2004). Human resources as a part of the organization also strive for accomplishing this main goal, i.e. self-actualization. Because this striving does not stop at the level of an organization, organizations have an important role as a contribution in helping their employees to reach the top of the hierarchic scale, which was defined by Maslow.

Each person experiences work in different ways and different factors are motivating them to carry out the activities. The way people approach work is influenced by the results of their expectation from the job. Observing the opinions about the fact that persistence has an important impact on success, it is not possible to notice a huge difference between the received answers. All respondents regardless to the years of work experience do agree to a greater or lesser extent, that the reason for their success is persistence. The received answers are showed in figure 1.

Pierre Show points out that the younger population and those who don't have a long work experience are usually satisfied with the present reward system in the organisation in which they are working. He points out as well that the engagement increases till the employee's 50th age, after when it comes to dissatisfaction with the reward system (Jeghult, 2007). This fact is proved with this research too where the results show that the respondents with fewer than 15 years of work experience are satisfied with the reward, while the respondents with more than 15 years of work experience think that the reward system is unjust. Based on this, it is possible to conclude that for carrying out the tasks this group of employees is stimulated to a greater extent by financial reward and they think that for their contribution to the organization they deserve – in return - more reward in financial form (see figure 2).

Unvaried job does not cause any internal motivation and reward. For this reason the employees are seeking for a greater outward reward in the form of money. If carrying out a certain job offers satisfaction and if there is an internal motivation present, it will lead to a situation where the employees will be ready to carry out the same actions for lower reward (Jeghult, 2007). The supposition says, the respondents with fewer than 15 years of work experience are satisfied with the received reward and are more likely to be motivated by creative work. However, the results are showing the opposite. The respondents with more than 15 years of work experience agree in a larger extent that interesting and creative job is the most important motivator, while the respondents with fewer than 15 years of work experience are mostly undecided with the mentioned statement. But it is possible to point out that for the members of an organization in general, financial reward does not stands for the main stimulator (see figure 2.)

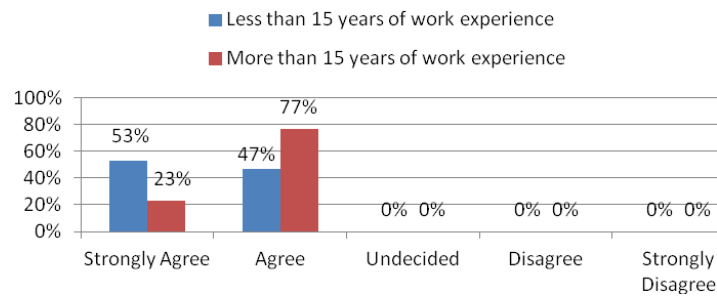


Figure 1: Graphical display of answers on the question „My ability to persist is the main reason why I am successful in my job “

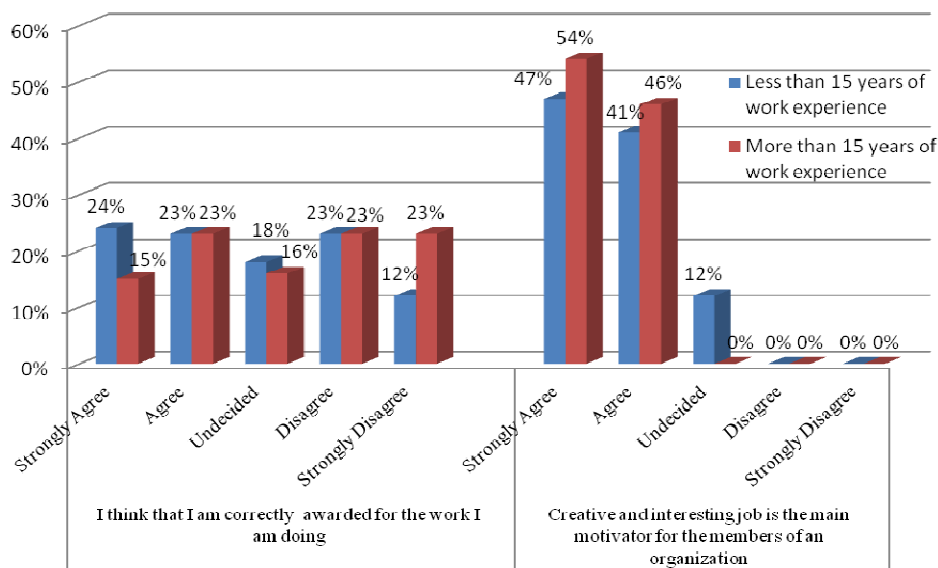


Figure 2: Graphical view of the attitudes according to the respondents work experience

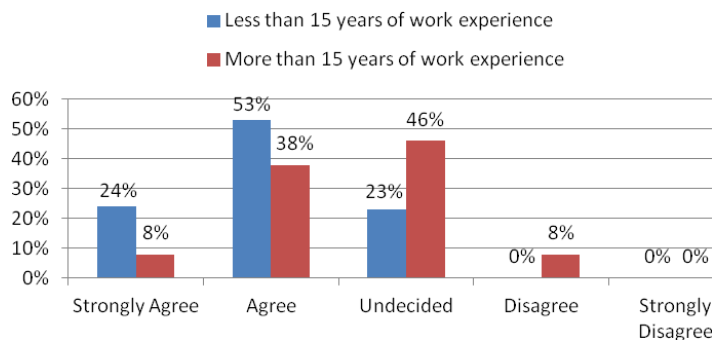


Figure 3: Graphical view of the answers on the question “Job satisfaction within a team is the key to the success of the organization“

In his work Maslow is looking for the answer to the question “Why people do not create and innovate” instead of “Why people do create and how creativity arises” which is more often asked. He is trying to find out the blockades that are tearing down the creativity in people. He mentions that for not creating it is enough just hard work and audacity (Maslov, 2004). The employees have a big impact on creativity. Not receiving rewards and commendations for new ideas, but also inadequate registration system for the ideas can worsen the relation to creation and innovation within the organisation. It is nearly impossible to consider the employee’s motivation separate from the job satisfaction. The factor which causes the satisfaction is changing with time, and so what once was a great motivator declines and is going to be on a lower level, so they become no longer important motivators and they are going

to be replaced with new ones. To the question whether satisfaction is the key factor to success or not, based on the received answers, it is possible to point out that the respondents with fewer than 15 years of work experience more strongly agree with this fact comparing to the respondents with over 15 years of work experience, while this group of respondents has a different opinion about it (see figure 3). These results are confirming the supposition which presents the root of this study and on what this research is based.

Table 1: Employee expectations from the ideal leader

Flexible working time	44%
Social insurance	37%
Possibility of progress	34%

AVANTGARDE-Experts carried out an online research in Germany on a topic based on job satisfaction. With this questionnaire they came to the solution that the main expectation from an ideal leader is flexible working time, followed by social insurance, and on the third place is the possibility to progress, which is shown in the table 1.

These results once again point at the fact that financial reward as a motivator is no longer the main goal of the employee's. As an answer to the belief that reward in a financial form is the main stimulator, numerous researchers show the opposite situation. Even if it is not always the main motive, it could be said that it is still an important factor of motivation. It is not possible to apply just one kind of reward system in all organizations. It is necessary to adapt the way of rewarding to employees within an individual organization and to their needs.

CONCLUSION

The research led to the cognition that leaders within an organization have a great impact in the mentioned domain. Their obligation is to be connected with their employees in one continual process in order to accomplish the best possible result. It is necessary that they recognize some negative signals from the employees in order to satisfy their wishes. The research indicated the fact that the most of the respondents agree with the statement that the key to the success within an organisation lies in satisfaction. From all these facts follows the cognition that financial reward does not have an immediate effect and for that reason it is not the main initiator in work.

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EDUCATION STRATEGY ANALYSIS AND DEVELOPMENT OF HUMAN RESOURCES IN THE FIELD OF ELV RECYCLING

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ABSTRACT

Today, the most important issue becomes the reduction of use and saving of raw materials on the one hand and reduction of waste materials on the other hand. The idea of a large proportion of vehicles in the environmental load is widely spread in the public. Therefore, recycling implementation in the process of production vehicles are environmental directives. Education for sustainable development is a way of applying science to improve the quality of human life, maintaining earth's ecological balance. In this paper, we have discussed the general principles of sustainable development in engineering and education: recycling of end-of-life vehicles (ELV – End-of-Life Vehicles) as the mainstream waste in the EU and the state of education personnel in the field of recycling and sustainable development.

Keywords: sustainable development, recycling, education, ELV (End-of-Life Vehicle).

INTRODUCTION

Every human activity, both in the production and consumption process, leads to waste generation. It is possible to achieve the reduction of waste generation in spite of the increase of total industrial activity by proper waste generation control measures and the optimal mechanism of waste management and recycling. Waste management strategy is based on the minimization of waste, recycling of waste and its reuse and safe disposal of non-recyclable residues. The main activities, especially in developed countries, are aimed at finding the most suitable recycling methods. It turned out that there is not any waste that cannot be somehow processed and converted into secondary raw materials or alternative energy source. The result is preservation of natural resources (Pešić, R., Babić, S., & Milosavljević, B., 2009).

The idea of a large proportion of vehicles in the environmental load is widely spread in the public. A car is a very complex product that contains about 15,000 parts made of different materials using different technologies. Degradation of the environment is present in the production process, as well as while using waste during the exploitation and management by the end of vehicle life. These facts require that the recycling of end-of-life vehicles (ELV - End-of-Life Vehicles) must establish an appropriate system with effective and comprehensive management (Kozić, A., & Sudarević, D., 2005, Simic, V., 2013).

Universities in Serbia have to make a fundamental review of the programs and their contents in the light of theory and practice of sustainable development. The steps of sustainable development should be sought in the quality of education and building systems of creativity and tolerance based on institutions. It is certain that sustainable development is no longer a matter of choice but a necessary concept that must be implemented in order to ensure conditions for the survival and prosperity of future generations. A sustainable future requires a system of education and knowledge that will gather people who can creatively and critically think, successfully solve problems and mutually contribute to the development of the new economy and stable social system in accordance with the principles of sustainable development; educated people who are innovative in thinking and action, learn quickly and change their own skills in accordance with technological developments and global trends of development (Desnica, E., & Nikolić, M., 2013, Nikolić, M., Sajfert, Z., & Kreiner, J.H., 2011).

ROLE AND IMPORTANCE OF RECYCLING

Recycling is a set of activities that ensure the reuse of waste materials. The following strategic goals are achieved by recycling: saving raw material resources (all materials come from nature in limited quantities); energy saving (without energy to spend in the primary processes, as well as in transport, while additional energy is obtained by burning materials that are not recycled); environmental protection (waste materials degrade living environment, so recycling protects the environment); creation of new jobs (processes in the recycling of materials include investment in knowledge and labor creating the need for new jobs) (Krstić, D., 2005).

ELV Recycling

At the beginning of mass car production and creating a car waste that have completed their life cycle, the idea emerged that certain parts of such cars can be reused (e.g. as spare parts). The car is a complex product and its life cycle should be in accordance with the cycle of circulation of raw materials. It should be recyclable as much as possible, and thus becomes an environmentally friendly product.

ELV recycling comprises recycling in the narrow sense, recovery and reuse. The principle 3R (Reduce - Reuse - Recycle) is known in the world and it defines a modern recycling principle. The first R refers to reduction or designing cars that will have a longer life while using fewer resources. Second R refers to reuse meaning that some parts and systems can continue to be used as a second hand and then these parts are converted into the materials of which were originally made (recycling - a third R). Concept 3R is improved into the 5R by Toyota, adding the material purification process to facilitate recycling and the process of energy recovery back from the waste, continuing to reduce the rest of the 25% being deposited (Pešić, R., Babić, S., & Milosavljević, B., 2009, Krstić, D., 2005).

Situation in the Country and World (Krstić, D., 2005, <http://ec.europa.eu/environment/waste/elv>)

Examining the legislation, primarily by considering the current general situation in the field of ELV recycling in our country, the following can be concluded: ELV generally cannot act in a manner that ensures the environmental protection; ELV recycling system is not established because there is no globally organized management of such waste; there are ELV wastes where customers take off the vehicles what they need by paying appropriate amount of money; recycling material reparation is made in a smaller number of companies, mainly, of metal; repairing parts (mainly clamps, oscillating shoulder, brake shoe, stabilizer bar - all the parts of particular importance for the security), is performed without any quality control and usually with inadequate materials and technologies; tradition mainly exists in recycled steel and waste that is generated in the process of components production.

The general estimation is that recycling is one of the most dynamic industries in the developed world that is being in constant expansion. Estimates show that each year, only in the EU countries more than

10 million ELV is obsolete, which means that 10 million tons of this type of waste is produced annually. This reason is more than enough to put ELV as a priority of every country.

Generally, a large number of participants is involved in the recycling of ELV (where the system is set up). In order to define the functional, efficient and effective system, it is necessary to define its boundaries and operators. System operators for ELV recycling are organizations as legal persons and individuals as involved natural persons, carrying out processes and/or activities of the highest importance to the technological functionality and system management.

PERSONNEL EDUCATION IN THE FIELD OF RECYCLING AND SUSTAINABLE DEVELOPMENT

The baseline of Strategy in the field of education for sustainable development states: favorable general conditions for economic-financial, institutional and technical support to the reform of education and education for sustainable development; promoting sustainable development in the context of formal and informal education; sustainable development training for all teachers at all levels of education; systematic development of research in education for sustainable development; constant improvement of cooperation in this field at national, regional and international level (Desnica, E., & Nikolić, M., 2013, www.odrzivi-razvoj.gov.rs).

Implementing the Strategy, segments of education on sustainable development are gradually included at all levels of education. At the higher education level in recent years, a series of faculties, departments, courses or study groups in the field of the environment are established for basic, master and PhD programs. School curricula regarding sustainable development are still present at the technical faculties, although there is the rise in interest of social courses (Desnica, E., 2014).

Cooperation between University and Economy

The requirements addressed to education are arising from the needs of the economy, production, management and society in general. The economy is the one who sets the criteria for the qualifications of professional staff, while education offers an answer to these demands and needs. According to the changes, individuals, willing to learn throughout life, are needed in each company, team and community. Due to the fact that labor markets increasingly rely on high levels of skills and transversal competences, higher education should provide students with the advanced knowledge, skills and competences that will be needed for their profession. A positive outcome can be expected if the importance of integration and cooperation between universities and economy is emphasized as an adequate solution to meet these needs and achieve the objectives (Desnica, E., & Nikolić, M., 2013, Gajić, O., & Lungulov, B., 2011).

Cooperation between University and economy is crucial today. This cooperation is achieved in different ways - through development of new academic programs, joint research projects, seminars, presentations at fairs, etc. In order to effectively improve the transfer of knowledge and innovation in the market, it is necessary to promote academic entrepreneurship, as well as any form of cooperation between university centers and business organizations. Universities, together with other research organizations, play an important role in the creation and dissemination of knowledge on the local area and beyond. Collective ambition of the University and the economy is to encourage innovation that would bring mutual benefit and development of the region. Connecting master and PhD students to companies in the region is crucial not only for universities but also for companies so that students are given information on contemporary issues related to research and companies will have an opportunity to apply these results in their business (Desnica, E., & Nikolić, M., 2013, Polovina, A. et al., 2011).

The curricula of environmental protection, recycling and sustainable development at our universities (Trumić, Ž., M., & Trumić, S., M., 2011).

Development of human resources for proper and sustainable waste management can be divided into three main areas: education, professional personnel training (including waste producers' training), and public awareness development.

The objective of personnel training and public awareness development is to make recommendations for actions that will: increase the awareness level of environmental issues, especially with children and young people, creating a background for future actions and sustainable waste management; ensure adequate technical and professional competence at all levels of institutions and organizations, employed in government at all levels in accordance with the powers, including companies from the private sector, with responsibility for waste management and law enforcement at all levels.

The key improvement of waste management is the need to develop skills of professionals working in the industry and incorporating techniques and technologies in the education of future professionals in the field of waste. Public awareness about waste and environment needs to be developed, through media, education in schools and various campaigns. Professional training will be a primary objective in the short term to ensure that staff, working in the field of waste management, will technically be competent in their work. This will include requirements for training of personnel who deal with staff and waste management in their companies that are responsible for waste management in ministries or local government. Professionals in the field of waste management must help to establish the education, policy development and curriculum.

In recent 15 years, the real expansion of courses related to the fields of environmental protection and sustainable protection has been at universities in our country and abroad. Table 1 provides an overview of several faculties of technical sciences in Serbia that have courses related to recycling, sustainable development and environmental protection.

Table 1: Overview of technical universities with curricula of environmental protection, recycling and sustainable development

<i>No.</i>	<i>Course</i>	<i>Faculty</i>
1.	Environmental Engineering (general and master studies)	Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia (joint study programme with Faculty of Technical Sciences, Novi Sad)
2.	Environmental Engineering (general and master studies)	Faculty of Mining and Geology, Belgrade
3.	Mining Engineering, module Recycling Technologies and Sustainable Development (general, master studies)	Technical Faculty, Bor
4.	Urban Engineering (general studies)	Faculty of Engineering Sciences, Kragujevac
5.	Environmental Engineering (general, master, PhD studies)	Faculty of Occupational Safety, Niš

CONCLUSION

The automotive industry is an initiator for development of the national economies and integrator of modern achievements in the field of engineering, technology and almost all other scientific disciplines. On the other hand, the automotive industry is a significant consumer of raw material and energy resources, and also an important participant in the degradation of the environment. Therefore, the management of vehicles' life cycle is an important aspect today and especially in the future of automotive industry.

Higher education institutions have a strong starting point for the preparation of engineers who are able to design and develop sustainable products and processes. When environmental engineering curricula are involved in a global dimension, then learning experiences can be used to fulfill six principles that define the role of professional engineers (Engineering Council, 2009) and first principle is the social

need for engineers to contribute to building a sustainable society, both in the present and future (Roger Penlington, R., & Steiner, S., 2010).

It is necessary to have an increase of information about the fact that education and learning are an ongoing process that requires constant improvement of existing skills, as well as the development of multi-disciplinary competencies in order to meet the increasing demands for flexibility and mobility (Bologna process) within the enlarged European Union. Reforming their education at all levels (kindergarten, primary education, universities) and changing the consciousness of employees that only through continuous, lifelong learning can remain in the race for promotion, we increase the attractiveness not only of the economy, but also the value of our resources.

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THE IMPORTANCE OF LOCUS OF CONTROL IN BUSINESS SETTINGS AND ITS RELATION TO VARIOUS WORK OUTCOMES

UDC: 005.96

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ABSTRACT

Since locus of control is considered to be applicable across all areas of life, its behavioural implications are very significant to work environment as well. This paper aims at understanding the locus of control as an important variable for the explanation of human behaviour in organizational settings. Special attention is paid to the concept and types of locus of control, the differences between internals and externals as well as its relation to various important work outcomes including employees' well-being, motivation, effort, performance, job satisfaction, satisfaction with co-workers, stress, perception of the job, compliance with authority, supervisory (leadership) style and employees' reaction to it. Therefore, increasing managers' awareness of employees' locus of control may be a key factor in predicting employees' workplace attitudes and behaviours and a useful variable for employee selection.

Key words: locus of control, types of locus of control, work outcomes, leadership style.

INTRODUCTION

The concept of locus of control was developed by American psychologist Julian Rotter (1966), who defined it as the degree to which the individual perceives that the reward follows from, or is contingent upon, his own behaviour or attributes versus the degree to which the individual feels the reward is controlled by forces outside of himself and may occur independently of his own actions. Since locus of control has been widely studied by scholars and scientists there are many definitions of the concept which are mainly based on original Rotter's definition. According to Ng, Sorensen and Eby (2006), locus of control is the extent to which people believe that they have control over their own fate, while Babalola (2009) conceptualizes it as a personality predisposition which describes an individual's perception of their ability to change the situation. Spector (1988) who operationalized the notion of locus of control in a work context by developing the work locus of control scale (WLCS) defines it as a generalized expectancy that rewards, reinforcements or outcomes in life are controlled either by one's own actions (internality) or by other forces (externality).

Rotter (1966) differentiates internal and external locus of control. An internal locus of control is the perception that the individual controls his/her own actions and consequences, while external locus of control is the perception that others have control over the individual, and outcomes are dependent upon those with control (Tillman et al., 2010). Therefore, people who ascribe control of events to themselves and believe that they are the masters of their fate are said to have an internal locus of control and are referred to as internals. On the other hand, those who attribute control to outside forces and believe that they do not have direct control of their fate are said to have an external locus of control and are termed externals.

Researchers observe that individuals' locus of control plays an important role at work. In the organizational sciences, the differentiation between internal and external locus of control is crucial for explaining how employees approach work, both attitudinally and behaviourally.

INTERNALS AND EXTERNALS AT WORKPLACE

Locus of control in the workplace differentiates employees who believe they can exercise control over their work and their environment through their own actions - employees who are more or less self-reliant. Internals and externals differ in many ways. Employers' awareness of distinguishing characteristic between internals and externals and recognizing that employees operate from an internal or external locus of control may have direct and powerful effects on organization and contribute to employees' overall satisfaction.

These are some of the basic differences between employees with internal and external locus of control according to Spector (1982):

- Internals display greater job motivation because they perceive themselves to have greater control over the work settings.
- Internals perform better on the job than externals. They hold greater expectancies that effort will lead to good performance and good performance to reward. Thus, they exert greater effort in situations where rewards are tied to performance, and ultimately, greater effort should lead to better performance across individuals.
- Internals demonstrate greater job satisfaction. They tend to take action more frequently than externals do. The dissatisfied internal is more likely to quit a dissatisfying job. Thus, there would be fewer dissatisfied internals than externals. Also, internals may perform better and receive the benefits of that performance. In situations where rewards follow performance, internals are likely to be more satisfied. Third, internals tend to advance more quickly and receive more raises than do externals. More frequent promotions and salary increases should be expected to lead to greater satisfaction.
- Internals perform better in learning and problem-solving situations, because of their better use of information.
- Internals look to themselves for direction (and are likely to be independent and resist control by superiors and other individuals) while externals look to others. Therefore, externals are more conforming and compliant and make more compliant followers or subordinates than do internals.
- Internals and externals differ in their perceptions of job characteristics and in their reactions to those characteristics. Because of the personal control over their environment and sensitivity to information in it, internals perceive the job as offering more autonomy and report more feedback on the job.
- Internals tend to take action and would be expected to quit a dissatisfying job. Externals tend not to take action, and therefore even if they are dissatisfied they may stay on the job, at least until environmental factors force them to leave.

Chen & Silverthorne (2008) reported that employees with a higher internal locus of control are more likely to have lower levels of job stress and higher levels of job performance and satisfaction. They have less role conflict, ambiguity, and overload, so enjoy more job satisfaction than those with external locus of control, (Singh & Ashish, 2011; Tillman et al., 2010) who are more likely to develop burnout (Alarcon, Eschleman, & Bowling, 2009; De Hoogh & Hartog, 2009; Meier et al., 2008). Employees with internal job control are proactive in finding practical solutions to conflict, while employees with external job control tend to avoid conflict (Qiang, Bowling, & Eschleman, 2010; Taylor, 2010). Because of their proactive tendencies, internals are more likely than their external counterparts to engage in problem-focused coping behaviours, such as making and following plans to reduce or eliminate the stressor and seeking instrumental social support (Gianakos, 2002; Ng et al., 2006).

Internals generally possess better social skills, are more considerate of others, are more effective at influencing people, and have better interpersonal relationships with supervisors and co-workers than externals (Kapoor, Ansari, & Shukla, 1986; Lefcourt, Martin, Fick, & Saleh, 1985; Ringer & Boss, 2000; Qiang, Bowling & Eschleman, 2010).

Employees with an internal locus of control look positively at the work environment, whereas externals' perception of work environment is negative (Judge, Locke, & Durham, 1997; Judge, Locke, Durham, & Kluger, 1998). Internals are more likely to set challenging goals for themselves and are more persistent in pursuing those goals in the face of adversity (Erez & Judge, 2001; Hollenbeck, Williams, & Klein, 1989; Yukl & Latham, 1978) which contribute to the relatively superior performance and career success of internals (Mento, Steel, & Karren, 1987; Wofford, Goodwin, & Premack, 1992).

RELATIONSHIP BETWEEN LOCUS OF CONTROL AND VARIOUS ORGANIZATIONAL VARIABLES

Organizational researchers have increasingly explored the role of locus of control in the workplace. Numerous studies of locus of control in work settings have linked this personal trait to various organizational variables.

In meta-analysis study conducted by Judge and Bono (2001), locus of control displays positive relations with job satisfaction and job performance. Salazar, Hubbard and Salazar (2002) found that internal/external locus of control impacts hotel managers' job satisfaction. Ng et al. (2006) meta-analysed the relationships between locus of control and a wide range of work outcomes and found that locus of control was positively associated with favourable work outcomes, such as positive task and social experiences, and job motivation. The results of a study by Vijayashreea and Jagdishchandrab (2011) indicate that there is a positive correlation between internal locus of control of employees in Public Sector Units in Bangalore and job satisfaction as well as between external locus of control and job satisfaction. Chen and Silverthorne (2008) found that locus of control, plays an important role in predicting the level of job satisfaction, stress and performance among accountants in Taiwan while in a study of Indian IT professionals' locus of control it was positively related to organizational commitment and was found to moderate the relationship between job satisfaction and organizational commitment (Chhabra, 2013). According to Spector et al. (2002) locus of control contribute to well-being at work. Locus of control is a powerful indicator of Hong Kong teachers' job attitudes in terms of organizational commitment, intrinsic satisfaction, extrinsic satisfaction, social satisfaction, influence satisfaction, role clarity, and feeling of job challenge and organizational perceptions in terms of principal's leadership, organizational structure, teachers' social norms, and organizational culture and effectiveness (Cheng, 1994). The multiple regression analysis in research conducted by Kaur and Gupta (2016), of the impact of personal characteristics on innovative work behaviour of 120 teachers in India, has indicated that internal locus of control has a positive correlation with innovative work behaviour, and is a significant predictor of innovative behaviour. The results of the study by Mohapatra and Gupta (2010) shows that executives' internal locus of control has a significant correlation with factors such as managing emotions in the self, social skills and utilizing emotions. Locus of control has been related to attitude toward work and client participation in vocational rehabilitation for individuals with industrial injuries (Duvdevany & Rimmerman, 1996). The regression analysis in research conducted by Sahraian et al. (2014), showed that locus of control in nurses has a significant positive correlation with the job stress. Boshoff and van Zyl (2011) indicate statistically significant relationships between internal locus of control and ethical behaviour, as well as external locus of control and ethical behaviour among employees in the financial sector in South Africa.

LOCUS OF CONTROL AND SUPERVISORY STYLE AND SUBORDINATES' REACTION TO IT

Locus of control has been empirically correlated with the supervisor's behaviour and style, and the subordinate's reaction to it. Byrne (2011) found that managers with internal locus of control were more supportive and involved than those with external locus of control, shared many characteristics of transformational leaders including collaboration, support, participatory involvement, and communication (Mohapatra & Gupta, 2010) and were more task oriented and functioned better in stress situations than did externals (Anderson, Hellriegel, & Slocum, 1977) According to Miler et al. (1982), more internal chief executives tended to pursue more product-market innovation, undertake greater risks, and lead rather than follow competitors. In their study locus of control of top executives was found to bear a direct and significant relationship to the nature of corporate strategy. Howell and Avolio (1993), found a statistically significant correlation between managers' internal locus of control and transformational leadership while external locus of control positively correlated with transactional leadership. Also, the findings of their study positively related an internal locus of control with three of the four "I's" of transformational leadership: idealised influence, intellectual stimulation, and individual consideration. The results of a study conducted by Ahmad (2014) among head nurses showed that a moderate internal locus of control were associated with democratic leadership style as well as coaching and direction style while an external locus of control was associated with a laissez faire leadership style.

According to Martin et al. (2005) locus of control is an important antecedent of the quality of relationship that people develop with their managers. The more employees rate themselves as having an internal locus of control, the better they perceive the quality of their relationship with their manager. In a study which investigated the moderating effect of locus of control on the relation between supervisory style and satisfaction with supervision Runyon (1973) found that employees with internal locus of control were more satisfied with supervision under a participative style, and they were more satisfied with a participative than with a directive style whereas externals were more satisfied under a directive style, and they were more satisfied with a directive than with a participative style.

Spector (1982) suggests that internals and externals differ in their personal supervisory styles and in their reactions to the supervisory styles of their superiors. Externally oriented employees prefer supervisors who are directive, and they themselves rely more on coercion with their subordinates. In addition, they seem more concerned with the social rather than the task aspects of the job. Those who are internally oriented, prefer participative approaches from their supervisors, rely more on personal persuasion with their own subordinates, and seem more task oriented and less socially oriented.

CONCLUSION

From all mentioned above, it can be concluded that locus of control, both of subordinates and their supervisors, is very important personality trait, thus special attention should be given to it. Also, many researches who have examined this topic found that locus of control, especially internal locus of control, is related to wide range of positive work outcomes which leads to better business results.

In the organizational sciences, the differentiation between internal and external locus of control is important for explaining how employees approach work, both attitudinally and behaviourally. Therefore, increasing leaders' and managers' awareness of employees' locus of control may be a key factor in predicting employees' workplace attitudes and behaviours and a useful variable for employee selection. It is crucial for leaders and managers to keep in mind personal differences of employees when applying different leadership styles in the workplace, as its' effectiveness can directly depend on the personality type of subordinates.

Also, company needs to ensure that it has the right type of leader available by selecting the one who is internally oriented and possess characteristics of a transformational leader.

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SURVEY ON JOB SATISFACTION AND MOTIVATION OF EMPLOYEES IN THE EVENT OF A HIGHER EDUCATION INSTITUTIONS AND CONSTRUCTION COMPANY

UDC: 331.101.32:005.336.1

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ABSTRACT

Motivated people will invest more effort in their work than those who are not motivated. Improving productivity, efficiency and creativity and the quality of working life will achieve through motivation. Administration stimulation encourages staff to creativity, greater results and accountability. The combination of material and moral forms of stimulation is achieved by full engagement of employees, which reflects the efficiency, rationality and efficiency.

Key words: Motivation, labor, business results.

INTRODUCTIONS

Human activity is initiated motives, directed and maintained until the activity is not fulfilled. Motivation is one of the most important topics in management because organizations achieve goals through performance evaluation and the results of employees and managers. In order to accomplish its employees working effects must be served three main factors which are:

- the ability of employees to achieve the effect,
- the chances of employees to achieve the effect,
- motivating employees to achieve performance

An important goal of the technology design is identifying some of the most important elements of success and focus the strategy and the product design on them. (Vágási et al., 2006)

JOB SATISFACTION

The behavior of people in an organization have a very powerful influence their values and attitudes. Both of these categories create in people a strong predisposition to behavior in a certain direction.

The most important of all is the attitude of employees towards their work. This attitude is called job satisfaction and we can define it as "the cognitive, affective and evaluative reactions of individuals to their job." Job satisfaction is therefore a complex attitude which involves certain assumptions and beliefs about the job (cognitive component), feelings towards work (affective component) and assessment work (evalutivna component). Job satisfaction is one of the most researched topics in the field of human behavior in organizations. The reason for this is certainly a widespread belief that a satisfied worker is a productive worker will be the organization's performance can not be achieved with disgruntled employees. (Tanasijević, 2007).

Job satisfaction exists in the extent to which people are satisfied with the outcome of the transaction. What one person receives more outcomes than on a price to be satisfied. So, to the satisfaction not only affects the size of bonuses, but also that the prize receives or whether the effort worker receives those awards on price. Workers who have little pay need not be unhappy if their salary is not the most important factor in job satisfaction. If this is the case, creative, young engineers in development it is possible to be happy in your work despite the low wages if they have the ability to work in this creative work, training, learning and progress, because that is what they appreciate the work. To we therefore anticipate one's job satisfaction, we must take into account not only the satisfaction of certain aspects of the work that the individual deals, but also his expectations from this job. In the total job satisfaction affects an imbalance or deviation satisfaction of expectations in terms of certain aspects of the job and not the height of satisfaction these aspects of itself. (Tanasijević, 2007)

What is the basis of quality labor organizations are trusted employees who are satisfied with their work, willing to grow and learn and time to themselves and bring profit organization, either in the material or any other sense. Employees who are not satisfied will not do the job properly, causing company suffers direct damage. Moreover, dissatisfied employees will want to leave the job and in this case, all resources previously invested in this employee practically be thrown into the water. In order to work out a healthy company and brought in a profit, it is necessary to control and maintain employee satisfaction, for it rests on human resources performance of a company

There are two basic approaches to the analysis of job satisfaction that are based on what people think about my work:

- first type refers to the general satisfaction of the transaction, without reference to some of its specific components,
- second type relates to certain aspects of the job satisfaction, such as salary, benefices međuljudski applicable.

PRESENTATION OF FINDINGS

The total number of employed persons was surveyed:

- In the construction company's employees surveyed 30 of those 30 workers, 9 are women and 21 je man, at the University of the surveyed 50 of the 50 employees, 30 are women and 20 are men.
- To obtain research based on which will be observed problems and determine the situation in the area of job satisfaction and work motivation of employees, selected the two companies differ in the structure of employment (in terms of qualifications, seniority, working conditions, interpersonal relationships, politics companies), allowing comparison of the results obtained by the survey.

It is divided into a number of surveys to all employees who have found themselves at a certain time at a certain place. The first group of questions is planned to determine the structure of the respondents. It was concluded that, in the two tested samples, the structure of the surveyed different by gender and level of education (and there are differences in the actual structure of the employees in the of the two organization).

In the sample of the University, 60% of employees are women (30 employees), a GP in the sample, they make up only 30% of respondents (9 employees). At the University of 4% of employees University Degree (2 employees), 26% of the employed base has higher education (13 employed), 30% masters (15 employees), and 40% of doctors Sciences (20 workers). In the construction is, the highest degree of education, primary higher education, has 30% of (9 employees), III degree of education has 40% of them (12 employees), and the University Degree 30% of its employees (9 in total).

It is assumed that the pattern of the University faithfully reflects the structure of employees, and that in a sample of construction companies more of those with a college education and those with lower secondary and lower education than there are among the employees.

When it comes to work experience, 22 respondents with university (44%) have less than ten years of service, a GP in the sample - 50% (15 employees). Between ten and twenty years of service to 46% of employees in the sample University (23 employees), whereas, among those surveyed in the GP, this group 30% (9 workers). More than 20 years of experience among respondents at the University has 10% of employees (5 employees), a construction company in 20% (6 employees)

Table 1: Structure of employees

	University	Construction company
Pole	Women - 60% (30 workers) Men - 40% (20 workers)	Women - 30% (9 workers) Men 70% (21 workers)
Years	Less than 30 – 30% (15 workers) From 30 to 50– 60% (30 workers) More od 50 – 10% (5 workers)	Less than 30 – 60% (18 workers) From 30 to 50 – 20% (6 workers) More od 50 – 20% (6 workers)
Education	IV degree – 4% (2 workers) Basic academic education – 26% (13 workers) Masters - 30% (15 workers) Doctors of Sciences – 40%(20 workers)	III degree – 40% (12 workers) IV degree – 30% (9 workers) Basic academic education – 30% (9 workers)
Years of service	Less than 10 years – 44% (22 employed) From 10 to 20 years old – 46% (23 employed) Over 20 years – 10% (5 employee)	Less than 10 years – 50% (15 employee) From 10 to 20 years old – 30% (9 employee) Over 20 years – 20% (6 employee)

The second group of questions related to the level of satisfaction with the hygiene factors. As far as salary satisfaction, surveys in both samples are between partial satisfaction I indecision satisfaction. As far as human relations - the university people are generally satisfied employees, while employees in the GP mainly partially satisfied. Relationship immediate supervisor employed at the University generally partially satisfied, while employed by the GP are neither satisfied nor dissatisfied. Working conditions are employed at the University partially satisfied, and employees of the GP are neither satisfied nor dissatisfied. Organization of work are employed at the University generally partially satisfied, as well as employees of the GP. Business Policy at the University Translated employees are generally satisfied, while the GP are neither satisfied nor dissatisfied.

Table 2. Only the degree of employee satisfaction hygiene factors

	Value ratings University	Rank University	Value ratings Civil Company	Rank Civil company
Satisfaction salary	2,22	VII	2,77	III
Satisfaction with personal relationships	1,82	III	2,53	II
Satisfaction with immediate superior attitude	2,26	VIII	2,96	V
Satisfaction with work conditions	2,02	V	3,13	VI
Satisfaction Labor Organization	1,92	IV	2,06	I
The satisfaction of gaining recognition for the work	1,70	I	3,47	VII

When it comes to respecting the rights of employees employed at the University are partially satisfied, and employees of the GP are partially unsatisfied.

However, the total percentage of satisfied and the percentage of very satisfied is greater than at the University of the GP, and the percentage of dissatisfied and, in particular, a very disgruntled, is greater than in the GP at the University, where such a bit.

A significant difference, except in respect of the rights of employees, there is the satisfaction of gaining recognition for the work - interviewed the University are largely satisfied that factor, while, among those surveyed in the GP, the higher the percentage of dissatisfied than satisfied, a large number (47%) those are neither satisfied nor dissatisfied.

CONCLUSION

Employee satisfaction at the higher education institution is at a high level. Employees are largely satisfied with gaining recognition for its work, policy and human relations, and least satisfied with the relevant line manager and salaries. There is an extremely small difference between the value of the score hygiene factors, we can conclude that they are employed at a higher education institution, regardless of the ranking given, to a similar extent satisfied the above factors.

Employees of construction companies are most satisfied with the organization of work, human relations and payroll, are least satisfied with gaining recognition for the work and working conditions, and are particularly dissatisfied with the respect for the rights of employees.

We can conclude that they are employed at a higher education institution more satisfied with the transaction, in relation to the employees of the construction company.

Employees at the University of the most motivating opportunity for advancement, higher salary and greater possibility of obtaining recognition and awards for successful job. Motivates them as well and better working conditions, better organization of work and creative work. To a lesser extent motivates them greater respect for the rights of employees, better relationships, greater ability to participate in decision-making and successful business policy.

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ANALYSIS OF THE IMPACT STRESS ON MOTIVATION IN THE WORK ENVIRONMENT

UDC: 159.944.4:331.101.3

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ABSTRACT

The modern way of life and work, which features a permanent "race" against time, dynamism, technological progress, stronger competition on the market, globalization, job insecurity, cheap third-world labor, create increasing pressure on employees. Today, stress within the workplace presents a very important topic in the developed world as it is one of the leading causes that negatively affect the health of employees and a decline in productivity. The emergence of "fast fashion", a business model that had increased the introduction of trends and has led to the premature replacement of products that are fashionably obsolete. The aim of this paper is to analyze the causes of stress and to prove the correlation between it and motivation in the workplace of companies in the clothing industry.

Key words: stress, motivation, fashion industry, productivity, employees.

INTRODUCTION

The fashion industry is the subject of key trends in the last two to three decades. It has developed into a complex global system that, at its core, is based on the idea of continuous consumption of the "new" and the removal of the "old". *The emergence of "fast fashion", a business model that had increased the introduction of trends and has led to the premature replacement of products that are fashionably obsolete.*

Due to the rapidity of the life cycle of fashion products, stress in the clothing industry is becoming a permanent problem. Price reduction of clothing on a global level, low quality, poorly planned trend cycles combined with poor working conditions, long hours, low wages, fear of unemployment... all contribute to the stress and reduction in motivation of workers in the clothing industry.

Stress is a globally accepted term that comes from the English word 'stress', which means pressure. Although many people think that stress is easy to define, as well as being a synonym for many unpleasant phenomena, this statement is only true at first glance. Stress is a mental and physical state that affects the individual's work, their impact, health and quality of work. Alvin warns of the growing presence of technology in the working environment that encourages losing the boundaries between work and other areas of life and increases the risk of working all the time and everywhere (Allvin, 2008). In this sense, stress at work can be easily spread into other areas in life and it is difficult for staff to distance themselves from it and recover.

According to Showkat K.W. (2013) the productivity of employees and overall productivity of organization is affected by levels of stress and motivation. Researches provide solid evidence of problems caused by job stress. Stress causes various psychological problems like anger, depression, anxiety, irritability and tension and this influences the motivation of employees to a considerable extent.

More than a million workers in Europe are exposed to psychosocial risk daily at work, causing stress. More than 50% of people work under time pressure. A third of employees say that they have no control over work, or it is too small, 9% believe they are exploited, 23% of respondents have problems with fatigue, while 4% of employees are exposed to psychological violence (Đukanović, 2009). Therefore, large companies around the world are increasingly investing money in prevention programs and stress management.

SOURCES OF STRESS AT THE WORKPLACE

Stress at work may vary, whether they are of a physical, social or psychological nature. Stressors can be: the weight of the role at work; the rate of the work; dangerous or toxic working conditions; an inadequate and unsupportive environment at work; incoherent interpersonal relationships with superiors, employees, partners and clients; discrimination based on nationality or gender; frustration related to the social organization of the workplace etc. (Hepburn, Loughlin & Barling, 1996). Rollinson (2005) defines stress at the workplace as conditions that inhibit.

The sources of stress at the workplace in the fashion industry, these are most distinguished:

1. Nature of work. Mismatching the job and the skills, abilities and interests of the employee. Tight deadlines, especially in the era of fast fashion, where employees have large responsibilities placed upon them, longer work hours or working in shifts, as well as the fear of job loss.
2. Professional roles. The vagueness of the role is frequent, where what is expected of the employee is not clear. For example, fashion managers are required to make decisions about the design or the technological process of production. The result is dissatisfaction, decline in motivation, increasing anxiety and result in health problems.
3. Interpersonal relationships at work usually occur due to dissatisfaction with the manager, ongoing conflict between colleagues. Bad relations: reduce the energy of the individual, lower productivity, affect self-esteem, create an "I win, you lose" atmosphere, cause fear and distrust among people. Contrary to bad relations, good relations increase productivity and improve results, positively impact self-esteem, lead to problem solving, create a positive atmosphere and significantly reduce stress and anxiety.
4. Introduction of modern technology. Introducing modern technology is a challenge, but facilitates work and communication. In the fashion industry, modern CAD technology, associated with CAM systems, and integrated into the CIM concept greatly simplifies and accelerates the ability to respond quickly to changes in fashion. At the same time the introduction of technology is a source of stress, especially for older workers. Constant innovation for many of them present insurmountable obstacles and cause fear of redundant workers. The modern way of work is characterized by an increasing number of workers who work part-time, reduced hours and work "off the books" which can be an additional source of uncertainty, anxiety and fatigue. Thanks to modern technology, electronic control of employees is more prevalent which presents another source of stress at work.
5. Discrimination, sexual harassment, various forms of psychological and moral terror and violence in the workplace (mobbing), can be based on ethnicity, age, religion, race and sexual orientation. Special attention, when it comes to violent behaviour (Petrović, 2009), is to be paid to the following groups of workers: women, young workers, inexperienced workers, employees employed at jobs that require constant contact with others and workers belonging to ethnic minorities. The garment industry usually employs many women and auxiliary workers with lower educational backgrounds.

6. Physical working conditions are often not in line with ergonomic regulations and standards. There are most high or low temperatures, inadequate humidity, poor lighting, noise, vibration, dust. Factories in the textile industry for weaving, knitting and finishing are particularly pronounced poor working conditions that are far beyond the prescribed limits.

FACTORS THAT AFFECT MOTIVATION FOR WORK

In addition to stressors being known, in some situations it is almost impossible to avoid professional, as well as any other stress. Therefore, it is important to recognize it, deal with and overcome it. Eliminating stress and the possibility of its reduction positively affects motivation and employee satisfaction. The basis of modern management of human potential is an incentive for motivation, because only by creating a high-quality motivational system will allow for an organisation to increase its competitive abilities and values. Employee motivation is not only psychological and sociological problem of work and work related behaviour, it is directed toward a goal that wakes needs caused by man. According to Weihrich and Koontz (1998), factors that typically affect the motivation for work are:

- Salaries;
- Appreciation or recognition for a job well done;
- Enriching work;
- Career and advancement opportunities;
- Positive criticism;
- Management using objectives.

Motivational cycle leads to different management capabilities of complex phenomena such as a human motivation. Motivational cycle begins with chosen or imposed target. This goal comes from motive, which is implemented through work series and other activities. These activities (by their nature) take the number of obstacles, both objective and subjective frustration. If you offer to worker adequate and attractive targets, with appropriate care it can cause the desired behaviour. If the increase in efforts result with overcomes the frustration, they lead to the selected target (Zakin, Sajfert, 2014).

Motivation, like all other psychological variables cannot be measured directly. It is determined by behaviour, commitment, perseverance and direction of behaviour, looking at what results are achieved.

ANALYSIS OF EMPLOYEE MOTIVATION

The analysis of employee motivation was done in RAMAX, a private family enterprise that focuses on the production of men's, women's and children's clothing. The brand itself is not open-ended in terms of advertising, marketing and promotions as their main motive and goal is quality, which is essentially the only real motto in the entire concept. The impact of stress, elements of motivation and job satisfaction were all analysed within the company RAMAX.

The types of motivation are covered by questionnaires, namely: the possibility of interesting work, the possibility to retain employment, interpersonal relationships, status, pay based on work, wages, pensions, advancement opportunities, good physical working conditions (temperature, ventilation, noise) ...

Sixty people were interviewed aged from 24 to 60 years. The ages are then divided into five categories (up to 30, 31-40, 41-50, 51-60 and over 60). Workers have different qualifications, 83% of which have non-managerial positions and 17% are officials. Years of service ranges from 5 to 25 years. From the total number of respondents, 52 were female.

DISCUSSION OF RESULTS

Upon initial analysis of the respondents by age in the manufacturing sector, it is determined that they are mostly within the 41-50 age category, while officials are determined to be mainly aged between 51-60 years. The years of service of the respondents are approximately the same, where the largest percentage of employees from both sectors lie between 20 to 30 years of service.

To see which factors most affect stress and what type of motivation would be adequate, a survey was conducted where the questions were answered through the numbers 1-5, going from negation to agreement in full.

1. How are each of these motives important to you personally?
 - Work (52%) where officials are less interested in it (34%).
 - The possibility to retain employment – the motive is unexpectedly high (64%) among officials which is explained by the age structure and years of service. Manufacturing workers are less interested as opposed to officials due to the fact that lack of workers in the apparel industry modelers is scarce, but also their occupation allows for them to work from home.
 - Interpersonal relations – it is noticeable that interpersonal relations amongst officials is less important, while it is more so for manufacturing workers, making it a factor affecting human relations as well as one of the more important causes of stress requiring special analysis by agreement with handlers as well as interpersonal agreement.
 - Status – workers in the manufacturing sector, unexpectedly, care more for status than officials.
 - Pay based on work – pay based on work is more important for manufacturing workers than it is for officials.
 - Salary – this is more important to officials than it is to workers in the manufacturing sector.
 - Good physical working conditions – this is a specially/separately analysed motive that is equally important to everyone, regardless of job, level of qualification and position in the organizational unit.
2. How are each of the motives satisfactorily presented in your workplace?
3. How important are each of the motives in the employee size of your organizational unit?
4. How are each of the motives satisfactorily represented on the size of the jobs within your organizational unit? Three groups of questions yielded similar results related to personal motives which can be related to the current financial situation of the organization and the way payrolls and rewards are determined.
5. Is it possible for you to be employee elsewhere, under similar or better conditions at a different position or different organization? The biggest distrust, when the work organization is changed, is caused by the specificity of the work. Most employees that do not exclude this possibility are manufacturing workers whose profession does not tie them to the organization they work for.
6. How important is salary in relation of the material status of your family, or any other income you may have? It is interesting that the results that were recorded show that there is a larger number of employees that believe salary is not of crucial importance with respect to the material status of the family. Surely salary is of great importance, but this shows that most employees live in households where the respondent is not the sole employee.
7. To what extent are you satisfied with the professional status, career development prospects, social and other benefits offered by the organization? As with the motive, this question showed that most employees are unhappy with the professional and social status in the company.
8. Taking into consideration the overall situation and place of work, professionalism and commitment, what is your personal contribution to the overall operation of the organization? Employees in the manufacturing sector rated their work as significant and very significant, while officials rated their work as less significant.

9. Considering what you give the organization, are you satisfied with what you are given? Employees feel that they give much more to the organization than they receive, pointing primarily to inadequate physical working conditions and inadequate payroll.
10. The degree of compliance with the established claims. These statements best illustrate the relationship between employee and their work and organization. Being aware of the specificity of the work, the degree of stress they are exposed to, they are dissatisfied with the situation the company has found itself in. They see no perspective, on a global level, but remain loyal to their company.

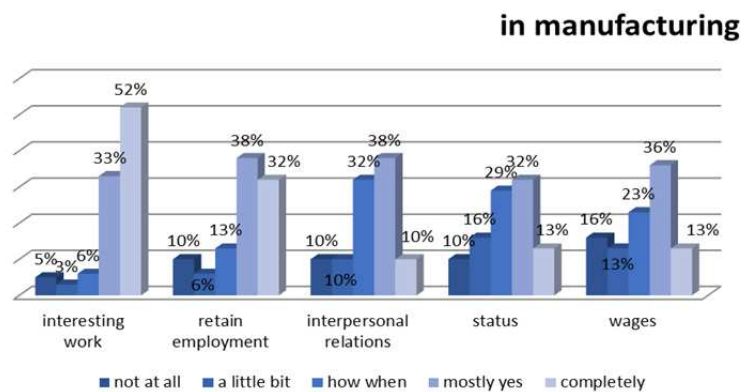


Figure 1: What motivates employees in the manufacturing sector

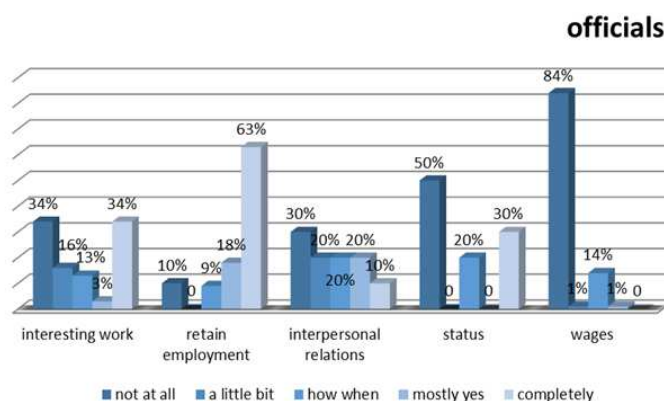


Figure 2: What motivates officials

CONCLUSION

The results and statistical analysis point to the fact that a large number of workers is exposed to stressful situations that negatively impact their health, productivity and indirectly the success of the organization and society as a whole.

Due to stress-induced illnesses, absences are frequent, sometimes individuals even abandon their jobs, which directly affect the organization. In many countries, sick leave is covered partly or wholly by society, presenting a great financial burden on the state budgets.

The results indicate that the workers in the garment industry are influenced more by material, rather than nonmaterial factors. Most of the dissatisfaction is caused by working conditions. As for the causes of stress at work, they are mainly exhausted by overtime and organizational changes.

As for the situation in our country, most companies in the garment industry belonging to the private sector, there is only a hope that organizations and owners will recognize that there truly is a problem. The consequences of stress can be avoided or reduced through effective management of stress and

stressful situations. Today, developed countries are increasingly allocating resources for prevention programs to prevent the occurrence of chronic stress among employees and thus reduce costs and losses suffered by the individual, the organization and society.

It is necessary to provide expert, organizational and financial support for the elimination of stress and the increase in motivation in companies in the fashion industry.

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LEADERSHIP AS A PREREQUISITE IMPROVING THE QUALITY OF DOMESTIC ENTERPRISES

UDC: 005.322:316.46

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ABSTRACT

A leader must be a leader who needs to know to run his team, every leader has a hidden skill and behavior that make him the leader. The leader must have his techniques behaviors, strengths and skills and set 4E can make the organization a peaceful atmosphere among employees that will manifest itself through efficiency and effectiveness with minimal problems. In this paper I will present to you the behavior, strength and skills of a leader, also the 4E set, competitiveness and knowledge. You will see the techniques of leadership behavior, skills, power, set 4E and knowledge can contribute to prosperity in the process of admission of knowledge in the governance of local businesses organizations.

Key words: Leader,skills,behavior,4E,strenght, competitiveness, knowledge

INTRODUCTIONS

The leader is a person who has the skills, behavior and power to influence a group of people in order to achieve his vision. The leader must be a leader in an organization , he has to have his followers so tha he could achive his goals and to achive them well with the help of its associates. The leader should have the skill and ability of persuasion,he has to engage people, he has to focus them on their real activity and to give them guidance,to inspire and motivate them. The leader is a person who has the power of persuasion, ability to specify other members time to follow him in achieving the objectives proposed for the better prosperity of the organization. There are three main elements that a man has to accomplish to be a leader. The first is that the leader is always investing in power. The second is that a true leader is surrounded by the right people. The third is that a true leader understands the needs of his followers (Rath, 2008). Leadership deals with change, starting from the vision of the future generation, through the gathering of people around the ideas presented in the vision and encouraging them to overcome all obstacles on the way to the finish line generated from the vision (Sajfert, et al. 2012).

LEADERSHIP TECHNIQUES

Leader skills

The notion skill leaders implies his ability and willingness to do things in a proper and effective way. Nature of a leader is a skill that determinane process of learning and building personality. Under the

concept that leadership can be learned significantly entered the broader focus of researchers leadership so that today most research conducted on the subject of leaders skills. The leaders performance is not measured by his success and ability to do things more effectively, but also to have the skills for success in leading the organization.

Emotional intelligence of a leader, as a very complex phenomenon, is a crucial factor that determines whether a company will be able to survive and have a good position in the market (Sajfert et al. 2011). Today, as never before, is growing awareness that the success and profitability directly dependent on human resources in the organization (Sajfert, et al. 2012). The real test abilities of leaders in such an environment is how much has the skills to establish and maintain human relationships (Seifert et al. 2012). Necessary skills of leaders that enable effective and dynamic leadership, are (Weiss, 2003):

- Skill of diagnosis,
- Skill to adapt, and
- Clear communication skills.

In today's business need for leaders is growing. Because of that the organizations are reporting an increasing need for successful leaders while there are less of them to find. In the future, the organization will face a deficit of leaders and managers. Following eight skills are ranked as critical to the future success of the leader (Sajfert et al. 2012):

- Strategic planning,
- Change management,
- Inspiring loyalty,
- Resourcefulness,
- Does everything you need,
- Ability of quick learning,
- Participatory management,
- People leading skills.

Also the respondents pointed out that these four listed skills that are ranked most important, they lack skills of modern leaders. Researchers CCL concluded that today leaders are inadequately prepared for the challenge that lies ahead into the future (Sajfert, et al. 2012). We detect three general categories of skills relevant for leaders: Interpersonal skills, conceptual skills and technical skills (Yukl, 2002). Very significant and essential skills of a leader is the ability to focus on possible or existing problem, understanding its complexity and the generation of potential problems and possible solutions. Knowledge and skills of the leader or leaders have the skills that occurs over time as a function of education and experience in the work of individual organizations.

STRENGTHS AND LEADER BEHAVIOR

"A leader is a person who sees more than others, who can see further than others, and that he sees a difference ..." -Leroy Eimes (Pockell, 2007).

Every leader should be aware of their own strengths and capabilities. Every leader leads in a different or better way that it is almost always the same amounts on their abilities in skills, talent and virtue for guiding and motivating team members in the organization. Basic characteristics of leaders: communication, innovation, initiative, creativity, vision, flexibility, encourage change, determination, leadership and setting an example Fig. (Sajfert et al. 2006).

A true leader must use their strength to motivate his members. Adequate access to set 4E is something of great importance to the leader. 4E are:

- Have a vision - to make an attractive picture of what can be achieved,
- Enable - to equip, enable and empower,
- Forcefulness - revive, stimulate and recharge,

- Providing - affirm, confirm and guarantee (Stephan, 2002).

For a leader to be able to help his team is to achieve higher goals, or to fully understand them, a leader must carefully examine and monitor capacity of 4E. The leader who is going through transformations shows or recognizes its own strength has to know that his only primary responsibility to strengthen and enable the people in the organization, providing better opportunities to work at a higher level.

The problem is when leaders thought that imitating other leaders can give him the effectiveness of the procedures. The main element of every leader is strength. Leader must be aware of any strengths and weaknesses in their possession. The leader must know his power as a carpenter knows his tools or as a doctor who knows which instruments are available. What all leaders have in common is that really know their strengths and they can invoke the law of virtue at the right time. (Petrović, & Bakator, 2013).

The leader of the forces of domination in the field of performance knows how to make things happen. They can have an alternative for solving the problem to catch the idea and it is implemented in the right way. The leaders of the forces in establishing basic relationships are the glue that holds the team together. They have the unique ability to create groups and organizations. They have a unique ability to avoid interference and maintain the flow of work in peace and harmony (Rath, 2008). Leaders strong forces and strategic thinking are run by team members focused of what could be. They are trained to absorb, analyze and gather information that would effectively influence the work of their organizations. They think about the future, for the future of the organization.

Vision is the central component of all leaders (Kotter, 1996). We can conclude the analysis of this statement if you know that the original, we have on one side the focus additional attention on the behavior of a leader (leaders). The behavior of leaders is important for organizations to be able to properly direct their followers in the organization. Good leadership behavior is the key for additional motivation and mood within the organization chooses and efficiency of the right way.

There are five types of behavior of effective leaders such as:

- Planning, coordination and organization of activities,
- Super Vision subordinate associates,
- Creating and maintaining good relationships with subordinates, co-workers,
- Creating and maintaining good relations with superiors, co-workers at the same level, and external partners,
- Taking responsibility for the results, execute the given obligations and the necessary decisions (Sajfert et al. 2012).

There are negative behaviors of leaders, poor team work or lack of teamwork in the organization are the qualities of bad behavior of leaders. There are a set of six negatives in the Institutes of leader behavior as follows:

- Lack of trust in subordinates,
- The failure to create and communicate a vision,
- Unrealistic expectations,
- Setting bad examples,
- Failure to retain top talent,
- Taking for granted the success (Sajfert, et al. 2012).

THE INDIGENOUS LEADERS AND IMPROVING THE QUALITY OF BUSINESS ORGANIZATIONS

The process of transition should include that the economic operators in transition further educate and allow independent access to the market for a strong and healthy competitive battle for the successful

operation at the international level. The process of transition involves major changes to the organizational structure of the whole subject, and on the way, the thinking of management and other employees in organizing. An important and significant role in the process of transition is located just in the executive management and the owners of domestic capital, which should constitute the sound market fundamentals of modern business. In survival and development of the organization is one of the key factors of productivity, and it plays an important factor in achieving competitive advantages in the market. Improving competitiveness and increasing the productivity of the importance of the national economy to the global economy is closely linked with economic development organizations, increasing the number of employment and significantly effective economic activity that focuses on the imperative of increasing the productivity of the organization.

Transition has an economic vision that includes some of the five cases which facilitates planning to substantially redirect to a significant market economy, which is crucial in the process of transition and strengthening of the economy of the organization. Some of the processes are: privatization, liberalization, restructuring, institutionalization and stabilization (Tajnikar, 1998).

Leadership in the domestic economy is still tied to proprietary torque or power that stems from ownership. The problem lies in the fact that the accumulation of capital in the process of transition does not mean that the owner of the capital and the leader of the most common is equity in the initial stages of the transition process accumulates on the basis of a monopolistic position or closeness to the political structures. Also on the domestic market prevailing conception of leadership as innate characteristic. Taking into account the above mentioned facts, it becomes clear why the lack of competitive domestic enterprises on an international scale, local businessmen and entrepreneurs think in terms of the local market and the first transitional step, instead of turning improving their own knowledge and application of modern management methods and techniques. (Bešić, et al. 2008).

CONCLUSION

The leader is a person who must have certain skills, behavior and knowledge to be able to successfully lead the organization. The leader is the one who has to motivate his followers who would successfully lead your organization. The leader must develop the skills, behaviors and power so that he could have a major impact on the entire organization and its work. In addition to possessing the skills, behaviors and power there is a combination of 4E that can help him to organize and the right way to lead your organization to the final goal of achieving success and strengthening competitiveness.

The leader or leaders must continually develop their skills, follow new trends, innovation and the changes that it is adopted by the time that his organizations' could be constantly evolving, improving and perfecting. A successful leader must possess certain knowledge to be able to develop their skills in an organization that knows how to motivate people and to direct them in the right way. The leader or leaders with good behavior, strength and skills which has able to achieve all the goals that can help the organization to stay on top of the world market. A leader must know how to lead your people as the only way for further success and development of the organization. People must have necessary education and training so that they could reach a dangerous level of knowledge.

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BEHAVIOR OF BIG FIVE PERSONALITY FACTORS ON GENERAL JOB SATISFACTION

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ABSTRACT

The researches show the results of a meta-analysis that links the behavior of large 5-Factor of personality on general job satisfaction. The research results bring the organizational framework, 334 correlations 163 independent samples that are classified in an order. The results of the correlation factor of job satisfaction were - .29 for Neuroticism, .25 for Extraversion, 0.2 for Openness to Experience, .17 for the Agreeableness, and .26 to Conscientiousness. The results further show that only relates to the Neuroticism and Extraversion for job satisfaction generally have in common with the research. As an assembly, Big Five factor personality has multiple connections to the job satisfaction .41, which shows the support dispositional sources of job satisfaction when organizational properties are organized according to the 5- personality factors.

Key words: ethical behavior of leaders, the big five factors, job satisfaction.

INTRODUCTION

Research on the source of job satisfaction has its own history. Locke (1976) defined job satisfaction as satisfactory or positive emotional state resulting from the evaluation of work or work experience. McCormick, Ilgen (1985) believe that job satisfaction associates attitudes of members of an organization and refers to the general attitude of the individual in relation to his job. The basis of job satisfaction was previously considered as treatment satisfaction. Hoppock (1935), for example, found a strong correlation between working group emotional adjustment and constant level of work satisfaction. Similarly, Fisher and Hanna (1931) concluded that much of the dissatisfaction result with emotional inability to fit. With some notable exceptions (PC Smith 1955; Weitz, 1952), discusses early and disproportionate sources of job satisfaction was inactive until the 1980s. When a series of provocative studies (Arvey, Bouchard, Segal, & Abraham, 1989; Staw, Bell, & Clausen, 1986; Staw & Ross, 1985) has led to a new interest related to this issue. In the past 15 years, more and more of literature that provides general support, job satisfaction is, in part, on the basis of supported (House, Shane, & Herold, 1996). Spector (Spector, 1997) pointed out that, although many of the characteristics are shown to be significantly correlated with the job satisfaction.

Allport and Odbert (1936) have coined the first list of the terms that describe the differences in behavior, which were distributed on the personality traits, temporary states and mood, behavior and evaluative assessment record as physical characteristics and talents. The results of this study can be expressed as a percentage of the total number of terms to each pair of respondents is arranged on the

same column is identical. Taking only the case where all three interviewed reported agree, located 141 word or 47% of the tender leaves.

Raymond and Kline (1977), have analyzed the factors and came to 4.500 terms relating to the personality traits, the analysis by which Cattell and his associates came to the 12 factors, which are involved in its later 16PF model. Cattell, Eber, and Tatsuoka, (1970) performed by the empirical theory and factors multidimensional instrument are used to measure and create a well-known model respectively 16PF of personality factors. Big five initial model was made by Ernst Tupesi and Raymond Christal in 1961 (Tupesi & Christal, 1961) but failed to reach an academic audience until the 1980.

In Digman, J. M. (Digman, 1990) advanced his five factor model of personality, which Levis Goldberg (Goldberg, 1993) extended to the highest level of organization. Goldberg (Goldberg, 1993) the creator of the term "Big Five" is considered that more or less all of the known Personality Inventory reflect some of the aspects of the model. "Big Five" model assumes the existence of five basic dimensions underlying personality traits revealed that during the analysis of natural language, and analysis of psychological measuring instruments. These dimensions are: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness. It should be borne in mind that this is generally one of the possible operational implementation of the model to the one proposed by Costa and McCrae (Costa & McCrae, 1992; 1995a, 1995b). The following text is relating to a clarification of the subject matter of each of the measurement scale domain (Costa & McCrae, 1992).

Extraversion (E), extroverts are sociable, but this is not their only feature. In addition that they love people and prefer large groups and conferences, extroverts are assertive, active and talkative. They love the excitement and stimulation, and by nature they are happy. They are also optimistic and full of energy. Introverts are reserved (which does not mean antisocial), independent and moderate (which does not mean lethargic and lazy).

Conscientiousness (C) is the dimension of Big Five, which includes the conditioned control of social behavior such as pulses or deliberate action, regulation and priority setting. The ability to control impulses is primarily related to the domain N.

Neuroticism (N) field of personality or different adjustment emotional stability of the mismatch and neurotic. Although clinicians distinguish many aspects of emotional distress, research studies point to the fact that individuals who are prone to some of these emotional states also tend to others. General tendency is to experience negative emotions such as fear, sadness, anxiety, anger, guilt and resentment is the core of this domain. Why were some of the most creative geniuses prone to neuroticism. Iko had in his whole life numerous mental problems; Vincent van Gogh was an artist whose work left a deep mark in the history of painting. Charles Darwin has long suffered from nausea and problems with the digestive tract. Winston Churchill called his depressive episodes "black dog". Isaac Newton defined the universal law of gravity, making innovative telescopes and wrote interesting mathematical theories. All this was managed, despite his severe depression and one severe nervous breakdown.

Agreeableness (A) same as Extraversion is primarily a dimension of interpersonal tendencies. A person favorable to cooperation is a basic altruistic. They sympathize and empathize with other people, there is a need to help them and believes that other people for them will be just as generous. A person low for (A) is egocentric, skeptical about the commitment of other people, antagonistic and competitive-minded. Low (A) is associated with narcissistic, antisocial and paranoid personality disorders, while the high A is in connection with addiction disorders.

Openness to Experience (O) implies active imagination, aesthetic sensitivity, a preference for diversity, intellectual curiosity and independent thinking. Open-minded individuals are curious how the events in the inner world and the events in the outside world, their lives are richer with experiences. They are prone to experimentation, new ideas and unconventional values.

This introduction is too short to describe the complexity and comprehensiveness of the Big Five personality model and its dimensions. It is designed primarily as an informative overview of the main features of the model to be in the following texts emphasis on individual dimensions and their correlates, and their implications for everyday life.

HYPOTHESIS

H 1: There is a correlation between the five-factor personality with job satisfaction

H 2: Big Five personality factors has multiple connections to job satisfaction.

RESULTS

Meta-analyses results between Big Five properties on job satisfaction.

Table 1: Meta-Analysis of the Relationship of Personality and Job Satisfaction

Trait	Average			
	k	N	p	SDp
Neuroticism	91	23,431	-,28	,15
Extraversion	73	19,145	,24	,14
Opennes to Experience	48	14,324	,021	,20
Agreeableness	36	10,453	,16	,15
Conscientiousness	77	20,451	,25	,21

Note. k = number of correlations; N = combined sample size; p = estimated true score correlation; SDp = standard deviation of true score correlation.

From the table we can see the number of correlation for Neuroticism is 91, for Extraversion 73, for Opennes to Experience 48, for Agreeableness 36 and Conscientiousness 71. The combined sample size which is made on the basis of the research is: Neuroticism 23, 431, Extraversion 19,145, to Opennes Experience 14, 324, Agreeableness 10, 453, and conscientiousness 20, 541. Neuroticism ($p = -.28$) was the highest correlate of job satisfaction, followed by the conscientiousness ($p = 0.25$) and extraversion ($p = 0.24$). Both intervals reliability and credibility are disabled for two traits: neuroticism and extraversion. For the other two traits of conscientiousness and convenience - confidence intervals are disabled, which means that we can be sure that the average correlation is different from zero. However, the 80% confidence interval is probably involved in these properties, which indicates that the ratio of diligent and advantages with the job satisfaction can not be completely generalized over the study. Finally, openness to experience, show a weak correlation with the job satisfaction ($p = 0.02$), which is different from zero. Standard deviation of true correlation score for neuroticism, 15, Extraversion, 14, Opennes to Experience, 20, Agreeableness, 15, and Conscientiousness, 21.

The meta-analysis, sample sizes varied considerably from 5 to 2,900. As Huffcut, Roth and McDaniel, (1996) mentioned above, the weight concern studies of the sample size (n by weight), in meta-analysis that several studies can dominate the analysis. Accordingly, they have developed an alternative method to weighing a mass of 1 assigned to the study the sample size is 75 or determined conditions, 2 if the sample size is between 75 and 200, and 3, if the sample size is 200 or more. We used this method to determine the weighing whether to give a different result from N-weighted analysis. This alternative weighting procedure to change some of the results, although not drastically. The results were as follows: Neuroticism, $p = -.31$; Extroversion, $p = .25$; Openness to Experience, $p = .02$; The advantage of $p = .19$; Conscientiousness ($p = .28$). Thus Huffcutt, et. al. (1996), is a method by weight.

Table 2: Regression of Job Satisfaction on Big Five Personality Traits

Trait	N/weighted correlations			Huffcutt, et.al. (1996)		
	B/R	SE	T	B/R	SE	T
Neuroticism	-,19	0,6	-3,28*	-,21	0,6	-,3,68*
Extraversion	,20	0,6	3,70*	,21	0,6	3,80*
Openness to Experience	-,037	0,6	,070	-,04	0,6	0,75
Agreeableness	,37	0,6	0,59	,05	0,6	0,86
Conscientiousness	,19	0,6	3,35*	,21	0,6	3,67*
Multiple R	,40	0,6	7,60*	,43	0,6	8,27*

Note. β = standardized regression coefficient; T = T value (B/SE). * $p < ,01$.

As shown, regardless of how weighting is used, three characteristics of Big Five traits - Extraversion, Conscientiousness, Neuroticism - were significant predictors of job satisfaction. Although the three properties are significant, regardless of the method used for weighting the assessment of the correlation, the results were somewhat stronger for analysis by Huffcutt, et. et al (1996) a method by weight. Perhaps the most statistically considerable multiple correlation (R, 40 in the N - weighted analysis, R = 43 The results obtained by Huffcutt, el. Al.1996) Between five major factors and job satisfaction.

Table 3: Methodological Moderators of the Personality-Job Satisfaction Relationship

Trait	Measure of Big Five trait		Research design	
	Direct (D)	Indirect (I)	Cross-sectional (CS)	Longitudinal (L)
Neuroticism	-,26	-,30	-,27	-,31
Extraversion	,23	,26	,24	,14
Openness to Experience	,18	,01	,021	-,08
Agreeableness	,13	,20	,17	-,22
Conscientiousness	,16	,30	,25	,17

Note. Table entries are average correlation between Big Five traits and Job Satisfaction

Moderators Big Five Personality- job satisfaction

The results of the measurement of job satisfaction of the big five personality traits. As it can be seen, the ratio of five personality traits, and correlation with job satisfaction work tend to be higher for several measures, most notably Brayfield and Rothe (1951) measures. It is also noted that the correlation job satisfaction personality generally were lower for ad hoc or previously unconfirmed, measures of job satisfaction. Table 3 shows the results of two methodological moderators. Direct and indirect measures of personality does not differ much in their relationship with job satisfaction; There was little job satisfaction is correlated more strongly with the indirect measures (significant only in the case of conscience). Similarly, and somewhat surprisingly, personality-job satisfaction correlations did not differ by the section relative to a longitudinal study designs; only if the benefit is the difference significant 5.

CONCLUSION

The results of this study indicate that the five personality factors make fertile ground for testing job satisfaction. In particular, the properties of neurotic disorders extraversion and diligence displayed moderate correlation with job satisfaction. We are aware that without the published basic research focusing on the relationship of the five personality factors on attitudes to work. Thus, these results fill an important gap in the literature.

In short, the quantitative results of the review indicate that neuroticism, extraversion and conscientiousness show significant correlation with job satisfaction, and that the five personality factors make fertile grounds to investigate the source of job satisfaction. In light of these results, future

research should try to integrate alternative frameworks to the source of job satisfaction and the model of psychological processes that may explain the relationship characteristics of five personality factors with job satisfaction.

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FEAR OF PUBLIC PERFORMANCES AND ITS OVERCOMING

UDC: 159.942

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ABSTRACT

Public performances are for some people a source of great fear. In most cases, it occurs due to lack of knowledge, lack of confidence or credibility. Regardless of the variety of manifestations of fear, a kind of public appearances is usually seen as a side effect, as something that threatens the performance. However, in professional work underlines that this fear is not only unpleasant consequence of public speaking, which should be released, but its integral part. It's a natural reaction that can not be removed, but it may be reduced so it does not completely paralyze a person in his/her speech.

Keywords: public speaking, fear of public speaking, stage fright.

INTRODUCTION

According to a number of studies (Wallechinsky et al., 1977), one of the most common fears is fear of public speaking. In the United States, in the nineties, a detailed study of fears has shown that in first place is the fear of public speaking, and then followed by the fear of heights, insects and financial problems.

All who had the opportunity to publicly perform, experienced fear, anxiety, nervousness and discomfort. The researches have shown that more than 40% of the people when holding a speech before an audience are accompanied by sweating of palms, quick heart beating, and shortness of breath or "lock" memory (Laskowski, 2002). At some occurs chill, nausea, a feeling of being lost or stuttering (Kurtus, 2001). As the performance is at bigger audience the stage fright is bigger.

Fear of public speaking is a normal response ahead of a speech or presentation. There is no person; no matter how skilled in the art of public speaking, which comes before the public without any sense of stage fright. The fact that the speaker is concerned that his/her exposure is high quality, it is quite logical that before going in front of the audience feel a certain level of tension.

PSYCHOLOGICAL APPROACH OF FEAR OF PUBLIC SPEAKING

Fear of public speaking is a form of social anxiety. It can be expressed as difficulty in speaking in front of others, or as lack of skills to adequately express the presenters' thoughts, and can also be due to the interaction of these two phenomena. This fear or anxiety is manifested in three distinct response systems: cognitive function, motor behavior and response of the autonomic nervous system (www.akademijauspeha.com). Often these systems interact and occur almost simultaneously.

Within the cognitive system, there is a difficulty in thinking such as the inability to remember some important things, confusion, difficulty concentrating on the topic discussed, and the inability to find adequate words. On the other hand, there is a marked directing attention to the presenter, especially on visible physical reactions and symptoms of anxiety, as well as their own mistakes.

In persons who expressed a fear of public speaking, evident is the behavior to avoid situations of public performances. Since the speaker can not escape from the audience that awaits him/her, there appears some somatic changes in motor skills, in the form of muscle tension and difficulty in breathing, the expression of fear on his/her face, pompous smile or laughter, tense and trembling voice, monotone in voice or unnatural deep voice, facial expression expressionless, frequently flicker, stutter, pause in the speech, and frequent errors, a solid or a bent posture.

The reactions of the autonomic nervous system, such as tremor, sweating, heart palpitations, dry lips or pain in the stomach in some situations can become extremely of high intensity, so that people experience a panic attack.

Each of these three components reaction (cognitive, motor and autonomic) is expressed to different degrees at different individuals; fear of the appearance before the others at some people is manifested through expressive physical reactions, while in some other kind of reaction almost never occur (www.vesti.rs). Sometimes it happens that a person despite feeling intense fear in the cognitive and physical level still is able to maintain its perfect exposure.

CAUSE OF PUBLIC PERFORMANCES FEAR AND ITS OPERATION

A person who is afraid of public speaking is facing excessive porch. Depending on the individual, the jitters can manifest a variety of symptoms, which is based on the excitement that occurs in the body as a result of increased amounts of epinephrine. Psychologists, find the root of the problem is fear of embarrassment in front of a group of unknown people.

Unlike normal, moderate fear which is motivating and helps the individual to be calm, thoughtful and attention focused, basically a fear of public speaking is a paralyzing stage fright. It is the excessive concentration that disrupts and diverts attention from the task (what needs to be carried out, say or do in front of an audience) on the inner state of an individual who has stage fright. So instead of focusing on the performance of the task the person is preoccupied with negative thoughts, intense negative emotions (fear and/or shame), unpleasant physical sensations (trembling, redness, etc.), and daydreaming about a possible unfavorable outcome.

People who have expressed a fear of public speaking even before they go out in public, begin to dream and visualize failure and making mistakes, they say something they did not want or did not say what they wanted, they imagine to lose breath, trembling, as the audience reacts negatively to their exposure, etc. In some people's fantasies this can go so far so that they imagine that the audience's (or some important person to them) ignore, criticize and make fun of the person and in this way he/she feels horrible and it is an unbearable experience.

WHEN DOES THE FEAR OF PUBLIC SPEAKING APPEAR?

Fear of public speaking can occur suddenly after a stressful or humiliating experience during a public presentation, but it is more usually that it develops silent, and that becomes apparent only at the end of childhood or in adolescence. The research conducted by Stein, Walker and Forde (1996) states that at 90% of respondents this fear appeared before the age of twenty. Other (Hofman, Elers, & Roth, 1995) suggest that the fear of public speaking occurs, on average, in the thirteenth year of life.

During childhood, children are faced with the demands of the new environment (school environment), and the challenges of adapting and creating friendly relations with other children. However, in adolescence, they will be faced with more complex requirements. Therefore it is very important that children from an early age get the opportunity to perform in front of an audience, to try and learn the skills of public speaking, as the later, in adulthood, this fear is not to interfere with social functioning.

Adolescents thanks to a higher level of cognitive development, become aware that there is some discrepancy between their own self-image and how others perceive them. Those who have less capacity to overcome these stressful situations are going to be more anxious and exhibit avoidance reactions in social situations. This fear is often transferred into adulthood, and may constitute a chronic problem.

Phobia of public speaking can occur the first time and in adulthood, it happens most often to people who had never had the need to speak out publicly, and they want the situation poses a completely new and unfamiliar challenge, which is therefore frightening.

HELPFUL TIPS FOR OVERCOMING FEAR OF PUBLIC PERFORMANCE

Although the best method for overcoming fear is good preparation (Laskowski, 2002), there are many tips that can help a speaker in this domain. Some of them (www.toastmasters.org):

- to get acquainted with the room in which he/she will exhibit;
- to check if in the audience is a person who knows him/her;
- to learn some of the techniques of relaxation;
- to imagine himself/herself as exhibits and that his/her audience will applaud at the end;
- keep in mind that the audience always wants to hear what he/she has to say that is friendly and wants to be successful in his/her speech;
- should never apologizes for having stage fright, because the public can not even notice that, but can draw attention to his/her anxiety;
- should concentrate at the messages that will transmit his/her story to the public, the personal and professional accomplishment that will have on the performance;
- with each subsequent exposure he/she will gain new experience.

The feeling of fear and nervousness in public speaking, is quite normal and can be mitigated and reduced. Proper breathing techniques can reduce the feeling of fear for 15% of general mental state by 10%, with the largest portion (75%) belongs to the good preparation and practicing exposure (Laskowski, 2002). Nothing is so good to relax in front of the speaker's performance as knowing that he/she is well prepared. Those who do not prepare, can prepare to fail (Laskowski, 2002).

Among the advice for overcoming fear, can be found tips like this: Before the advent do not think about performance; Before you begin, take a deep breath and smile; Imagine that you are alone and speak before the mirror; Before exposure do not drink coffee but juice or water (Kurtus, 2001).

The speaker can defeat fear, if he/she deals with it. He needs as much as possible to be exposed to situations that demand from him to speak in front of others, to work on himself, he attended various seminars, lectures and educational workshops, which could help him in a fast and efficient way to eliminate the fear caused by the unrealistic sense that if its shortcomings come to light and will therefore be ridiculed. No man is perfect, nor will be, but the secret of success is precisely what the recognition of this fact. If a person is sure in herself/himself, the frightment of the appearance before the audience will be less.

Many who have experience in public exposures recognized that fear never completely disappear, but they learned to "bear" with it, and that despite it during exposure remain natural and establish good contact with the audience.

A good presentation is one that at the speaker and the audience causes pleasant feelings, creating a kind of encouragement and can initiate the action. The ability to speak confidently exhibitor, is somewhere a matter of talent, but most importantly it has the capacity to hold the audience's attention.

The speaker must abandon the idea that he/she always and at all costs must leave a good impression and fascinate the audiences. As long as he/she is convinced that it needs to attract someone's attention, or to obtain a fascinating one's admiration, will be terrified because quite realistically be estimated that it may happen that he/she fails for some reason. In this case, the speaker will be anxious and will be too nervous.

Fear is the strongest at the beginning of the speech. Therefore, the first sentence should be practiced in exposure in order to easily overcome the start. Positive thoughts are necessary at that very moment. Auto suggestion is a powerful tool in the fight against stage fright. Remember the words of Gotthold Ephraim Lessing (German writer and philosopher): Many make mistakes for fear of mistakes. „Aristoteles would agree with him and would say: "People do not feel fearlessness when they believe that they would neither in the present nor in the future fail, but rather success." So, become fearless, stop the fear of public speaking, because just like fear, courage can become a habit. Do not think about fear just before the performing; do not talk about it with others.

CONCLUSION

Fear of public speaking is a natural reaction that can not be removed. The only thing that can be done is to soften the intensity of this fear in order not to completely paralyze a person in his/her speech. Therefore, in preparation for a public performance it is very important to accept the idea that the fear of public speaking is normal, even to some extent a necessary reaction of public exposure.

Most fear is completely irrational, although it is difficult to explain to people suffering from a phobia, a fear for the best solution to face with it, get to know yourself and get to know that things are not as negative as they seem at first glance.

Over time, the fear of public speaking will diminish. Experience is the best lesson that can be learned at speaker that this fear is largely unfounded. Although fear, can never completely disappear, it can turn into a personal ally of the person who performs. The feeling of nervousness should be seen as something that would give the presenter a better focus and memory. The best thing a speaker can do for himself is to converted nervousness into energy and passion.

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THE GROWING IMPORTANCE OF INTERNAL COMMUNICATION ON BUSINESS SUCCESS

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ABSTRACT

Communication represents the essence of organizations. Internal communication is important for building a culture of transparency between management and employees, and it can engage employees in the organization's priorities. It is a prerequisite for effective and good team work, and if it is negative, it may be a biggest obstacle for a company. Successful managers know that communication with employees is of great importance, which leads to job satisfaction, additional engagement and more productive employees, and better financial results of the company. This paper deals with the importance of internal communication through presenting researches about this area.

Key words: communication, internal communication, organizational performance.

INTRODUCTION

An organization cannot exist, if there are no people in it. Relationships between people are conditioned by communication. All organizations are created and organized by the communication process, and consist of people who communicate with each other (Adler & Elmhorst, 1996). Communication takes place constantly, at all levels and in all forms of business (Videnov, 1995).

Internal communication can be defined as "Planned use of communication actions for systemic influence on knowledge, attitudes and behavior of employees" (Tench & Yeomans, 2009). Skoko (2006) stated that internal communication means all public relations activities, with the aim of informing, motivating and training employees while Dowl and Taylor (2008) that internal communication is a process of creating and understanding messages within the network of interdependent relationships, to assist resolving uncertainty in the environment.

What is common to the variety of definitions is stressing the importance of internal communication for any organization, and emphasizing that the most important relationship of the organization is the relationship with employees at all levels (Broom, 2010). Also, they share the conclusion that successful internal communication leads to the success of the organization. Therefore, it can be concluded that internal communication is one of the fundamental discipline that increases the performance of the organization.

THE IMPORTANCE OF INTERNAL COMMUNICATION

Mintzberg has in his research (Bahtijarević-Siber et al., 2008) almost 40 years ago warned of the importance of communication and communication skills. He noted that managers spend up to 80% of their time on communication (direct contacts, meetings, telephone conversations, etc.). Therefore, communication is the most important activity of managers at all levels.

In doing so, we should not forget that individuals, employees, are the most important subjects of communication. Almost 70% of working hour's employees spend in communication - writing, reading, speaking and listening - the lack of effective communication is just one of the reasons that stand in the way of a successful performance (Robbins, 1996).

Employees are the key factors in achieving the communication process, and one of the biggest challenges of contemporary organizations is to get the employee who is committed to the organization and to go beyond their usual duties, and provide performance that is above expectations. However, managers can expect this from employees only if they are fully satisfied with internal communication.

Therefore, managers must know the communication process, the basic elements of the process, the dependence of these elements and principles of functioning, different types of communication with advantages and disadvantages of each, as well as communication barriers and ways to correct them. Only on the basis of this knowledge a manager is able to develop effective channels of communication and to increase the efficiency of existing ones, in order to effective functioning by the system which he manages.

In this sense, it can be said that, when the leakage of information, gossip and spread of rumors, replace organizational communication as the main source of information within the system, it is a sure sign that there is some problem. This situation, can lead to disaster. Content, timing and channels of communication cannot be left to individuals, nor can it be implemented unplanned and ad hoc, since it leads to disorganization in communication, and can have multiple negative implications for the business performance of the organization. Strategic approach to internal communication, detailed analysis of the problem, defining desiring communication tactics and implementing new communication practices, creates an effective internal communication within the organization, which contributes to higher motivation of employees to do their job, higher labor productivity and better business performance of the organization. Therefore, we can say that internal communication has a strategic purpose, because of the two-way relations that makes trust between employees and improve efficiency. Employees, who are better informed, will have greater motivation and thus this will contribute to higher productivity (Tench & Yeomans, 2009).

PRESENT RESEARCH ON INTERNAL COMMUNICATION

The importance of internal communication has encouraged theorists and practitioners to propose ways of measuring the quality of communication. The interest for instruments designed to measure the performance of communication began to grow in 1970 as a result of increasing interest of US organizations, on the one hand, and the efforts of government institutions in Finland, on the other hand (Greenbaum, 1988). In both cases, the main motive for measuring communication performance was to improve various aspects of communication climate in the relations with employees.

Assessment of satisfaction with internal communication is a significant component of the overall assessment of communication (Tkalac Verčič & Verčič, 2005). Satisfaction with internal communication, which can be defined as a personal satisfaction inherent to communicate effectively with someone, or someone with us (Thayer, 1968) is in the focus of research interest for more than 20 years. Various studies have linked this segment with job satisfaction, productivity and commitment to the organization (Gray & Laidlaw, 2004). Therefore, there was a clear need for the development of

high-quality instruments for measuring the satisfaction of internal communication that provide valid and reliable results. To date, developed was a series of such instruments.

Then, the satisfaction with internal communication was the subject of much research. Robson and Tourish (2005) claim that there is evidence in the literature to which internal communication increases the likelihood of organizational success. Quinn and Hargie (2004) suggest that the core value of the quality of internal communication, relationships that organizations have, or that the quality of internal communication is a part of the organizational efficiency. Hargie and Tourish (2002) report a study which show that the improvement of the communication leads to a larger amount of beneficial outcome for the organization, such as: better image, enjoying greater trust of their employees and the public, easier and faster implementing changes, while helping increase the creativity and range of ideas to solve problems in the organization.

Clampitt and Downs (1993), concluded that the quality of internal communication result in increased productivity, reduced absenteeism, better quality of products and services, increased level of innovation, fewer strikes and reduced total cost. Snyder and Morris (1984) prove that the two communication variables (quality of communication with superiors and exchange of information with the employees of the same level) positively correlated with some measures of overall organizational performance.

Gray and Laidlaw (2004) cited a research by Anderson and Martin (1995), who claim that employees communication interaction with co-workers and superiors is because they want to feel happy and involved. According to Rubin (1993) employees whose needs are high quality communication, showed a tendency to build effective relationships in the workplace. There is also a high correlation between communication satisfaction and overall job satisfaction (Pettit et al., 1997).

The research of the consulting firm, Watson Wyatt (2004), has proven that companies with high employee involvement have a 26% greater employee productivity, attract better experts in their ranks, and have stable business. Highly engaged employees twice as likely are profiled in top experts, are absent up to 20% fewer days from work, and often exceed the set plans and norms. Study by Watson Wyatt provided proof of the strong correlation between communication effectiveness, organizational turnover, and financial performance.

According to Yates (2006) Watson Wyatt defines an effective communication organization as one that excels in the following eight areas:

- Educating employees about organizational culture and values
- Helping employees understand the business
- Aligning employees' actions with customer needs
- Providing employees with financial information and objectives
- Providing employees with information on the value of their total rewards programs
- Explaining and promoting new programs and policies
- Integrating new employees into the organization
- Exhibiting strong leadership by management during organizational change

The importance of internal communication was the topic of one of the most renowned consulting companies in the world - Boston Consulting Group (BCG). They made a telephone survey in 2001 with 123 large companies in the United States, Europe and Asia. The working assumption was that the usual company model is "Invest to reduce costs". The model assumes that companies invest in new communication technologies to increase productivity and reduce their costs. Results showed that 80% of American and 90% European and Asian companies, have increased investment activities in internal communications. In addition 40% of American and 50% European and Asian companies have increased their exploration budgets for communications technology. Thus, it is clear that companies are investing in communication technology to design more effective internal communication

processes. Furthermore, costs decreased (eg, labor costs), which in turn increased the productivity of companies and allowed them to remain competitive in the business world.

For the purposes of the second Regional Center, Agency for Public Relations, Meritor Media, in cooperation with the portal posao.hr conducted a survey on internal communication in which the subjects were Croatian managers. The survey was conducted in Split on 29th and 30th May 2009. All respondents agreed with the fact that the internal communication is very important. Research has shown that more than 50% of respondents are not satisfied with internal communication, and considers that it should be improved, and 77% believe that it is necessary to further educate top management on the importance of internal communication. In this study were presented suggestions in order to improve internal communication: timely inform all employees, encouraging top management for further education about this topic, applying equal and transparent rules for all employees, and ensuring a responsible person who would be responsible for providing information to employees (Bedecković, 2010).

Results of a study (García-Morales, Matías-Reche, & Verdu-Jover 2011) show that Internal communication influences Technological proactivity, Organizational learning and Organizational involvement. (Figure 1)

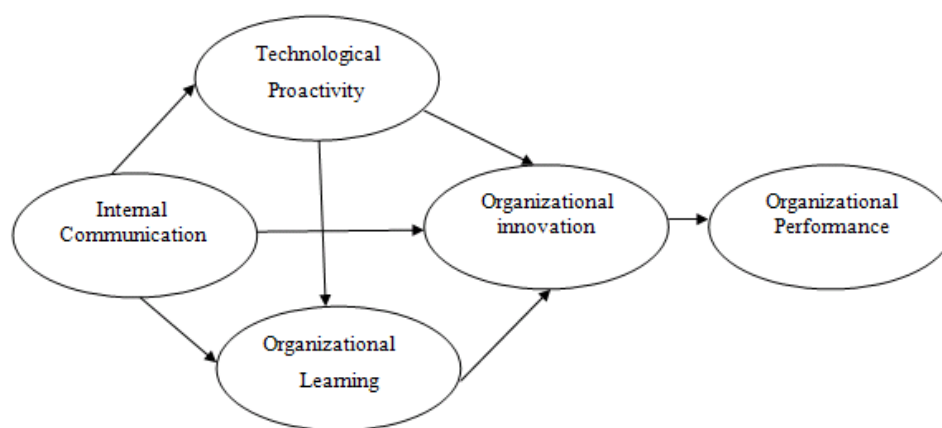


Figure 1: The influences of Internal Communication (García-Morales et al., 2011)

CONSEQUENCES OF NEGLECTING INTERNAL COMMUNICATION

Although the importance of internal communication is known, many executives know their value, but very little time and resources are invested in the development and strategy of internal communication. We forget or ignore the fact that not a single project or a change will not succeed if the employees do not understand or do not agree with the message sent by management. Communication in such organizations is sporadic. There is only a one-way communication, from top to bottom. Employees are isolated from the decision-making process, management does not consult them about any questions, employees get only individual information. In such organizations there is no team spirit, nor a good working atmosphere. In such organizations, employees do not feel loyal to the organization and are not motivated to perform the duties and exercise of the above average results. They feel alienated and neglected. This may adversely affect the employee's personality, self-esteem and working skills.

Organizations with underdeveloped internal communication do not perform well as their competitors who use advanced communication practices. Lack of internal communication and lack of care for employees and their needs, leads to competitors being ahead. In such organizations there is high staff turnover, which results in higher operating costs. Training new employees is costly, and also it takes time to set them the speed and a routine that is needed in the organization, so this leads to reduced operating results in that period. In addition, frequent fluctuation of employees from organizations and

new arrivals, indicate the need and necessity of establishing a successful internal communication within the organization.

Non-performing internal communication leads to a number of other negative consequences. For example, when a group of people work in isolation of one another and share the minimum information - positive change is slowing down (Hargie & Tourish, 2002). Hargie and Tourish (2002) have found, and that the low quality of communication at departments creates a feeling of isolation and unhappiness, and it is associated with lower levels of involvement in the decision-making process. This also means that insufficient information exchange leads to uncertainty and increases alienation. Based on the above, it can therefore be concluded that the employee satisfaction, internal communication is extremely important for organizational performance (Gray & Laidlaw, 2004).

CONCLUSION

In today's environment, communication is no longer just a means of understanding each other. It is the basis of good relations in each company. Good relationship creates a positive atmosphere that creates positive energy, and from positive energy arises enthusiasm and creativity.

Only highly motivated and loyal employees are ready to fight with a lot of passion for the achievement of the company's objectives. These employees think about the company as their own, and feel success as their own. At the same time, the objectives of the company should be known to employees, as it should be clear to them the tasks and expectations that the employers have towards them. As the external public is informed, both should be the internal, or even more.

The importance of internal communication in modern business is growing, because it is a prerequisite of a successful business. The organization can achieve the best results only when the energy of all of its employees is aimed in the same direction.

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COMPENSATIONS AND BENEFITS IN ORGANIZATIONS IN SERBIA

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ABSTRACT

This paper shows main elements of compensation and benefits management. First part of the paper introduces the topic through basic definitions of compensation and benefits, then moves towards elementary theoretical approaches in motivation through compensation and benefits, ending theoretical field with recent trends for further development. Second part of the paper provides insight in practical application of compensation and benefits management on global scale, and separately on Serbian labor market.

Key words: Compensation, Benefits, Employee motivation, Serbian labor market.

INTRODUCTION

Human resource management and employee motivation is one of the most important elements for organizational success. Since 2008 crises, many organizations decided on different cost reduction and saving measures, even employee downsizing. Compensation and benefits management had a difficult task to at the same time reduce HR budget cost and meet the employees' expectations in order to attract, motivate and retain them. Key challenges facing organizations globally these days considering HR cost are: Economic uncertainty, Multigenerational workforce, Competition from emerging markets, Disruptive technology, Cost reducing initiatives, Automation and machine learning (Mercer, 2016a). For right comp. and ben. management approach, it is important for companies to understand what it is made from and how does it influence employee experience. This paper should provide basic insight in global comp. and ben. practices and their application on Serbian labor market.

COMPENSATIONS AND BENEFITS MANAGEMENT IN ORGANIZATION

When we look through compensation and benefits (CB) management, there are two sections to consider: first compensations and second benefits, or as stated in Cascio (2003) – direct (wage and/or salary) and indirect (benefits) forms of compensation. Importance of compensation management comes from its critical effect on both employees and employers. For employee salary usually represents main source of income and security. On the other hand, for employers compensation and benefits influence business and competitiveness on the markets (Gerhart, et al, 1995). According to (Bernadin, 2007) compensation is a concept that defines all forms of financial returns and tangible benefits that employee receives as part of employment relationship. Compensation also refers to remuneration, pay, and/or incentives used to motivate employees (Lekovic, Maric, 2013). Dowling et al. (2007) list the fundamental components of international compensations program: Basic salary,

Stimulus for serving abroad, Compensations (flat, travel to the country of domicile, education of children, moving expenses), and Benefits. Benefits include other forms of employee motivation such as shorter work time, vacations and holidays, pensions, insurance (life, social, health, etc.), maternity leave, conscription, flexible benefits and capital distribution in various forms (Lekovic, Maric, 2013). Employee benefits for health care, pension schemes, annual vacations, etc. could also be defined by government regulations. Aside from CB management, there are also other extended ways of giving benefits, work autonomy, opportunity for professional development, security, recognition or quality of working life (Bonache and Fernandez, 1997).

According to Gerhart and Milkovich (1990, 1992) pay practices may vary significantly across employing units and to some degree, across jobs. In (Gerhart, et al, 1995) these variations are grouped and explained in dependence of form, level, structure, mix, and administration of payment systems.

- Pay can be in the form of cash or benefits (e.g., health care, retirement, paid vacation).
- There is a difference amongst levels (how much) of compensation and benefits. These levels are defined in comparison with other organization on the market.
- Structure of CB refers to the nature of pay differentials within an employing unit, for example:
 - How many steps or grades are in the structure?
 - How big are the pay differentials between different levels in the structure?
 - Are employees at the same hierarchical level in different parts of the organization (e.g., different product sectors or different occupational groups) paid the same?
 - What kind of timing is used trough employees' careers development?
- Organization can offer employees different with payment systems through different salary increase options, variable payments and other cash compensation.
- Pay policies depends from decision on who is involved in the CB process (HR, line managers, employees, government etc.).

THEORETHICAL CONCEPT OF CB MOTIVATION

Importance of CB management comes from its influence on employee behavior. In (Gerhart, et all, 1995) authors analyze different theoretical approaches to CB motivation: Reinforcement Theory, Expectancy Theory, Equity Theory, and Agency Theory. In Reinforcement Theory, it is considered that a response followed by a reward is more likely to recur in the future (Thorndike's Law of Effect). In that context, if desirable employee behavior is monetary rewarded, it is more likely to be repeated in the future. On the other hand, if the same behavior is not recorded, chance of it not being repeated in the future is raising. Expectancy Theory also considers link between rewards and behaviors, emphasizing the rewards as individual experience rather than monetary payment. Key moment according to this theory is not whether the reward is distributed, but whether employee feels rewarded. Equity Theory is based on fairness of compensation system in employees' eyes – the way they value their own contribution to the organization and what they get in return for that contribution. Return-contribution ratio is compared to others inside and outside the organization. Agency Theory provides an idea that employee (usually managers) motivation could be aligned with strategic organizational goals.

Besides these theories, there are strong arguments supporting individual pay programs, promoting performance based CB management (Milkovich & Wigdor, 1991; Gerhart & Milkovich, 1992). This way companies may be able to attract and retain more high performance employees.

FUTURE TRENDS IN CB MANAGEMENT DEVELOPMENT

Two biggest trends for the CB management these days are definitely measurement and transparency. Both of these questions have considerable influence on employee motivation. When talking about transparency, pay confidentiality has been eroding for years. Problematic of confidentiality comes from the fact that for years it presented a way for managers to maintain control. "When employees are completely in the dark, it is difficult to realize there might be a problem" (Risher, 2014). According to (Risher, 2014), the two most frequently cited theories linking pay and motivation are Equity theory and Expectancy theory, both

focusing on compensation transparency. Dissatisfaction among employees may come from both, knowing and not knowing coworkers salary range: not knowing may lead them to overestimate others salary and be dissatisfied, but for those who know they earn less than others dissatisfaction comes right from that knowledge. Furthermore, fear of transparency among managers also comes from the option that it could also trigger questions about performance policy, and other questions that come with it.

This questions are highlighted in the research results showing that 60% of surveyed employees don't understand how their performance is measured; 45% think performance reviews are a waste of time, and more than half think their rating is not accurate; 36% do not understand how their rating is linked to their pay increase (Risher, 2014a). Most of the problems with performance management are not related with HR management, but with line managers who should perform it. First of all, performance of employees is usually rated at the end of the year, making is just another imposed activity for line managers and supervisors. These managers and supervisors are most likely not trained for any performance measurement and do not have right skill to assess employee effort value. This is followed by the lack of reward systems for those who do good performance evaluation, so there is no motivational impact either. And at last, measurement tools and questionnaires are not developed for specific job groups, but rather unspecific sets of no more than three level rating scales. Purpose of this rating fail to show its importance in the eye of employee, since there is usually no transparent way of seeing how or even does it influence compensation level that employee receive.

GLOBAL COMPENSATION PROGRAMS AND PRACTICES

WorldatWork research report on Compensation Programs and Practices from 2015 shows following results (WorldatWork, 2015):

- More than 92 % of respondents have either written or unwritten compensation philosophy, which is consistent with the results from previous years, but the overall understanding if these philosophies among common employees are slowly declining trough years, recording only 28% in 2015.
- 85% of organizations target their base salary at the 50th percentile – median, yet 66% pay at the median in practice. Value of jobs is based on market pricing (89%), followed by classification (18%) and point factor (18%).
- Base salary is defined by individual performance in 71% of companies, followed by position in range (59%), individual performance against management by objectives (MBOs) or similar personal objectives (49%) and market value of the position (49%). 82% of overall companies are using bonuses as variable pay plan, increasing over the years, on the other hand, individual incentives are declining since 2012 at only 17% in 2015. Performance score is also connected with salary increase in 72% of respondents.

On the Figure 1: CS Europe salary increase 2008 vs. 2016 there are differences among salary increase in 2008 and 2016 in countries of Central and South Europe. On average salary increase dropped for 5.68% since 2008.

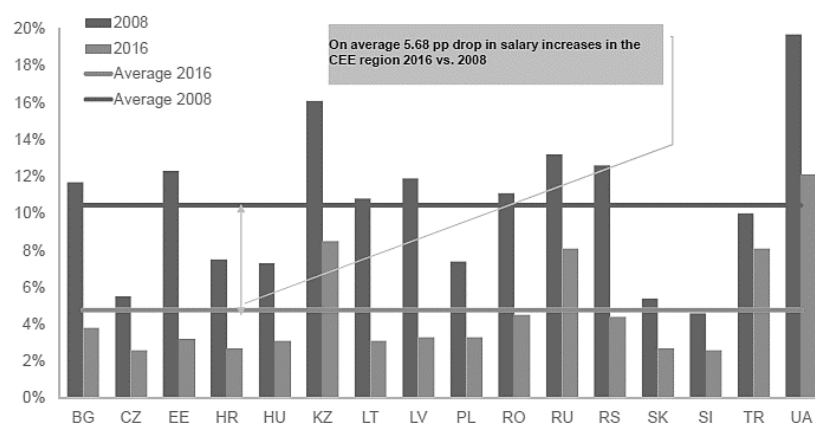


Figure 1: CS Europe salary increase 2008 vs. 2016(Mercer, 2016)

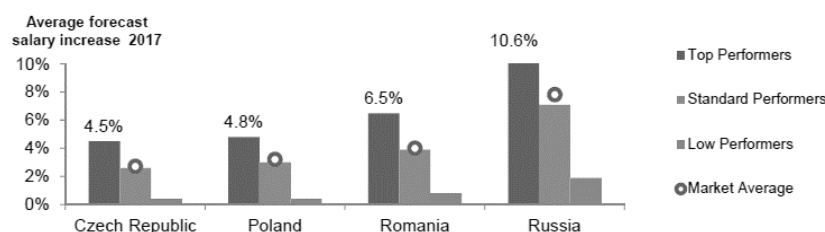


Figure 2: CS Europe - Salary increase performance distribution (Mercer, 2016)

Planned salary increase for Central and South Europe expected in 2017 is shown in Table 1: Expected salary increase in 2017 CS Europe. Figure 2: CS Europe - Salary increase performance shows distribution of expected salary increase among different performance level employees in some of the CS Europe countries.

Table 1: Expected salary increase in 2017 CS Europe (Mercer, 2016)

Country	Increase	Country	Increase
Belarus	10%	Slovakia	3%
Ukraine	10%	Albania	3%
Russia	8%	Czech Republic	3%
Turkey	8%	Croatia	3%
Moldavia	7%	Macedonia	3%
Georgia	6%	Slovenia	3%
Armenia	5%	Bosnia and Herzegovina	2%
Serbia	5%	Montenegro	2%
Romania	5%	Cyprus	2%
Bulgaria	4%	Estonia	3%
Hungary	3%	Latvia	3%
Poland	3%	Lithuania	3%

Primary reasons for lower projected salary increase in 2017 relative to actuals of 2016 are (Mercer, 2016a): response to economical uncertainty or general cost reduction, weaker business results, changes in business strategies and responses to commodity prices. Higher salary increase projections are notable as a result of: delay in salary increase for previous years, response to economic improvement, change in business strategies and greater competition.

What kind of Pay system will have the right effect on employees primary depends on variety of human needs, culture, national legislation and pay tradition, but literature shows different studies examining reward preferences for increased pay, job security, coworker respect, promotions, variable pay, specific benefits, employee dispositions/personality, job flexibility, status and prestige, meaningful public service and a lot of other factors (Scott, et al., 2015). Research conducted by the same authors has shown how pay preferences vary also on individual characteristics and national culture. Older respondents with high education have stronger preferences for variable pay than their younger or less educated colleagues. Also, older respondents and those with higher pay level prefer less transparent CB systems than younger or less paid ones. When looking through nations, differences among respondents are also notable. Germany for example had a lower preference for pay difference based on capability, pay variability and bonus plans, but stronger preference for pay transparency than did all other countries. Compared to all other countries, with the exception of Germany, Polish respondents were least likely to prefer bonus plans. The Spanish respondents were the least likely of all the countries to prefer pay transparency. Finally, for the most part, Australia, Britain, Canada, China and the United States did not have many pay preferences that were statistically different from other countries, except Germany.

Budget strategies for reduction recognized as important in 2017 are (Mercer, 2016a):

- Distributing the budget evenly across all employees,
- Eliminating the base salary increase for the majority, and
- Focusing on broader employee value proposition.

LABOR MARKET IN SERBIA

The Labor Act in Serbia guarantees equal pay for equal work, consisting of the following mandatory elements: (a) basic salary and (b) increased salary (payable for: work on a public holiday, night work, past years of employment with the current employer, and overtime work) that are precisely defined relative to base salary. A meal allowance and annual vacation allowance are also mandatory payments, but the law does not prescribe the minimum amount. In each calendar year, the employee is entitled to annual leave of a minimum duration of 20 working days. Serbian Labor Act also considers Maternity, Childcare, Injury and Sick leave, where first two are fully paid by the state, third is fully paid by employer and in fourth case, employees are entitled to a compensation of salary in 65% of the employee's average salary calculated over the period of 12 preceding months. The Serbian mandatory statutory social security system includes the following schemes: Pension and Disability Insurance; Health Insurance; Unemployment Insurance. The contributions for these insurance schemes are imposed as mandatory. Besides mandatory insurances, companies may choose to voluntarily organize participation in additional social security schemes for their employees.

According to research presented in (Štangel-Šušnjar & Slavić, 2012) HR budget in 2010 makes up to more than 30% of total overall budget in companies in Serbia. Decision on compensation of employee is in more than 70% of cases made by line manager and around 20% made by line manager in consultation with HR department. In 2015 CARNET research, results show lower influence of line manager in this decision, making this 57% line manager decision, 24% line manager in consultation with HR department and 19% mostly HR department decision. Comparison of this research shows a rise in HR department importance in CB decision making (Carnet, 2015). Same research also shows that base salary for managers is usually decided upon individual negotiation, but other employees get their base salaries defined on the company or department level.

Table 2: *Level of base salary determination (%)*. shows level on what base salary is determined. For the most companies this decision is made on Country or Company/department level, with exceptions for managers that have greater individual influence on base salary decision than any other category of employees.

Table 2: Level of base salary determination (%) (Carnet, 2015)

	Managers	Specialist	Workers
Collective negotiation on the country level	29	29	30
Collective negotiation on regional level	4	6	5
Company/department level	32	56	56
Unit level	7	13	14
Individual level	54	23	16

Besides base salary, other compensation methods of motivation in companies in Serbia include stimulation and bonuses based on individual and organizational performance. Non-monetary motivation is also present in one out of three companies. Profit and share options are not that popular in organizations in Serbia.

Table 3: Compensation methods in Serbian organizations (%) (Carnet, 2015)

	Managers	Specialist	Workers
Stock Ownership	6	3	2
Profit share	19	14	13
Stock Options	6	4	3
Flexible benefits	23	13	10
Individual performance variable pay	65	64	53
Individual performance bonuses	55	42	32
Team performance bonuses	35	29	25
Bonuses based on organizational goals	54	35	30
Non-monetary stimulation	37	38	36

As shown in (Lekovic, Maric, 2013), most of the benefits provided to employees in Serbian companies are government regulated. Benefits related to Workplace Childcare, Childcare Allowances and Private Health Care are on the very low, almost none existing in CB motivation packages in Serbia. On the other hand, benefits such as Career Break Schemes and Maternity, Paternity and Parental leave level are amongst highest in Europe. Still,

taking in count low living standards in Serbia, this benefits are reduced to minimum. Table 4: *Other benefits in Serbian organizations* (% gives an overview of other benefits provided by the organizations in Serbia, besides ones guaranteed by Labor Law.

Table 4: *Other benefits in Serbian organizations (%) (Carnet, 2015)*

	Total	Private sector	Public sector
Childcare in organization	1	2	0
Childcare addition	2	3	0
Unpaid or career development leave	41	36	51
Educational/training breaks	55	57	50
Private medical insurance	16	17	13
Flexible meal allowance benefits	19	25	8

CONCLUSIONS

For conclusion, it can be noted that CB management in Serbia follows simple strategies. In the part of the compensations, organization tends to offer employees with basic salary options and bonus schemes. Besides for the managers, base salary for other employees is usually predefined on country or organizational level. Poor verity in other compensation methods (besides bonus schemes) probably comes from the fact that employers on Serbian labor market tend to take advantage form low economical standard and high level of unemployment. Same comes for benefits. Besides those predefined by Labor Act, employers have no motivation to provide employees with additional benefits in order to attract and retain them. Getting in pace with global trend is yet to come for Serbian labor market.

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Session C: MARKETING AND MARKETING MANAGEMENT

Papers (pp. 173-218):

Mihalj Bakator, Vesna Marić, Slađana Borić, Dušanka Milanov THE USE OF SOCIAL MEDIA IN MARKETING STRATEGY DEVELOPMENT	...173
Mihalj Bakator, Nikola Petrović, Mina Paunović ANALYSIS OF PRODUCT QUALITY AND BRAND LOYALTY ON THE SMARTPHONE MARKET IN SERBIA	...178
Dragan Čočkalo, Melita Čočkalo-Hronjec, Jelena Tasić, Cariša Bešić, Miloš Vorkapić THE ASPECTS OF CRM APPLICATION ON SOCIAL NETWORKS IN SERBIAN BUSINESS PRACTICE	...183
Dejan Đorđević, Srđan Bogetić, Snežana Bešić THE ANALYSIS OF MARKETING PRACTICE IN DOMESTIC ENTERPRISES	...188
Aleksandar Grubor, Nikola Milicevic, Nenad Djokic RETAIL CENTRALIZED DISTRIBUTION SYSTEM	...194
Bojan Matkovski, Marija Jeremić, Danilo Đokić, Žana Kleut COMPETITIVENESS OF SERBIAN MEAT AND MEAT PREPARATIONS ON THE INTERNATIONAL MARKET	...200
Miloš Pjanić, Branimir Kalaš, Ivan Milenković ONLINE DISTRIBUTION CHANNELS FOR INSURANCE PRODUCTS IN SERBIA AND THE EUROPEAN UNION	...206
Bruno Završnik SLOVENIA'S IMAGE AS A TOURIST DESTINATION	...212

THE USE OF SOCIAL MEDIA IN MARKETING STRATEGY DEVELOPMENT

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ABSTRACT

Marketing strategy development is a key process for a company. Business performance on the market relies on the effectiveness of the marketing plan. In the modern business world, market saturation is a big problem, where massive amounts of similar products and services flood the same market segment. Consumers are prone to influence by social media. Social media platforms can be used for marketing strategy development. The use includes harnessing information and feedback from potential customers. Based on the gathered information companies can develop better, more effective marketing strategies. Business performance can be improved and overall sales percentage can be higher. There are many benefits of social media use in marketing strategy development. A more optimized marketing plan, higher profit margins are only some of the positive outcomes from the use of social media. There are risks. However, with adequate security systems, these risks can be cut down to minimum.

Key words: social media marketing, market, consumer, platform, marketing strategy.

INTRODUCTION

Marketing strategy development is a crucial process for the survival of a company. The presence of market saturation with a broad variety of similar products from a huge number of competitors, make it difficult for companies to survive in the continuously changing environment. Companies must adapt to the constant changes and dynamic principles which form the laws on a specific market. (Kotler & Keller, 2016). To achieve sustainability, companies focus on an effective marketing strategy. Further, small and medium businesses need to develop flexible strategic plans. Flexible strategies adapt more effectively in opposition to rigid and status quo oriented organizational structures (Vorkapić, Popović, Čoćkalo, Đorđević, & Minić, 2015).

Social media has become a main part of life for the majority of people. Through social media sites, people share their experiences, thoughts, feelings, and digital content in the form of videos and pictures. For companies the most important information is the one regarding to its products.

Users' opinions and reviews determine the fate of the company in the future. The customers share their experience through social media (Kubacki, Dietrich, & Rundle-Thiele, 2017). Researchers Agnihotri, Dingus, Hu, and Krush (2016) indicate that information communication is a critical behavior among customers and salespersons, too. (Agnihotri, Dingus, Hu, & Krush, 2016). The sales divisions of companies must effectively create and distribute information to the potential customers

with the goal to generate sales. Positive messages on social media sites contribute to a positive corporate image (Agnihotri, Dingus, Hu, & Krush, 2016). Customer satisfaction and customer care can be addressed through social media. These two concepts are important for achieving good business performance. Companies create and manage branches with experts or hire part-time experts for PR services (Ulaga & Chacour, 2001).

The aim of this paper is to analyze and define the utilization of social media in marketing strategy development. Strategic planning is an imperative for good business performance. The marketing strategy development process needs to address the major benefits and crucial role of social media. Further, in this paper the main concepts of marketing strategy development and social media marketing will be reviewed.

MARKETING STRATEGY

Marketing strategy development

Developing marketing strategies is defined as a process of exploiting the company's resources to achieve long-term or short-term success on a specific market. The marketing strategy development process uses a wide set of actions and procedures, followed by good decision making techniques (Kotler & Keller, 2016). In addition, strong leadership skills are mostly required for timely and effective decision making and setting and achieving goals (Hansen, McDonald, & Mitchell, 2017). Key elements of marketing strategy development are segmentation, targeting and positioning, promotional tactics, monitoring and evaluation and a good, thoroughly defined marketing plan (Kotler & Keller, 2016).

Segmentation includes defining and identifying a specific market segment, where the company's products and services can gain an advantageous market position. Competitors are the main risk to business performance gains. On saturated markets, companies must prepare for highly dynamic risks (HDR). These risks can be in the form of new strong competitors, technology advancement or innovation in some products or services (Abrar, Safeer, Baig, & Ghafoor, 2016).

Targeting and positioning defines the narrow market segment where the products and services are distributed. Without effective targeting and positioning systems, companies would have a difficult time generating sales if they can't find the consumer market which wants to buy the offered goods. Targeting includes various activities like market research, competitors' popularity report and other factors which interfere with the flow of stable product and service sales (Abrar, Safeer, Baig, & Ghafoor, 2016)

Promotional activities include a vast amount of advertising, public relations, personal sales and other activities. The main goal of promotion is to sell the products and services to the consumer. Through promotion, companies tend to achieve a higher corporate image, bigger profits and a bigger market share (Đorđević & Čočkaló, 2010). The mentioned elements should be integrated in a compact, easily readable and realistic marketing plan. Marketing plans show how the key aspects for marketing strategy development (Kotler & Keller, 2016).

Marketing strategy model

Kotler defined the SWOT analysis as a tool for auditing, examining the internal organization structure and external environment. The word SWOT stands for strengths, weaknesses, opportunities and threats (Kotler & Keller, 2016). Strengths are internal factors and can include specialized staff or experts, new advanced technologies, innovation, location of the distribution centers, quality processes, optimization of procedures and other elements which are perceived as values (Đorđević & Čočkaló, 2010).

Weaknesses can be the lack of experience in a particular market segment, bad quality procedures or lack of innovation. Strengths and weaknesses are internal factors, while opportunities and threats are external. Opportunities can be mergers, strategic alliances, new market or market niches (Đorđević & Čočkaló, 2010). Further, threats are the factors and situations that put a high risk on business performance. These can

be new effective competitors, price wars or the fact that competitors have acquired superior channels of product distribution.

Other marketing strategy models include Porters five forces, 7Ps of marketing mix and Ansoff-Matrix strategy. The Ansoff Growth Matrix is defined as a marketing tool through which businesses determine their product, service and market growth strategy. This is referred to also as market penetration, where the companies are focusing on existing products and selling them into existing markets (Kotler & Keller, 2016). Porters' five forces is a framework that determines the competition within an industry. It depends on five forces that define the competition's strength and based on the results, the company can make a decision if it wants to enter to that market or not. In addition, Porter's five forces include rivalry in the industry, bargaining power of suppliers, bargaining power of buyers, threat of new entrants, and threats of substitutes (Kotler & Keller, 2016).

SOCIAL MEDIA MARKETING

Social media marketing development

In the modern business world, companies can't survive without enough exposure to the public. The reason behind this is that the public defines the market segments. If the competitors are communicating strong positive messages through various communication channels, they will have a superior position on the market in opposition to the companies that don't rely on effective communication. (Kotler & Keller, 2016).

Social media sites and platforms reach more than a billion people around the world. This type of communication channel is very effective in sending messages and information to potential consumers. Social marketing is not different from other business strategies (Vorkapić, Popović, Čočkalović, Đorđević, & Minić, 2015). There are a few crucial steps for effective social media marketing development. These steps are defining social goals, extending effort in the organization, focusing on networks that add value, creating engaging content, identify business opportunities through social interactions, track and improve market efforts (Kumar, Choi, & Greene, 2016).

Companies must define their goals from a social aspect. Further, social media marketing is a part of internet marketing strategies. Similarly as a marketing plan, or internet marketing plan, social media marketing development needs a clearly defined social goal. The goal can be a better corporate image, better public relations or generally higher numbers in sales (Kumar, Choi, & Greene, 2016).

All the effort in the organization need to be extended to a point where almost every employee is included in such a manner where he or she can contribute to overall better business performance. Therefore, when a social media marketing plan is in development, human resources in the company must be aware of the goal of this plan. This way, the effectiveness of the social media marketing plan will be higher (Lee, 2016).

Furthermore, there is a need to clearly define and identify the best social media platforms for communication and message distribution. There is a big difference if a message or information is distributed through Facebook or LinkedIn. Therefore, companies must decide through what social media platform they want to communicate with the consumers (Antoncic, Auer Antoncic, & Aaltonen, 2016).

There is a problem when the markets are saturated with similar products and services. A big number of competitors create dynamic markets (Antoncic, Auer Antoncic, & Aaltonen, 2016). Comparatively, on the social media platforms, the problem of saturation is even more expressive. Certainly, there are untouched niches on social media, but the majority of content is very similar. The biggest obstacle for companies and their most important goal in social media marketing should be creating high quality content. Content that offers more in opposition to the other information that is already present on social media (Antoncic, Auer Antoncic, & Aaltonen, 2016).

The use of social media in marketing strategy development

Companies develop marketing plans with the goal to penetrate new markets or solidify their position on existing markets with new, innovative or existing products and services. Social media platforms can be used for the marketing strategy development (Đorđević & Čočkaló, 2010). Competitiveness can be measured by the intensity of generated sales viewed in accordance of the market size. Companies must find solutions and innovation in their surroundings (Đorđević & Čočkaló, 2010).

Information provided from the environment, more precisely from specific segments of markets, can be used for product innovation and quality improvement (Kotler & Keller, 2016). On Figure 1. the information flow and connections between the company, marketing strategy, products and services, social media platforms and market are shown. The figure is based on the research of social media marketing and marketing strategy development (see Figure 1.)

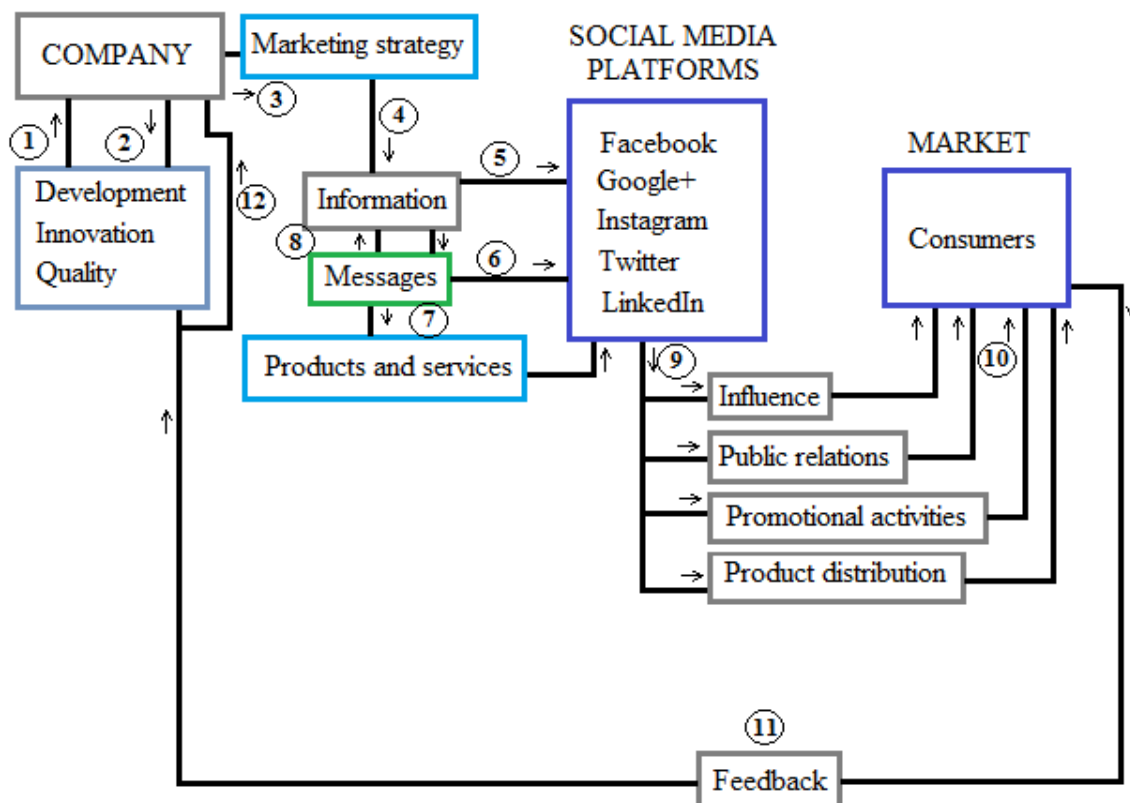


Figure 1: The use of social media in marketing strategy development

The company has its department where development, innovation and quality control occurs (1, 2). Through the marketing strategy information and messages about the company’s products and services are distributed via social media platforms (3, 4, 5, 6, 7, 8). The outputs from the social media platforms are in the form of influence on the consumers, public relations building, promotional activities and product sales generating or distributing (9, 10). On the market, consumers receive the messages and information in various forms. After the information is processed, usually a feedback is generated which is not always directed towards the company, but rather it is freely available to other consumers too. However, the feedback information is easily accessible to the company, and based on the feedback, further development, innovation and quality improvement is conducted (11, 12).

CONCLUSION

Developing effective marketing strategies is an imperative to good business performance. Companies tend to create flexible strategic plans in order to answer the changes that may occur on dynamic markets. The social media offers a wide set of choices, from which companies can choose to use in their marketing strategy development processes. In the modern business world, without a basic

presence on the Internet or to be more precise, on social media platforms, a business can't survive or in a less severe situation, it can't achieve great business performance.

In this paper the main concepts of marketing strategy were reviewed. Further, the social media marketing concept is analyzed. In addition, the use of social media in marketing strategy development is shown through a graphic model. This approach features a clear and simple understanding of the importance of social media for business performance. There are exceptions for businesses that don't require social media presence or presence on the Internet overall. However, sooner or later, it is suggested that these business eventually also turn to at least a small promotional activity through social media. A representative, small website goes a long way in the business world. Products or services can be shown to a big number of potential customers. Businesses can put themselves on the market in way that only through social media is possible. There are many benefits but also there are risks too. The risks can include but are not exclusive to cyber - attacks, website hijacking and other type of misuse of information by third parties. These can compromise the effectiveness of social media marketing strategies. However, the risks are only present for high profile companies which accordingly have high security systems to prevent those types of attacks. On the other side, small and mediums businesses are less likely to be the target of such threats.

Future works will concentrate on defining the main and subtle factors of social media which interfere with easy marketing strategy planning. Further, the effectiveness of various social media platforms and cost-benefit calculations should be addressed.

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ANALYSIS OF PRODUCT QUALITY AND BRAND LOYALTY ON THE SMARTPHONE MARKET IN SERBIA

UDC: 621.395.721.5:339.13(497.11)

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ABSTRACT

Companies penetrate the market with high quality products with the goal to achieve a stable market position. Product quality is a crucial factor that dictates the success of a product or service on the market. Consumers tend to buy higher quality goods and often associate high quality with popular brands. Brand development is important for long-term survival of a company. Brand loyalty is achieved through constant care of consumers and improvement of product quality. It is difficult to develop a strong brand, but relatively easy to ruin one. The dynamic changes on the market are ruthless in the modern business world, and companies are focused on stabilizing their position on the market through high quality products and influential brand development.

Key words: product quality, brand management, brand development, brand loyalty, market saturation.

INTRODUCTION

Brand of the product affects the market position of a company. The more popular brands have better chances for survival on a saturated market. Consumers will more easily identify popular brands in opposition to the less known brands (Kotler & Keller, 2016). Companies are focused on market share enlargement and higher profit margins. The goal is to sell high amounts of products and services in the shortest time frame. This way the company's competitiveness is better and overall has a better position on the market (Kotler & Keller, 2016).

After launching a new product on the market, the company follows in what merit the product and service satisfies the needs of customers. Based on the feedback of the users, may they be positive or negative the company modifies its products and services accordingly. Through product and service improvement a higher level of satisfaction of customers is achieved (Olbrich, Jansen, & Hundt, 2017).

Companies tend towards high quality products. The development process of products is focused on the elements that created dissatisfaction among the consumers. High quality products are an imperative for strong and popular brand development (Đorđević & Čočkalović, 2007).

Brand development is a painful, complex and long process, where the consumers are influenced through various promotional activities. Brand loyalty is crucial for a stable business performance on the market where many competitors launch a big number of similar products (Santos - Vijande, del Río-Lanza, ASuárez-Álvarez, & Díaz-Martín, 2013). Brand management is important more than ever. The fast-paced changes put companies under business risks. Competitors are merciless when it comes to promotional activities. Their marketing strategies are aggressive and effective. This creates a chaotic scene on the market (Shachar, Erdem, Cutright, & Fitzsimons, 2011).

In this paper the main concepts of product quality, brand management and brand loyalty will be reviewed. In addition the product quality and brand loyalty on smartphone markets in Serbia will be addressed. Further, descriptive statistics will be used for small glance on some of the differences between specific smartphone brands. The research was conducted on 782 (N=782) smartphone users between the age of 14 and 65. The research was realized through a survey which included opinions on brand strength, brand loyalty and product quality. A part of the results are shown in this paper in the form of graphs, while the other results are analyzed in a concise manner.

PRODUCT QUALITY AS AN IMPERATIVE FOR CUSTOMER SATISFACTION

Quality and indicators of quality

Product quality can be defined as a set of product characteristics. When consumers perceive quality, they are not objective but rather subjective. This is called perceived quality from the perspective of the user. Tsotsou-a (2006) concluded that objective quality and perceived quality are very different and have different influence on the consumers. (Tsotsou, 2006).

Consumers perceive brand and quality through their own motives, opinions, attitudes, wishes and needs. (Tsotsou, 2006) Quality and brand of a product that is on the market integrate in a whole which satisfies the needs of consumers. Quality improvement is solely focused on consumer satisfaction. Quality management includes quality indicators. These indicators are market, business and social. (Đorđević & Čočalo, 2007).

The market aspect of quality includes customer satisfaction, suitability for use, market position and competitive advantage. The business aspect of quality includes efficiency increasing; cost lowering; productivity increasing; profit increasing and long term survival on the market. The social aspect integrates consumer health security, environmental protection, saving natural resources and consumer protection. To achieve business excellence, a company must address all these aspects. (Kotler & Armstrong, 2013). Built quality is a concept which is defined as an integrated whole of quality elements which are aimed at consumer satisfaction and overall product quality improvement. Further, the built quality is designed to satisfy the needs, wishes and expectations of consumers. Product and service quality can also be defined as a level of satisfaction of the consumer's needs (Coombs & Holladay, 2015).

Kotler and Keller (2016) define quality as an integrated whole of product and service characteristics which can satisfy the imposed and indicated needs of the consumers (Kotler & Keller, 2016). The basic indices of product quality are physical and functional lifetime of the product; reliability; availability; safety on work; conformity and ease in handling; coefficient of efficiency; degree of mechanization and automation; easy and economical maintenance and availability of parts for maintenance; price of the product and aesthetic appearance (Đorđević & Čočalo, 2007).

Motivators for product and service purchasing can be financial, social or psychological. Brands influence consumer in their purchasing habits. Popular brands tend to have an observable advantage over less known brands. Often, a strong brand is correlated with high quality. Consumers assume that if the brand is popular the user experience will be better (Kuo & Deng, 2009)

Product quality on the smartphone market in Serbia

The smartphone market is very saturated. Hundreds of brands are competing against each other over specific market segments. In this paper the popular brands like Samsung, Apple, Sony, HTC, Nokia and Microsoft, Motorola, LG, Huawei and less popular brands like Azumi, Ghong, Elephone, Wiko and others are analyzed. A part of the results from research which was conducted via survey is shown on Figure 1.

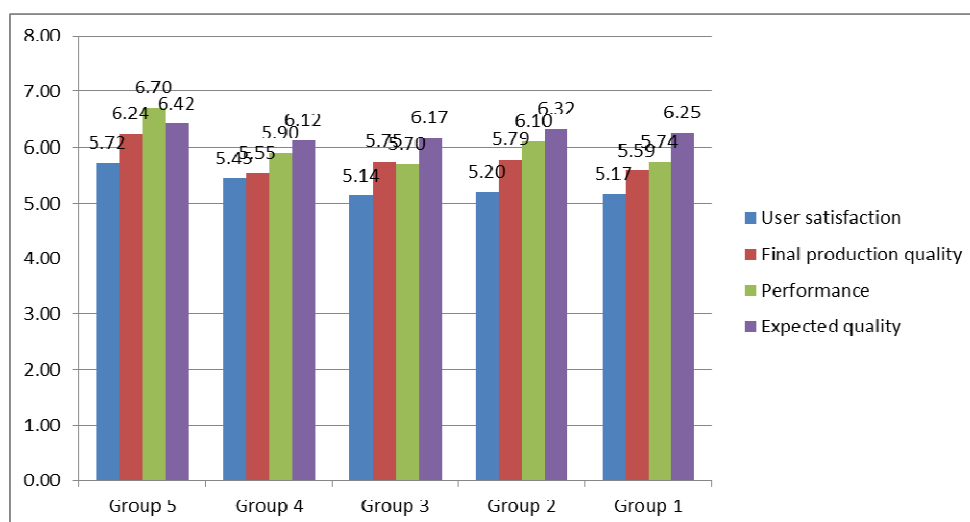


Figure 1: Users' opinions on smartphone quality by brands

The smartphone brands were grouped by their popularity. In the strongest group (Group 5) the brands Samsung and Apple are included. In the fourth group (Group 4) Sony, HTC, LG and Huawei are included. In the third group (Group 3) the Lenovo, Alcatel and Microsoft brands are included. The second group integrates lesser known brands on the smartphone market like Asus, Acer, Xiaomi and Meizu. In the least popular brands group Azumi, Ghong, Elephone, Wiko and Vivax are included. The survey asked for opinions on user satisfaction, final product quality, performance and expected quality or the perceived quality of the users. The survey was based on a 7 point Likert scale. The results showed that even if there is a visual difference for every brand group, these differences are not statistically significant.

BRAND AND BRAND LOYALTY

Brand and brand management

Successful brand management requires identifying how consumers connect or associate brands and products. Companies must know all the attributes which are connected to a specific brand. Connection and closeness with the consumers influence the strength of a brand (Olkkonen & Luoma-aho, 2014). Brand management is a complex process which includes all the business units of the company.

The main factors of brand management systems are continuous communication with consumers through all the year; sustaining power of influence, negotiation and leadership; managing the shareholders expectations; creating a contingent plan for promotional activities; always keeping promises to the consumers and distinguishing innovation from customer values (Grunig & Grunig, 2008). Continuous communication with consumers is necessary for a stable market position. The goal is not to let the brand to fall into oblivion. Through communication companies want to spread stories, myths and legends so the brand would gain popularity (Grunig & Grunig, 2008).

Strategic management is conducted through 4 main steps. These are identifying and establishing brand positions and values; planning and implementing brand marketing programs; measuring and interpreting brand performance, and growing and sustaining brand equity. The key concepts for every step are shown on Figure 2.

Developing a strong, popular brand includes systematic and structured management processes. Companies define their brand management processes to achieve better business performance (Kotler & Armstrong, 2013).

Brand management focuses on long-term planning of strategic brand development and its position on a specific market. Further, a well-planned branding strategy ensures a higher percentage of survival on a market. (Đorđević & Čočkalović, 2010). Markets are prone to constant changes. Saturated markets create stressful situations for companies as they struggle to maintain a stable market position (Kotler & Keller, 2016).

Strategic Brand Management Process

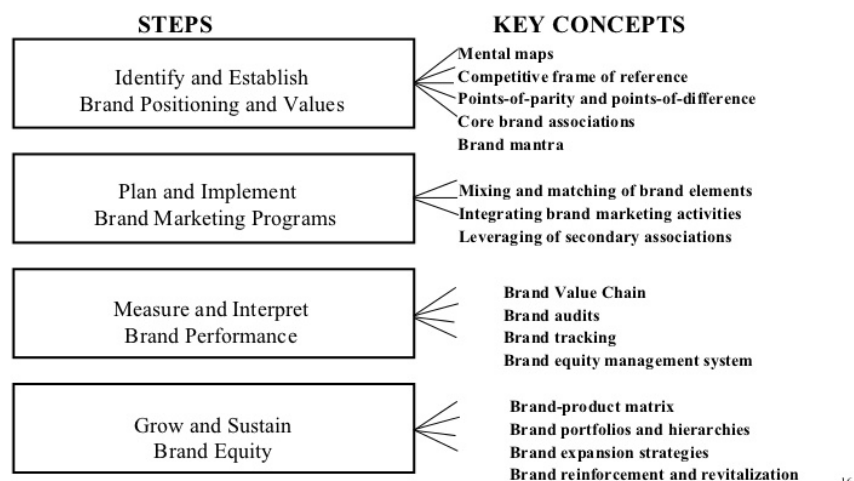


Figure 2: Strategic brand management process (Kotler & Keller, 2016)

Brand loyalty on the smartphone market in Serbia

Brand loyalty can be defined as an emotional connection that occurs between a consumer and a product which is sold under a certain brand. The consumer believes that the brand he buys is one of the best, and wouldn't change it to another product under a different brand. Brand loyalty is strength of the consumer-brand connection. In this paper the loyalty of smartphone users in Serbia is analyzed. The survey included questions regarding to brand loyalty, level of recommendation, willingness to pay a higher price for the brand and the level of trust in the brand. The results are shown on Figure 3. Smartphone brands are grouped by brand popularity. The categorization is the same as in the earlier mentioned graph. In the fifth group the most popular brands Samsung and Apple are included and in the first group are the least popular brands like Azumi, Ghong, Elephone, Vivax, Wiko and others. The results of the survey included the grouped brands and the graph is created by standard descriptive statistic tools.

Figure 3. shows that the less popular brands in group two got higher average points in opposition to more popular brands in group four and group three. In addition, this shows that brand loyalty is not always defined as common for popular brands. While there is no statistically significant difference between the groups, it shows that brand management often is influenced by other market factors. These factors can involve purchasing power of the consumers, personal user experiences or emotional connections that occur towards any brand.

CONCLUSION

In the highly dynamic market environment, companies are focused on creating strong brands which can survive on the market. Brand management is crucial for success on the market. However, brand management is tightly connected with product quality. This type of connection puts high strains on the business performance. The company must adapt to the market, defeat competitors, penetrate the market with high quality products and achieve business excellence.

Product quality is an imperative for strong brand development. Popular smartphone brands tend to have an advantage on the market. However, there is a possibility that lesser known brands have an edge over the strong brands with cheaper products and services.

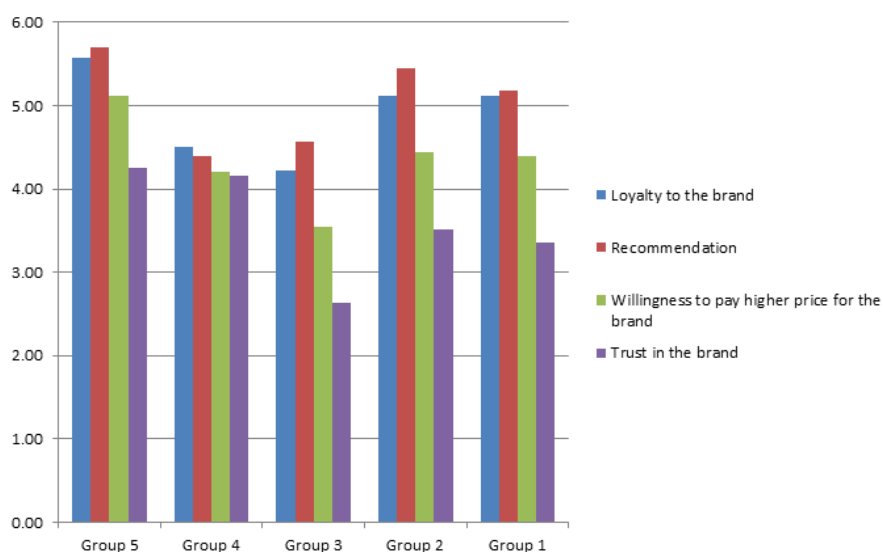


Figure 3: Users' brand loyalty by brands

There are factors on the market that need to be identified and defined so the influence of these factors can be controlled. It can be assumed that emotional components have a big role in the purchasing process of consumers. Memories and emotional connections to certain products or brands can override the urge to buy very popular brands or products and services. This area was not well researched. Therefore this remains only as a probability. Other factors which could influence brand loyalty are weather conditions, news or family relationships. These factors can't be measured nor involved in excessive research. However, in further research more measurable factors should be addressed so the influence of non-measurable factors could be minimized.

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THE ASPECTS OF CRM APPLICATION ON SOCIAL NETWORKS IN SERBIAN BUSINESS PRACTICE

UDC: 004.738.5:005.346(497.11)

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ABSTRACT

This paper presents CRM as a model for ensuring customer requirements satisfaction. A special attention is paid to an interaction of a traditional concept of CRM and social networks – a phenomenon of the new era, which offers great possibilities for enriching customer - enterprise relationship. Therefore, enterprises are given the tools for managing and measuring the social networks usage in order to be more successfully engaged with social users. Besides, this paper especially gives the analysis of domestic enterprises experiences in this field.

Key words: CRM, social networks, Serbia.

INTRODUCTION

Business performance, in the international context, has been drastically changed in the last twenty years. Geographical and cultural obstacles have been considerably decreased due to technological progress which resulted in information society. It has also made pre-conditions for broadening businesses and markets, beyond the national context, to the whole world. The final result is the creation of market environment for an enterprise and consumers as well.

The social networks like Facebook, MySpace, Twitter, You Tube, Friendster, Blogger, Digg and other, have nowadays escalated into an imperative of modern business and marketing communication and not only in connecting people in on-line context. They are specific on-line communities. Good companies are truly taking efforts to make their own profiles and start communication on these social networks with their fans (current and potential customers) in creative and funny way. Hollensen (2007) stated that "social media include a wide spectrum on-line, word-of-mouth forums, dating sites, blogs, chat rooms, e-mails going from consumer to consumer, Internet discussion boards and forums, sites including digital and audio context, pictures, films or photos, etc."

NEW ERA CUSTOMER SATISFACTION

It is obvious that the economic crisis will last for a long period of time and together with unemployment and inflation they represent the burden for market stakeholders who must survive and adopt skillfully in spite of gloomy predictions. Within the severe environment new consumers appear

along with prominent and beneficial development of Information Technologies. Knowledge about consumers' behavior on the market represents alpha and omega in creating quality marketing relations. Today's consumers search for information, they tend to be connected, they are often suspicious and like real brands...One significant recent survey on new consumers in the new era confirms that the consumers are behaving carefully and they do not spend lavishly, they cut expenditures and adopt the saving strategy. They are interested in prices and their comparability. When speaking about the world of young people, teenagers, the recommendations of the study are that they have to be taken seriously, that the relationship with them must be open and honest because teenagers who are able to recognize quality are not inclined to compromise. They are willing to reject TV but not the Internet. The most frequently visited pages are facebook.com and google.com. We can notice the growth of the Internet in informing related to purchase – more dominant for computers, mobile phones, books or music but also for food, drinks, hygiene items at every tenth examinee (Čóckalo-Hronjec et al., 2013).

The elements of successful management directed towards building the relations with customers in modern conditions of production assume: involvement of executive management and devotion to objectives of such management, successful measurement which is in short-term based on service quality management and in long-term on achieving a high degree of customer satisfaction, guidelines for individual initiative that provide the execution coordinated with general objectives and the strategy oriented towards building the relations with customers.

CRM AND THE CONCEPT OF CUSTOMER RELATION MARKETING

During the previous decade Customer Relation Management (CRM) was a strategic approach which most enterprises used trying to understand how to supervise their customers' behaviour (Ngai, 2005). As a rule, the enterprises were linked to often amorphous management strategy via technology, process and analytic algorithm of the enterprise. By collecting data about the customers and following all their transactions CRM managed to understand the way of thinking of individual consumers. Fortunately, the insight on consumers and efficiency of the process led towards the increase of buying and cost reduction (Zablah et al., 2004). Furthermore, CRM was used and is still used for the increase of efficiency regarding the sale of products and services as well as the management of sale by following customer activities starting from the first ones until the signing a contract, from ordering to problem solving (Boon et al., 2002).

Customer relation marketing has expanded with the development of the Internet when personalization of customer relation was made possible via a direct contact by creating database and following customers' activities. Then, integrated marketing communications have reached their full potential. Some advanced and innovative companies realized that it was not enough to give only additional, appropriate services to their customers and make easier to them to make decisions on buying so they could increase their sale and profit but they had to establish more quality, strong and close relations with them. The focus on relations along with modern methods of integrated marketing communications was a winning combination.

It is necessary for successful business to establish the relations of mutual trust and fair play between sellers and buyers although it is extremely hard to achieve the full win-win relation, especially in the current system of the world economic destruction. Good relation are built for years. Customer behaviour is getting more complex. Advanced companies tend to integrate all the processes in an organization (production, logistics, finance, sale, marketing, research and development, maintenance, IT and similar) and direct them to customers with the enhanced interactivity strongly supported by marketing communication. Since in IT sector, globally, some dramatic changes are taken place permanently and new generations of CRM architecture are appearing, companies should be careful when they integrate the processes of customer service and communication.

Critical aspects of CRM architecture represent contact points with buyers/customers (as sale services) and they are: Internet (via web site), e-mail, call-center, direct mail, POS, wireless communication and

direct sale (sale person engagement). The growth of load on contact points of the company represents, in fact, market expansion, the increase of customer interest and it asks for greater respect of marketing management in the new design of work and also the dynamics of these contact points. Effective CRM software can enable strong services in better connection of contact points and marketing operations.

SOCIAL NETWORKS AND THEIR SIGNIFICANCE FOR CRM

Since 2003 the impact of social communication transformation has transferred the ownership from customer/enterprise to the control in "the hands" of customers – this changes the way how enterprises answer to customer requirements. The discussions on enterprises value go beyond the framework of enterprises and they approach customers who discuss in public about the enterprise although they do not participate in enterprise's business performance in any way. Therefore, these discussions are no more under the control of enterprises. (Greenberg, 2009)

Social networking/connecting on higher level is described as convergence of technologies which enables individuals to communicate, share information and create new on-line communities more easily (Maoz et al., 2009). While social networks originated as a "province" of individuals the enterprises are trying to earn money on this trend because they are searching for specific strategies and tactics that could help them to extract value from them. In fact, Gartner Research shows that the enterprises are increasing their investments in social networks. It is not the question any more what social networks represent but what they mean to enterprises.

Unlike other communication media, the sites of social networks do not only enable their customers to communicate to one another but also to find the persons who share similar opinions with them. Once they find themselves the members can make ad-hoc communities/groups based on common interests. A lot of groups created like this is made of individuals who are becoming a new power described by the expression the "power of masses". In this way the sites of social networks help in transferring power from the enterprise to customers because the masses are able to canalize and exert the influence (Wu et al., 2009). The whole "story" is related to connecting and engaging the customers in the new way (McKay, 2009). The users who use social networks want to perform meaningful engagement and connection with enterprises and enterprises want to find out how to manage their activities and measure their influence on social networks. When social networks and CRM work together well, the enterprises are enabled to listen to their customers better and to engage "social" customers to work according to their rules while they manage and measure their efforts in doing so. By introducing/enabling the unused and so far unmanaged on-line conversations social networks also help the organizations to come closer to their customers in order to optimize their marketing, sale and efforts of user services (McKay, 2009).

The use of social networks can help the organizations in identifying the most influential users, in including them in product development and improving their emotions towards the brand. Social networks should be seen as channels that the organizations ought to follow and on which they have to be engaged (Maoz et al., 2009). This combination of factors has transformed the customers' way of thinking in regards to business – and not only how they did their business and how they became social users.

THE ASPECTS OF CRM APPLICATION IN SERBIAN BUSINESS PRACTICE

There are not many relevant indices about CRM application in Serbian economy. Comparable but not sufficiently comprehensive data were given in the study carried out by the Serbian Office for Statistics since 2004: "The use of ICT in the Republic of Serbia". Since 2010, comparable indices have been given in this study and the sample included from 1200 to 1400 surveyed enterprises, certified according to their size and field of work.

Almost one third of the surveyed enterprises did not have their web site - or only 75.2% of the surveyed enterprises in 2015 had the one. The customers/users are most often enabled via web sites the following: access to products' price-lists and catalogs, necessary information on products and possibilities for on-line submission of complaints. Online order or reservation of products/services, or online payment enables 24% of enterprises from 2015; in the previous years under one-fifth of all enterprises provided this opportunity. Advertising of free workplaces or on-line application has never been in use before and, on average, it was about 15% for the observed period 2010 to 2015. In the recent years the number of enterprises which order products/services on-line has been increasing – on average it is about 40% of enterprises in the last three observed years. Since 2013, the information related to the number of enterprises/users of social networks has been monitored and reported as well as the type of these networks. It is a fact that there is an increasing interest of enterprises for social networks application - from 23.4% in 2013 to 28.6% in 2015. The most frequently used ones are: Facebook, LinkedIn, Xing, Yammer; less frequently (in about 10% situations) the companies use Youtube, Flickr, Picassa. We can conclude from this information that the enterprises have pretty passive relation towards IT use in the Serbian economy. This state is partly justified and it reflects the general state since individual users are not much more dynamic, on the other hand, they are rather reserved and suspicious towards on-line payment, for instance. The reason can also be a several-year-long absence of a reliable mediator in payment (such as Pay Pall).

Figure 1 shows the purpose of software applications for CRM which the enterprises used most frequently in the observed period of time. In this occasion, two conclusions appear: 1. CRM tools are used in exceptionally low degree and 2. When they use CRM, it is only in basic, concept sense. It is obvious that there is no motif for more active, wider use of CRM.

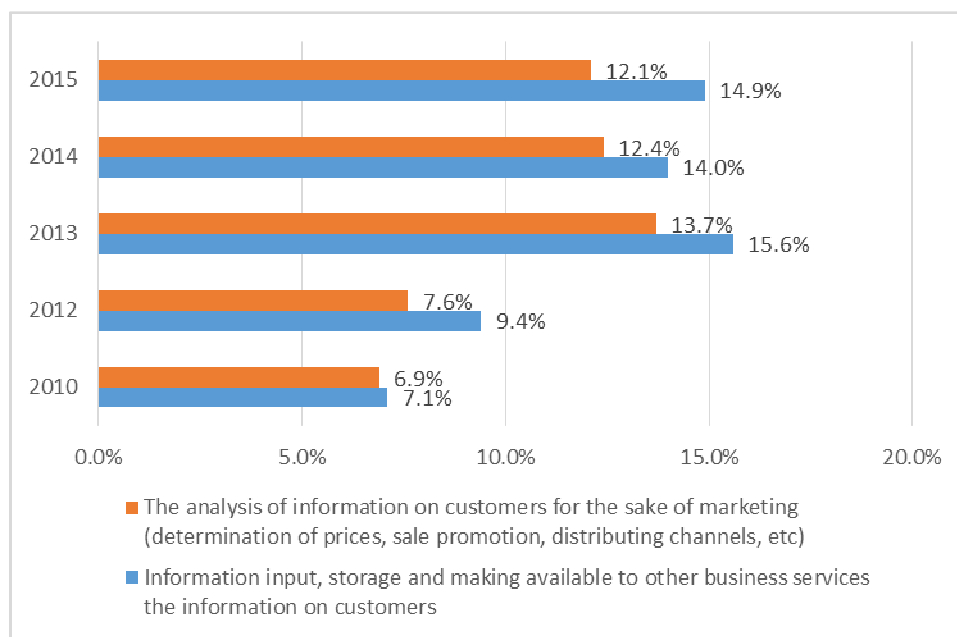


Figure 1: The most frequent use of CRM software applications (RZS, 2016)

CONCLUSIONS

The aim of the organization should be understanding and achieving an optimal level of customer satisfaction and the important step in achieving this aim represents the research of customer requirements so that good business decisions can be made; the improvement of business quality is seen through a satisfied customer. CRM offers operational – transactional approach to customer management focused on customer relations to sale, marketing and user service/additional services. In strategic sense CRM offers the changes of a process, cultural changes, automation of a technological process and the use of data for a long-term understanding of customer behavior and company's

interests as well. Among the aims of a traditional CRM the most distinguished ones are the increase of income or profitability, sale time or campaign efficiency, more advanced sale process and if user service is in question, the reduced waiting time for reply, etc.

The need for a social CRM originates from a fundamentally different user paradigm – a combination of social networking and CRM gives enormous possibilities for enriching the user interaction and it also gives the ways for managing and measuring companies' use of social networks in order to successfully engage social users.

The research results show that the use of IT in enterprises is not at the needed level and that the current state of social networks application does not indicate serious reflections of an enterprise towards their more appropriate use in communication and more privileged relation to customers. This is the path which domestic enterprises should take in order to improve their relations towards their own customers and enable a wider approach to the market. The present generations are used to comprehend social networks as an integral part of their lives so it is an obvious ticket for a more quality relation with them.

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THE ANALYSIS OF MARKETING PRACTICE IN DOMESTIC ENTERPRISES

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658.8(497.11)

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ABSTRACT

Global markets and modern business conditions require from enterprises to change their business philosophy and ways of behaviour in their business practice. Relationship marketing signifies a considerable advance in marketing approach, going from thinking exclusively about competition and conflict categories towards the categories of collaboration and interdependence. Domestic enterprises are facing problems with achieving competitive abilities on global markets and one of significant causes of this phenomenon is inappropriate implementation of marketing concept and modern methods and techniques of marketing management. In order to make domestic companies competitive internationally, it is necessary to change their way of thinking and, in some time, to adopt modern world achievements in the sphere of organisational management.

Key words: marketing, competitiveness, global market, management, knowledge, relationship marketing.

INTRODUCTION

Business environment has been changing permanently. These changes are permanent and business organizations have to make models of behaviour in relation to the observed and anticipated changes. The causes of these changes can be found in intensive technological development, the changes in competitive relations in the late 90s and in the effects of the World economic crisis from 2008. The world has come into the new economic stadium, so national economies became closely connected and independent.

According to Kotler (2009), the fact is that we are entering the new era of turbulence. Turbulence is a new normality. Stability is disappearing and the possibility of predicting events is decreased, so the society is exposed to the action of forces that caused the turbulence. Business turbulence assumes unpredictable and fast changes in internal or external environment of business organizations which affect their organizational structure.

International economic relations are globalized – international economic flows go beyond the borders of individual countries. The world is becoming one market. Internationally oriented enterprises are getting more significant. According to some authors (Acharol & Kotler, 2012), globalization is continuing feverishly with implacable tempo. The countries such as China and India, along with enhancing the consumption base, are competing with developed world countries.

The main consequences of market globalization are increasingly aggressive competition on the global level and the danger caused by narrow market identification. Global competitiveness is becoming more intensive, aggressive and noticeable. Market globalization has affected the changes in understanding and achieving competitive advantage. New business conditions characterized by fast technological progress,

market globalization, unification of customers' requirements and the increase of different interest groups' requirements are demanding from enterprises to accept totally new definition of business decisions and organization. Management has to be adjusted to customers' needs and the requirements coming from the environment.

International business practice has proved that there is a correlation between the improvement of the management methods and techniques and establishment and development of the competitive capabilities of business organizations. Application and development of the modern management concept, such as relationship marketing, quality management, benchmarking, corporate social responsibility etc, creates the preconditions to improve the other factors of competitiveness, such as productivity and innovation.

MODERN MARKETING

Brooks and Little (1997) defined a new model of market performance marked as *relationship marketing* while they were studying market appearance of enterprises in new, global circumstances. This model is based on:

- Database Management,
- Interactive Marketing Communication and
- Network Marketing.

Marketing based on Database represents an organized set of data on individual customers, current or potential ones, including geographical, demographic, psycho-graphic data, as well as the data related to behaviour during the consumption process. Database is used for locating potential customers or clients, as well as for creating targeted marketing communication and sale efforts. Interactive marketing represents a set of interactive relations, mostly at the level of personal communication, aided by Information Technology. Network marketing represents a set of connections and relations, mostly of strategic nature both at personal level and the relationship level among enterprises. It is most often about making strategic alliances and partnerships among the enterprises belonging to a particular branch.

This model starts from a strategic focus on customers and the relations and links originated from customers' requirements in relation to an organization, and it finishes by the analysis of customers' loyalty and satisfaction as an integral part of permanent mutual relationship building up. The clue for understanding this pattern is in creating a set of relationships between an enterprise and its environment.

According to Kotler (2004), the basic characteristics of relationship marketing are the following ones:

- It is more oriented towards partners and customers than products,
- It is more focused on development and keeping current customers than finding out new ones,
- It is more relied on multi-functional teams than the work at sector level,
- It is more relied on listening and learning than talking.

Relationship Marketing signifies an important paradigmatic step forward in marketing approach, going exclusively from thinking in competition and conflict categories towards thinking in the categories of interdependence and collaboration. It recognizes the importance of different participants – suppliers, employees, distributors, dealers, retailers, who collaborate in order to deliver the best value to targeted customers.

Global market, burdened by fast changes, creates a strong competitive activity. Kotler (2009) speaks about the phenomenon of hypercompetitiveness, that assumes such market conditions in which technologies and offer are totally new, the standards and rules are becoming fluid and they cause competitive progress that is impossible to be stopped. Hypercompetitiveness is characterized by fast competitive progress and therefore competitors have to build new advantages in a short period of time in order to be better than their rivals. In hypercompetitive conditions the application of standard marketing methods and techniques cannot give appropriate business results. This is even more significant in big and inert international corporations burdened by unnecessary administration and bureaucracy whose productivity is not able to follow global trends.

Traditional strategic approach implies a hypothesis according to which managers can predict future market trends precisely enough to choose a clear strategic direction just by using the set of analytical tools. On the other hand, when market flows are really turbulent and tend to become chaotic, this traditional approach is marginal and in real life even dangerous for the future of business organization. In order to avoid the influence of market turbulences Kotler suggests the application of a management system called Chaotic, (Kotler et al., 2014). According to Martinović (2009), the Management System Chaotic helps managers to reconsider the whole approach to management and marketing during recession and similar turbulent periods. Moreover, managers have to find a way to develop the system for early warning and identification of the first signs of changes, especially disastrous innovations and shocks. Then, it is important to make detailed, the worst, best and most expected scenarios by using the strategies for facing each of them, to cut costs strategically or to increase productivity, to secure market share in the fundamental consumer segment, to comprise strategic planning in shorter, three-monthly cycles in order to monitor the company's pulse better and easier so as to prevent potential disastrous consequences of leaving fundamental principles.

Taking into consideration the new marketing horizon oriented by further technological development and permanent changes in the environment, marketing model born in the new millenium is consisted of three dimensions of marketing comprehension: subphenomenon, phenomenon and superphenomenon (Acharol & Kotler, 2012). Marketing seen as subphenomenon assumes customers' experiences and observation system. Customers feel products and services through their senses and the understanding of sensual experiences is transferred to the level of neurophysiology. In order to be able to follow this trend marketing will have to develop considerably wider basis of theoretical and methodological tools. When we talk about marketing as a phenomenon we must observe that the days of vertical integration between producers and distributors have gone into the past and that nowadays distribution is performed through customers' networks, marketing networks, innovation and production networks. This means that we need rationalization and innovation outsourcing. In the future, the focus will be on micro production systems which will make products to satisfy demand near the very place of consumption. Finally, when we talk about marketing as a superphenomenon we must stress that marketing ought to establish a sustainable model of consumers' society. New business approach implies giving advantage to welfare of the society and customers in relation to welfare of marketing management. The key issues of global marketing will be the issues of sustainability and poverty reduction.

THE ANALYSIS OF THE ASPECTS OF MARKETING IMPLEMENTATION IN DOMESTIC ENTERPRISES

Marketing theory has been more quickly and seriously developed in our country than marketing practice. As a term, marketing came into use in the late 70s but the first significant theoretical contributions were noticed at the beginning of the 80s. Marketing, as a practice, started its development during the 90s along with the process of privatization but more serious advances were related to the beginning of the transition process after 2001. On the other hand, marketing communication has first been developed as practice and then as theory which is logical and equal in all developed countries. The majority of domestic state-owned systems had their advertising sectors or *economic propaganda* which functioned seriously until the late 70s. The real revolution in this sector took place in the time of economic relations liberation at the end of the 80s when for the first time the transitional process began but unfortunately, the process was stopped due to political crisis and international sanctions in the 90s. At that time a lot of marketing agencies were opened and some of them were given international license. In the late 90s along with opening a considerable number of international marketing agencies this activity became the reality in some enterprises which worked on domestic market. The beginning of economic transitional process and the appearance of a number of foreign enterprises on the market of Serbia made conditions for marketing practice improvement.

The main problems we face on domestic market in relation to marketing are the following:

- Lack of marketing logic adoption - marketing must be accepted not only as a business function but before all as a concept, business philosophy which has fundamental significance for every market oriented enterprise.
- Lack of integral marketing concept understanding - the acceptance of marketing only in principle can have contra - productive effects, mistification of marketing or voluntary approach. In a great

part of domestic enterprises marketing serves as a business element which is used only to make a distance from the past and not for real needs – transfer towards market business and profit way of thinking.

- It is characteristic for domestic enterprises to understand marketing in the wrong way. Marketing is often made equal with promotion and advertising.
- Inappropriate understanding of investments in marketing – investing in marketing, above all in promotion, is not an expense but investment whose effects will be visible in the future through both positioning on the market and good reputation of the enterprise.
- Problems related to organizational structure – it is necessary to clearly define marketing position within an enterprise in relation to the functions with strategic sign, as well as to other functions (coordination and competences issues at macro level).
- Inadequate speed of new trends, methods and techniques adoption in marketing – taking into consideration previously mentioned facts as well as economic crisis from the early 90s, it is obvious that even the enterprises with marketing behaviour do not have strength and space to accept all modern trends in the field of marketing quickly enough (Đorđević at al., 2001; Đorđević & Čočkaló, 2010).

Most domestic executive managers put the equation sign between marketing and promotion activities and some of them go even further and equelize marketing with sale. These are typical mistakes but they are not made only in domestic enterprises on relatively undeveloped markets, such as in transitional countries where Serbia belongs to. Similar problems can occur in some developed countries as well, but only in new enterprises or in micro and small enterprises in which marketing function is often the part of organisational sector dealing with marketing. Wrong understanding of marketing is typical for transitional countries and developing countries without free markets. Misunderstanding of marketing logic as a business concept and especially business function leads towards the next problem – personalization of marketing by managers/executives. General managers think they know best how marketing functions so they directly conduct all marketing activities. The next wrong step is inappropriate selection of those who should deal with marketing – for example, in the sector of small and mid-size enterprises marketing is a job of „some relatives“ who already work in the enterprise while in public sector politics plays a significant role. The problem is, certainly, in the wrong perception of reality which is the result of several decades long business shortsight – wrong set model of socialist self-management has been slightly redesigned into the first transition during the 90s with disastrous results, and the real transition which started in 2001 was not developed sufficiently satisfactory although it involved the greatest part of enterprises.

Inertness seems to be one of the main problems in management in relation to accepting modern methods and techniques of management quickly and appropriately. Most managers are guided by inertness in their daily behaviour, in other words, they like routine and making decisions according to certain standard principles. Domestic enterprises are still at the level of vertical marketing concept. Unfortunately, not all domestic enterprises are at that level, only those which successfully finished transformation process and some enterprises with autochthonous domestic private capital. Domestic businessmen generally need lateral advance in thinking – from thinking about the past towards proactive thinking.

The issue of marketing function improvement in domestic organizations, especially in domestic enterprises, is reduced to the issue of knowledge improvement and knowledge productivity. Domestic managers have to become efficient and then to make other employees efficient, too. Generally speaking, newly made framework of human society asks for people who are representatives of successful synthesis of knowledge, skills and attitude. This three-dimensional approach is conditioned by modern business performance. An individual must satisfy a wide spectrum of features in order to successfully respond to tasks imposed by modern organization. These requirements are becoming increasingly important in the activities related to marketing.

GUIDELINES FOR IMPROVEMENT OF MARKETING CONCEPT AND PRACTICE IN DOMESTIC ENTERPRISES

Transformation of domestic enterprises from relatively undeveloped organizations, from the standpoint of management theory and practice, towards the organizations with developed functions of research and

development, quality management and marketing, based on system approach to organization and management, represents the only choice for improving business appearance on the international market. Therefore, a special attention must be paid to implementation of new marketing approaches, both in conceptual and organizational sense.

Domestic enterprises must accept this modern marketing concept in their business on domestic market. Marketing ought to be clearly positioned within internal environment of business functions in the enterprise as a function of strategic significance, together with research and development function and quality management function. The stress is on wider acceptance of a new marketing model, characterized by technological development and represented in marketing communication component through the model of integrated marketing communication. New approaches to marketing research and its application in theory and practice represent the reality of modern business and they are the part of the world economy globalization process. Domestic enterprises have to get rid of their old way of thinking limited by domestic market, comprehension of business and business experiences (according to the motto "if something is functioning, it shouldn't be changed"). The common approach that the international market is seen as absolutely homogenous has to be left and furthermore, the international market should be viewed in the light of the most significant international tendencies, structural and technological changes, knowledge innovations with all specific features and local characteristics.

According to the results of the research which analyzed the implementation of modern management techniques in domestic enterprises (Bešić at al., 2013), the following management methods and techniques should be implemented in domestic business organizations so as to improve business efficiency and competitiveness:

- Database Management 18.4%,
- Quality Management System – 17.6%,
- Corporate Social Responsibility – 17.6%,
- Relationship Marketing – 16.8% and
- Benchmarking – 12.6%.

Management methods and techniques identified by domestic enterprises managers as significant for business performance of their enterprises are all based on knowledge. New management paradigm at global level is based on the process of knowledge productivity improvement. Database Management is in fact creating and storing information for the needs of managerial decisions and a piece of information represents knowledge in motion. Quality Management System in its essence involves the need for permanent knowledge productivity improvement, primarily through education for quality. The concept of Corporate Social Responsibility assumes learning about needs and requirements of other interest groups from business environment. Relationship Marketing finally means knowledge management. Marketing is a key instrument for making knowledge more productive. Benchmarking implies a technique of learning on other people experiences, primarily the best ones. It gives the best answers about temporary market position of the organization. The result of this process ought to be the creation of strategic variants for market positioning. Quality Management System, on the other hand, represents the need for permanent knowledge productivity improvement, predominantly through education for quality.

The following general recommendations for improving marketing activities of domestic enterprises are distinguished:

- Necessity for permanent knowledge innovation of all employees, predominantly marketing experts, who should be taught the most advanced world experiences and modern methods and techniques of marketing management,
- Necessity of planning approach to marketing activities,
- Necessity of permanent quality improvement, organization functioning and management innovativeness are imperatives of business performance in modern society.
- There are three ways of increasing enterprise's creativity:
- Employment of naturally creative people who would be given freedom in their work,
- Creativity stimulation by means of using a great number of well tested methods,
- Engagement of external experts who would enable the appearance of new, interesting ideas (Kotler, 2004).

The issue of marketing function improvement in domestic organizations, especially in domestic enterprises, is reduced to the issue of knowledge improvement and knowledge productivity.

CONCLUSION

Relationship marketing represents a significant paradigmatic step ahead in the field of marketing theory and practice. It recognizes the significance of different participants – suppliers, employees, distributors, dealers, retailers, who are collaborating in order to distribute the best value to their targeted customers. Globalization is the only way out for all countries in transition whereas the focus must be on development of industrial production. Newly industrialized countries have just worked on the development of industrial production and the offer of their industrial products at global markets. Inclusion into global flows is an imperative for all transitional countries and for domestic economy as well. It implies an appropriate implementation of all modern management methods and techniques, especially marketing.

Knowledge is the main driving force of permanent productivity growth in the companies from these countries. Companies from transitional countries are faced with numerous problems – among them the most important are those related to improving knowledge and organization. The application of modern management techniques is an essential precondition for the success of business in general. Domestic enterprises have to use international experiences, standards and globally acknowledged business practice in the process of their business internalization. It is therefore, necessary to implement these management techniques that potentiate long-term commitment towards competitiveness, such as marketing, quality management, benchmarking, etc. The main achievements in this field have been made by foreign marketing agencies or international corporations that collaborated with them. In this sense, domestic enterprises need experts with thorough knowledge on management and marketing methods and techniques.

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RETAIL CENTRALIZED DISTRIBUTION SYSTEM

UDC: 339.372

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ABSTRACT

Strengthening the role of retailers in marketing channels has left its mark in the logistics sector. Certain activities that were controlled by the manufacturers (suppliers) are being slowly taken by large retail companies. With the development of centralized distribution system, retailers are establishing control over the flow of products, generating significant benefits in the form of better negotiating position, more efficient retail operations and higher level of customer service. In this regard, the attention of this paper is devoted to the basic characteristics of centralized delivery system in retail. Accordingly, certain examples of the world's leading retailers, as well as those which operate on Serbian market have been presented. The paper also analyses main tasks and activities of distribution centers, including the factors that influence their number and location.

Keywords: retail, centralization, delivery, distribution center.

INTRODUCTION

Numerous changes in the market, followed by technological progress have led to the strengthening of the role of retailers in marketing channels. Along with the intensive development of retail network, logistics processes have been improved as well. In order to establish more effective control over the flow of products, retailers are increasingly channeling them through their own distribution centers (McKinnon, 1996). By switching to a centralized distribution system they realize numerous benefits that can be of a great importance in achieving competitive advantage. Accordingly, this paper examines the main characteristics of this system through three sections.

The first section presents the benefits that retailers can achieve with the implementation of a centralized distribution system. Also, beside the examples of the world's leading retailers, the attention is dedicated to potential constraints concerning the effective application of centralized delivery system.

In the remaining two sections, the emphasis is placed on the retailers' distribution centers. Thereby, their main processes and operations have been analyzed. In addition, key factors that affect retailer's decision in relation to their number, location and size, have been identified as well.

CENTRALIZED DISTRIBUTION SYSTEM

Increased market power of retail companies in marketing channels is reflected not only in the increase of their assets, turnover and profitability, but also in larger control over certain functions, especially in the logistics sector (Lovreta et al. 2006). In this regard, one of the changes is manifested in higher level of centralization in retail supply system. While in the 80s of the twentieth century, 55-60% of

sold products were distributed via distribution centers controlled by retailers (Ferne and McKinnon, 1991), in the last few years in some European countries, the level of centralization exceeded 80% (Pramatarova and Miliotis, 2008).

The implementation of a centralized distribution system brings many benefits to retailers. In the basic, Ferne and McKinnon (1991) include:

1. strengthening the negotiating position in relation to suppliers:
 - discount eligibility due to larger orders,
 - more effective centralized purchase,
 - reduction of congestions in the facilities,
 - easier information connection with suppliers;
2. increase the efficiency of retail operations:
 - greater employee productivity,
 - decrease in inventories,
 - lower storage costs due to cheaper locations,
 - better utilization of space in retail stores,
 - lower administrative costs,
 - more effective operation management,
 - less theft and damage related to stock,
 - better enforcement of EPOS system;
3. higher levels of customer service:
 - greater product availability,
 - better quality control,
 - wider range of products.

The accomplishment of mentioned advantages and the efficiency of the centralized distribution system depend to a great extent on retailer storage facilities and the level of their equipment. The world's leading retailers use modern distribution centers, equipped with sophisticated technological solutions.

The world's largest retailer Walmart has more than 40 distribution centers in the United States of America (Walmart, 2014), with the average area of more than 90,000 square meters. Equipped with a conveyor system (whose overall length exceeds 20,000 meters), carousels or other automated handling systems, each of them serves 90 to 100 retail stores, where in the circulation is 5.5 billion product packages annually.

As in the Walmart, in one of the UK's largest retail chains (Tesco), the attention was also paid to the development of distribution centers (Ferne and Sparks, 2009). In addition to modern equipment and automated systems, in them are installed special temperature chambers, which allow the storage of frozen and fresh products. Only in the UK and Republic of Ireland, there were built 28 composite distribution centers of area between 20,000 and 60,000 square meters, through which 60 million product packages are delivered in 3,000 retail stores weekly (Tesco, 2014). As in the case of Walmart, they are all equipped with sophisticated information systems for data exchange (based on Point of Sale - POS and Radio Frequency Identification - RFID technology), through which they are associated with retail stores and suppliers.

Certain changes in relation to the development of a centralized distribution system occur in the Republic of Serbia. In 2014, Delhaize Serbia has opened a distribution center of 70,000 square meters, which can deliver a range of 6,500 pallets on a daily basis, which is enough to supply 500 retail stores (Maxi, 2014). Also, other retailers on the Serbian market (such as Lidl and Univerexport), have started building their own distribution centers.

However, despite various advantages and high level of centralization in retail sector, it is necessary to bear in mind certain limitations. They are usually manifested in the form of large investments, additional costs, and limited resources of trade actors (Dujak, 2012). Hereby, of the special importance are information systems, know-how and competence of staff, both at the retailer, and at its suppliers.

MAIN ACTIVITIES OF THE RETAILER'S DISTRIBUTION CENTER

One of the main tasks of the retailer's distribution center lies in articulating the flow of products from suppliers to retail stores. According to Kalinic et al. (2009, p. 4), in them, the decomposition, i.e. the concentration of a given stream takes place. Whereas in the case of decomposing, the larger quantity of received products is divided into smaller deliveries, the concentration refers to the consolidation of smaller quantities of products in a single delivery to retail store.

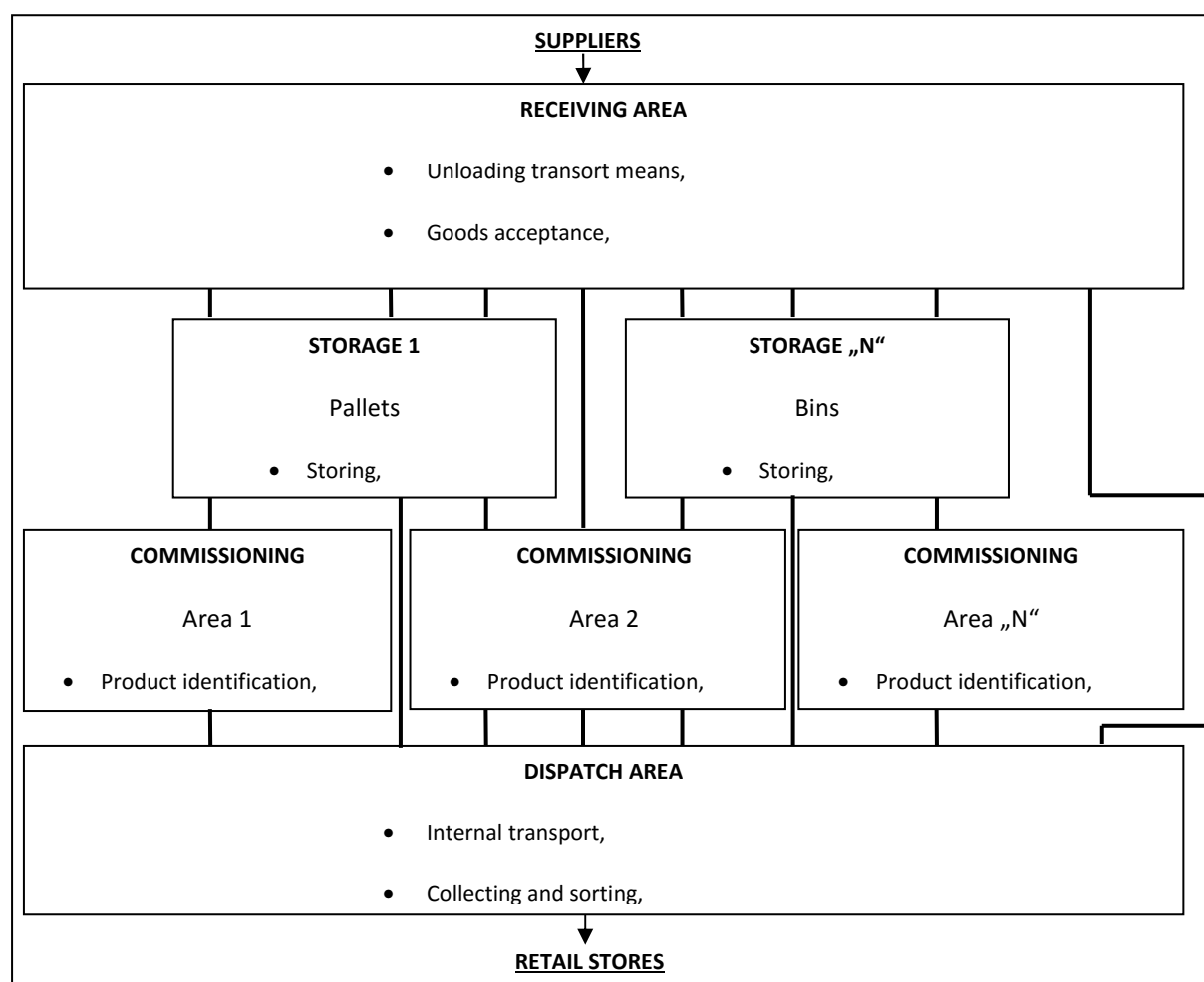


Figure 1: Distribution center activities (adapted to Gudehus & Kotzab, 2009)

All activities in the distribution center in relation to decomposition of product flow, Bloomberg et al. (2006) explain through its two main functions, storage and manipulation. In addition, manipulation function consists of several sub-functions: products reception, their transport to the warehouse, consolidation (commissioning) and product shipments. Similar to previous authors, Levy and Weitz (2012) distinguished six key activities of retailer distribution center. These include:

- managing of inbound transport - coordination of the physical flow of products from the supplier to the distribution center;
- reception and control - the reception of the shipment and its qualitative and quantitative control in accordance with the agreed specifications;

- storing and cross-docking - after the check, the received products are stored or reloaded to the consignment prepared for retail store;
- merchandising – the preparation of products for sale in a retail store (labeling, marking, etc.);
- delivery preparation – the selection of products and their consolidation into a single delivery;
- managing of outbound transport – managing of physical flow of products from the distribution center to retail stores.

One of the most detailed reviews of the activities of the distribution center was given by Gudehus and Kotzab (2009). They identified several standard functional areas (receiving area, storage systems, picking systems, internal transport systems, sorting and shipping area) within which various operations are performed (Figure 1).

In addition to the operational functions and services, in distribution centers the activities of administrative character can be realized as well. Gudehus and Kotzab (2009) include: control of inventory levels, data processing, preparation of transport schedules etc.

NUMBER AND LOCATION OF DISTRIBUTION CENTERS

The decisions in regard to the number and location of distribution centers directly affect the design of retailer logistics system. Therefore, they must be in accordance with the basic logistics goals of retail companies, in order to provide the highest possible level of service, with the lowest possible costs.

Larger number of distribution centers, that are closer to retail stores, increase the level of retailer service. However, on the other hand, such decisions can cause the increase of certain cost categories.

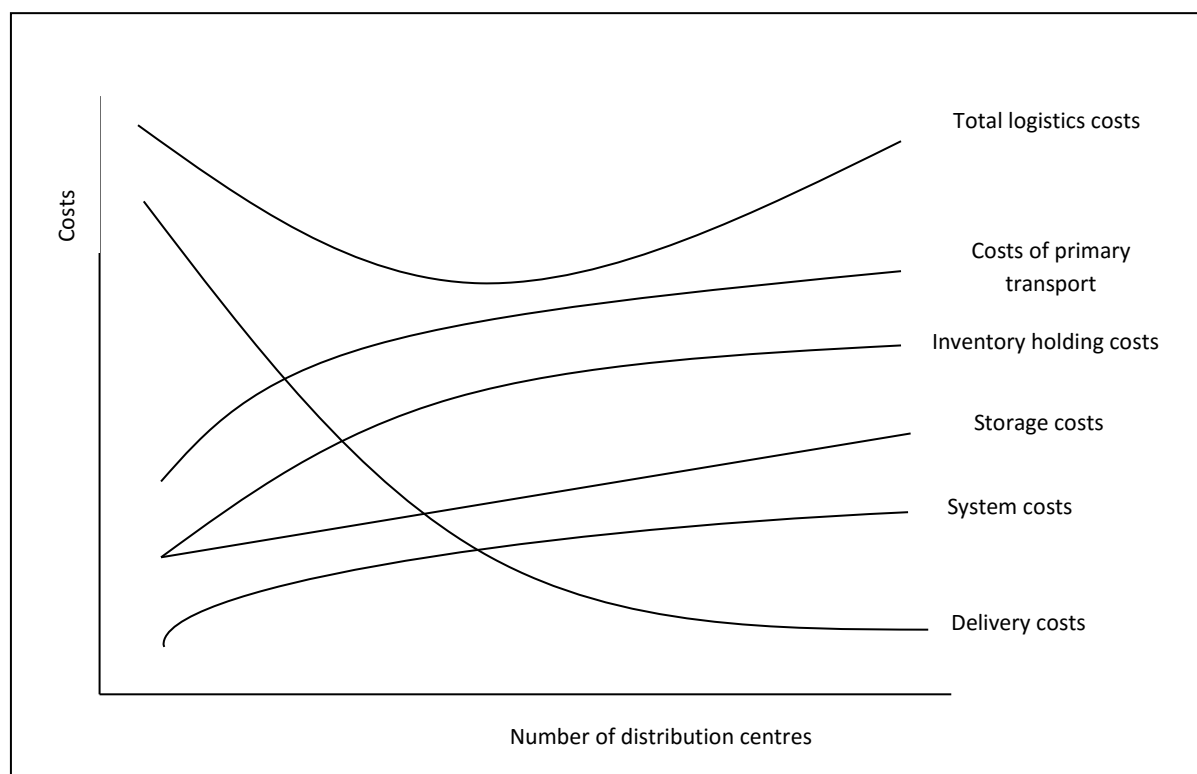


Figure 2: Optimal number of distribution centres (Rushton et al. 2010)

With the increase of the number of distribution centers, costs of primary transport, costs of holding inventory, storage costs and costs related to information connectivity (system costs) increase as well. Unlike them, the greater the number of distribution centers contributes to reducing the cost of delivery

of products in retail stores. Guided by the principle of total costs, the optimal number of distribution centers for the retailer occurs at the point where the total logistics costs are the lowest.

After identifying the optimal number of distribution centers, it is necessary to determine their locations. Since the given decision can have long-term impact on retailer's business performance, it is of a strategic importance for them. In this regard, when determining the location, not only for the distribution center, but also for other supporting facilities, Chopra and Meindl (2004) highlighted the importance of the following factors:

- distance from suppliers,
- communication,
- availability of labor,
- training of the workforce,
- infrastructure,
- attitudes of local government and others.

In addition to number and locations of distribution centers, retailers should pay special attention to their size. According to Farahani et al. (ed.) (2011), such decision should be based on an analysis of multiple determinants, including service levels, market size, materials handling system, the size and number of products, economies of scale, types of shelves etc.

CONCLUSION

With the increasing market power, retail companies are taking primacy over the logistics sector. By organizing a centralized distribution system, they established control over the flow of products. In addition, the implementation of centralized delivery may also contribute to strengthening the negotiation power of retailers, the increase of business efficiency and the growth of customer service levels. Since the successful implementation of the centralized distribution processes depends on the logistics capacity to a large extent, the world's leading retailers (including Walmart and Tesco) have invested significant resources in the building and equipping distribution centers.

Various activities related to the decomposition of product flow from supplier to retail stores occur within distribution centers. To these activities belong: managing of inbound and outbound transport, acceptance and control of the shipment, storage and handling, merchandising activities and the consolidation of product deliveries. Along with operational processes, in distribution centers can be performed data processing, organization of transport routes and other administrative tasks.

When determining the number and location of distribution centers, it is necessary to consider several factors. Hereby, it is important to analyze the different types of costs, in order to achieve their control with a higher level of service. In determining the location of a distribution center, the decision should be based on the analysis of the following factors: supplier distance, labor availability, their training, infrastructure, attitudes of local government and others. On the other hand, the size of the distribution center may be affected by handling systems, market size, economies of scale etc.

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COMPETITIVENESS OF SERBIAN MEAT AND MEAT PREPARATIONS ON THE INTERNATIONAL MARKET

UDC: 637.51/.52(497.11):339.13(100)

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ABSTRACT

Since the last decade, the liberalization process has been influenced significant changes in foreign trade flows of meat and meat preparations of Serbia. Namely, trade agreements with the European Union, Western Balkan countries and Russian Federation have been changing regional distribution of export, as well as import of this sector. In that context, the main objective of this research is analysis of competitiveness of Serbian meat and meat preparations on the international market, with special focus on competitiveness on Serbian most significant markets. According to the main objective, a methodological framework is based on usage of indicators which measure a level of comparative advantages of meat and meat preparations, as well as a level of specialization with the main trade partners, which is determined by the level of intra-industry trade. Results showed a negative trend of the level of comparative advantages for the most analyzed partners, except for Russian Federation, which is the consequence of facing with new market occasions that require adopting new standards and roles.

Key words: Serbia, meat and meat preparations, comparative advantages.

INTRODUCTION

Serbia has good natural conditions for development of livestock production, but despite this fact, in the last decades this sector had negative tendencies. Even 77.5% of the total number of farms is engaged in livestock production. Among the 489,364 farms with livestock production, about 99.9% are family farms (Popović, 2014). A large number of farmers, which are mostly engaged in production for own needs, is an obstacle to the development of intensive production. Small producers apply low intensive production systems based on locally adapted breeds (MAEP, 2014a). Also, Serbia has significant capacity for processing of livestock products; 1,176 slaughterhouse for cattle, pigs, sheep, goat and poultry, but in last years capacity utilization is below projected (MAEP, 2014a).

Total meat production in Serbia since the last decade has been slowly growing, reaching a volume of production to 480 thousand tons. Tendencies in production for each type of meat are very different; the production of beef is constantly decreasing, while the production of poultry meat has a dynamic growth trend. These trends are determined by a set of factors such as: the impact of weather on production and prices of animal feed, the decline in domestic demand for quality meats, inability to export pig meat etc. In addition, the production of meat for a long time was not in the system of subsidies to agriculture, which had a further negative impact on the development of this sector. (MAEP, 2014a).

In the last decade the significant results have been achieved in foreign trade flows of Serbia, as a consequence of achieved liberalization. Under the influence of the signed free trade agreement (with the European Union(EU) and the Western Balkan countries(CEFTA)), a partial change in the orientation of Serbian agri-food products' export, as well as an intensification of the foreign trade trends, took place (Matkovski, Lovre, & Zekić, 2017). These changes had effects on trade exchange of meat and meat preparations. A number of authors analyzed foreign trade exchange in liberalization process, as well as changes in competitiveness or comparative advantages, as a consequence of this process.

Birovljev, Matkovski and Četković (2015) analyzed competitiveness of Serbian agri-food products in the CEFTA countries using indices of comparative advantages and intra-industry trade. According to these authors, meat and meat preparations from Serbia have comparative advantages in regional countries, except in Croatia. Also, this sector is well integrated with markets of the CEFTA countries. Also, Ignjatijević, Čavlin and Đorđević (2014) measured comparative advantages of processed food sector of Serbia. In this paper, authors applied different indexes of comparative advantages and concluded that negative tendencies exist in comparative advantages of meat sector. Authors Božić and Nikolić (2013) analyzed degree of integration of the Serbian agricultural sector in the markets of key trading partners (CEFTA, EU) using index of intra-industry trade and found that meat and meat preparations are well integrated with the CEFTA market, while integration with the EU countries was not on satisfactory level. Authors Vlahović and Veličković (2016) in their analysis of export, regional destinations and comparative advantages of certain commodity sectors of agro-industrial products from Serbia concluded that meat and meat preparations have not satisfactory level of comparative advantages. In that context, these authors suggest that producers in Serbia should improve quality of products, as well as marketing activities. Also, producers should increase their productivity in order to achieve better price competitiveness.

The main objective of this paper is to find the level of competitiveness of meat and meat preparations of Serbia on the international market, as well as on markets of the EU, CEFTA and Russia using relevant indicators which measure comparative advantage and degree of integration with these markets. In order to reach this objective, this paper has been organized as follows. After introduction, in the second section there are showed the working methods and materials used to address the aim of this research. The third section shows the results of analysis of the trade of meat and meat preparations of Serbia, as well as levels of comparative advantages and index of intra-industry trade. At the end of paper, closing remarks by authors are presented.

MATERIAL AND METHODS

In this paper, the level of competitiveness of meat and meat preparations of Serbia on global market, on the market on EU and CEFTA countries, as well as Russia, is determined by indicators based on comparative advantages and level of specialization. These indicators are usually used in economic literature to measure competitiveness of some market segments on international market. Comparative advantage is measured by Lafay Index (LFI) which is set by Lafay (1992):

$$LFI_j^i = 100 \left(\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^N (x_j^i - m_j^i)}{\sum_{j=1}^N (x_j^i + m_j^i)} \right) \frac{x_j^i + m_j^i}{\sum_{j=1}^N (x_j^i + m_j^i)}$$

where x represents an export, m is an import, i is a country, j is a commodity and N is the number of analyzed items. When this index is greater than 0, it indicates an existence of comparative advantages and the higher index value indicate the higher level of specialization of the given country in trade in given commodity. This method is often used in literature for measuring comparative advantages of sector or commodity. There are a number of papers which determine level of comparative advantages of some sector or commodity in Serbian foreign trade exchange, for example: Ignjatijević and Milojević, 2012; Ignjatijević, Čavlin and Đorđević, 2014; Zekić et al., 2015. This method on analysis

of comparative advantages can provides a more complete analysis of the specific positions of individual products within the foreign trade structure of the country (Zekić et al., 2015).

Index of intra-industry trade (IIT) is used for analyzing the significance of intra-industry trade of particular commodity in total trade, between two countries (regions). This index is set by Grubel and Lloyd (1975):

$$IIT_j = \left[1 - \frac{\sum_i |X_{ij} - M_{ij}|}{\sum_i |X_{ij} + M_{ij}|} \right] * 100$$

where X represents an export, M is an import, i is a country, j is a commodity. IIT analyses the level of integration of some commodity with the particular market. If value of IIT is close to 100% it means that commodity is well integrated with analyzed market, which indicates opportunities for adaptation to that market with lower costs. If IIT is greater than 15%, it indicates intra-industry character of trade, which implies that commodity is significantly integrated with particular market. This method is also used in literature for measuring intra-industry trade of specific segments of trade in Serbia, for example in papers: Božić and Nikolić, 2013; Birovljev, Matkovski and Četković, 2015; Matkovski, Lovre and Zekić, 2017.

For a necessary empirical data for the research, a database of Statistical Office of the Republic of Serbia (SORS) is used. Analysis include foreign trade exchange of meat and meat preparations in period 2004-2015, and verifies the change in competitiveness of these products on the international market, as well as on the market of EU, CEFTA and Russia. Meat and meat preparations mean analysis of division 05 of sector 0 (Food and live animals) from the Standard International Trade Classification (SITC) - Revision 4.

RESULTS AND DISCUSSION

In the analyzed period 2004-2015 the average share of export of meat and meat preparation in total export of agri-food products was 3.6%, and this period is characterized by changeable tendencies in export of these products (Figure 1). The highest value of export of meat and meat preparations was realized in 2014, primarily because of increase of export of these products on Russian market.

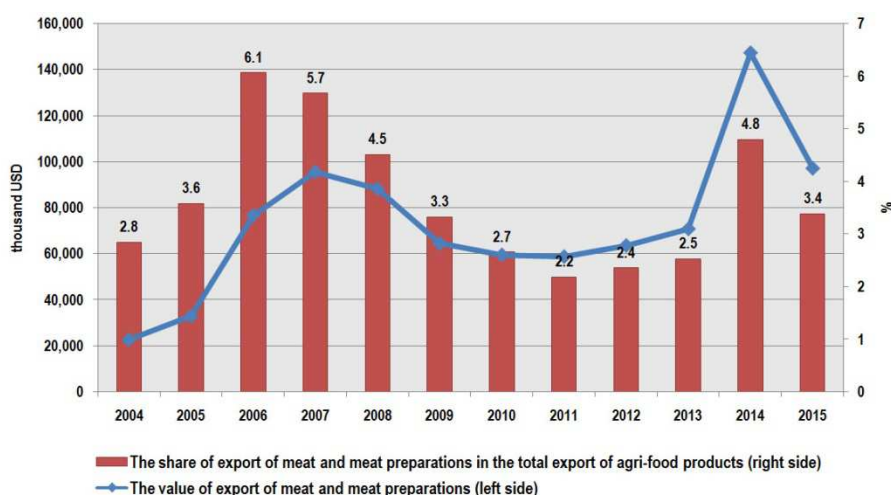


Figure 1: Trends in the export of meat and meat preparations of Serbia
Source: The authors' calculations based on SORS, 2016

The most significant market for the export of meat and meat preparations are CEFTA countries. In analyzed period about 77% of these product were exported to CEFTA countries. Significant market is

also Russia and increase of value of export to this market is influenced by Russian sanctions to EU. For Serbia, as a small agricultural oriented country, Russian market have become more important since 2011, when Russia allowed tariff free import for numerous of Serbian agricultural products. The second large increase in Serbian agricultural export towards Russia was in 2014 which can greatly be contributed to the increase in Russian demand caused by agricultural import ban (Djuric and Puskaric, 2015). Export to EU countries had been decreasing in analyzed period. The main reason for negative tendencies of export to EU are inadequate quality standards which are required by this market. Only about 0.5% of slaughterhouses have a permission to export to EU countries, so the majority has not standards which are obligatory for export to EU market (MAEP, 2014b).

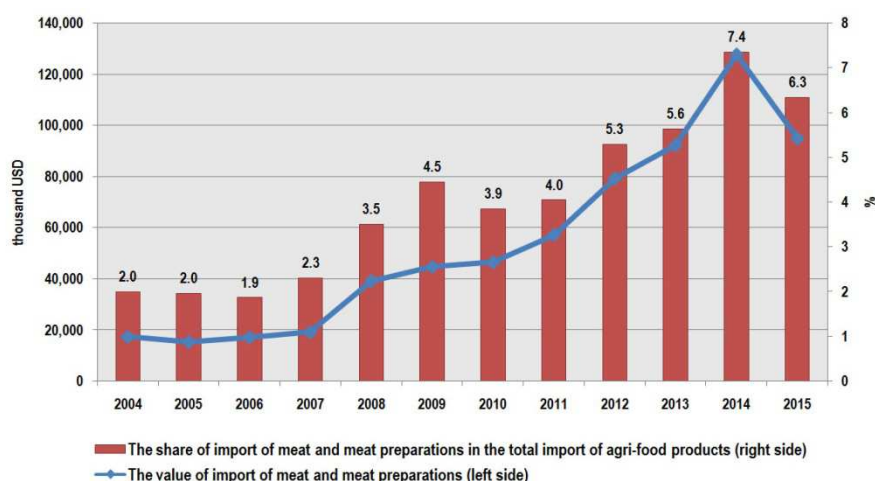


Figure 2: Trends in the import of meat and meat preparations of Serbia
Source: The authors' calculations based on SORS, 2016

Import of meat and meat preparations had been increasing permanently till 2014, when value of import of these products was the highest (Figure 2). Averagely, the share of import of meat and meat preparations in total import of agri-food products amounted 4%. The most significant market for import of meat and meat preparations were EU countries; about 72% of total import of meat and meat preparations was realized from EU market averagely for analyzed period. Significant market for import of these products are also CEFTA countries and from these countries was imported about 27% of total import of meat and meat preparations. From these two markets in all analyzed years was imported more than 97% of total imported meat and meat preparations.

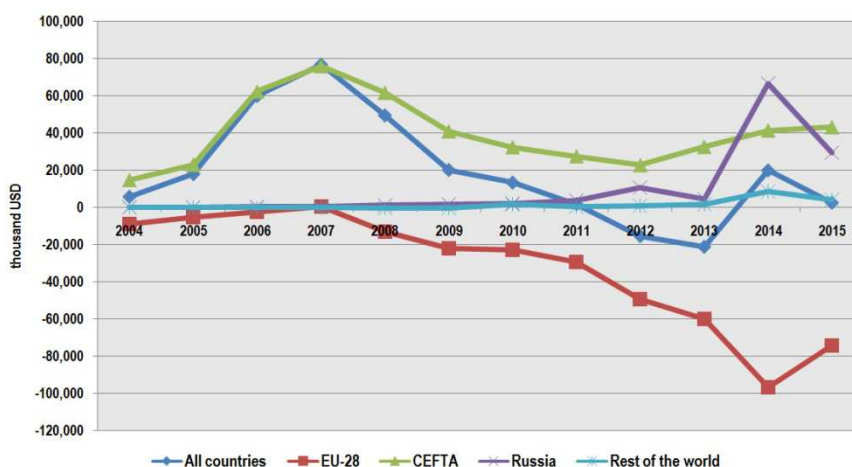


Figure 3: Trends of the net-export of meat and meat preparations of Serbia
Source: The authors' calculations based on SORS, 2016

If we analyze net-export of Serbia for all countries, a positive foreign trade balance was realized in the most of analyzed years (Figure 3). Only in period 2012-2013 a negative foreign trade balance of these products

was realized, primarily because of increase of import in these years. It is evident that Serbia had surplus in trade of meat and meat preparations if we analyze trade with CEFTA countries and Russia. However, in trade with EU it was evident deficit, which in 2014 reached about 96 million USD.

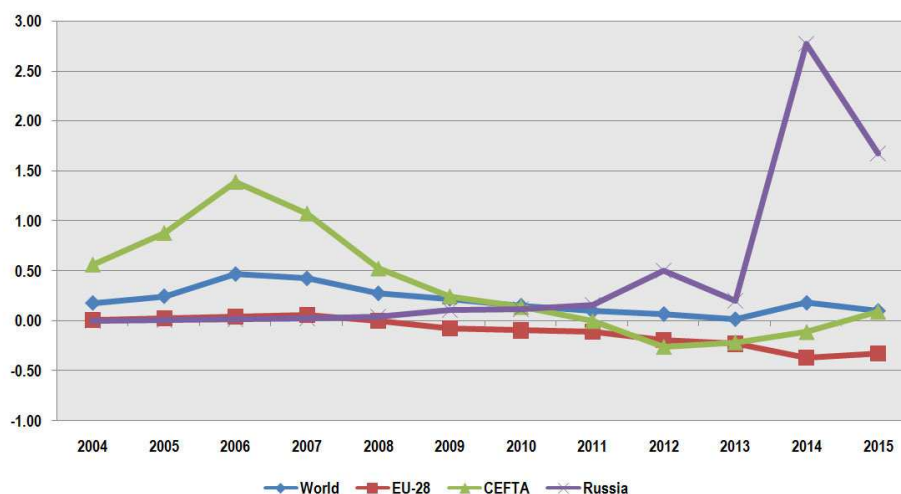


Figure 4: LFI of meat and meat preparations of Serbia
Source: The authors' calculations based on SORS, 2016

In analyzed period Serbia had comparative advantage of meat and meat preparations on international market (Figure 4). However, it is obvious that comparative advantages had been decreasing in analyzed period on international market. The biggest comparative advantages of meat and meat preparations, as well as the biggest increase of comparative advantages, Serbia realized on Russian market. On the other hand, Serbia had not comparative advantages on EU market. The main reasons for such negative tendencies of comparative advantages on EU market are their standards, which Serbia does not meet. The comparative advantages on market of CEFTA countries also had negative tendencies in analyzed period.

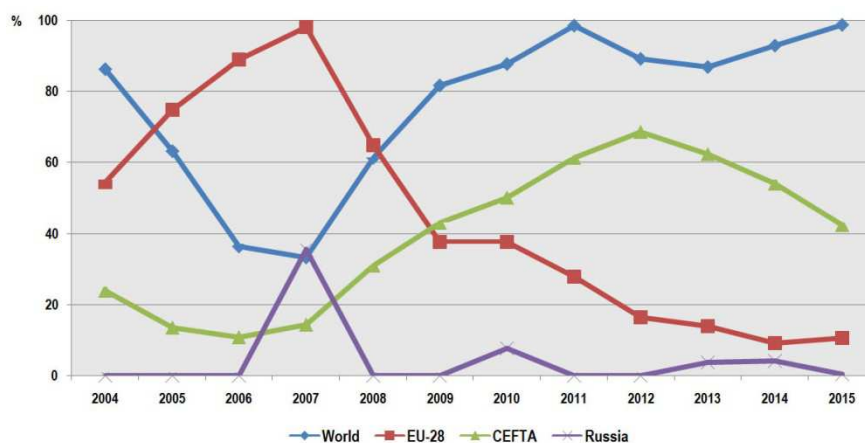


Figure 5: Index of intra-industry trade of meat and meat preparations of Serbia
Source: The authors' calculations based on SORS, 2016

The values of index of intra-industry trade of meat and meat preparations of Serbia in analyzed period were higher than threshold level of 15% which indicates intra-industry character of trade for all markets, except for Russia (Figure 5). That mean that meat and meat preparations are well integrated with global market, as well as EU and CEFTA market and that mean better specialization with these market. It is notable that index of intra-industry trade for meat and meat preparations had been increasing on international market from 2007. The tendencies in this index for CEFTA countries had been growing permanently in period 2007-2012, while in the last few analyzed years specialization with this market showed negative tendencies. Analysis of index of intra-industry trade with EU countries showed negative tendencies from 2007 as a consequence of greater values of export than import of meat and meat preparations.

CONCLUSION

As a result of the reduction of barriers on the national border, there is an increase in the foreign trade of meat and meat preparations of Serbia. The most significant market for the export of meat and meat preparations from Serbia are the CEFTA countries and in the last years Russian market has become more significant. Import of meat and meat preparations is in the largest degree concentrated on the EU countries. In analyzed period Serbia had a comparative advantage of meat and meat preparations on international market, but negative tendencies were present; the biggest comparative advantages of this sector Serbia had on Russian market, while on the EU market there were no comparative advantages, and main reason are inadequate standards for export to this market. So, in order to reach the standards, it is necessary to follow the rules of a technological adaptation, and of a higher level of efficiency in production which is not an easy task, as we have in mind domination of small agricultural farms. Also, results in this paper showed that Serbian meat and meat preparation are well integrated with international market, as well as the CEFTA and the EU, but not with Russia and the main reason is a low level of import from Russian market. Additionally, in future researches it would be desirable to find main factors which influence level of competitiveness of this sector, in order to identify potentials for additional improvement of competitiveness of this sector.

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ONLINE DISTRIBUTION CHANNELS FOR INSURANCE PRODUCTS IN SERBIA AND THE EUROPEAN UNION

UDC: 368.021(497.11:4-672EU)
004.738.5:368.021

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ABSTRACT

In conditions of growing competition in the insurance market, distribution channels for insurance products are one of the key factors of business performance of insurance companies. This paper analyzes the distribution channels of insurance products with a special focus on online distribution channels for insurance products. The subject of this paper is to analyze the representation of certain product distribution channels of insurance in Serbia, as well as the advantages and disadvantages of different distribution channels, prospects and directions of improvement of individual distribution channels. The first part of the paper points to the most important types of distribution channels for insurance products in the Republic of Serbia, in both life insurance and non-life insurance. The second part analyzes the representation of distribution channels in countries European union.

Key words: Insurance, insurance companies, distribution channels.

INTRODUCTION

Increasing digitalization and wider use of new media offer countless opportunities for sell insurance. New technologies can open new ways of marketing, product, and distribution. Today, development of different sales channels is one of the biggest challenges for all insurance companies. The advantage of modern communication is reflected in the fact that it can very easy and quickly adapt to external changes such as the introduction of new regulations. Insurance companies of developed European countries have recognized the relevance and possibilities of new media.

Digitalization is a very important factor in the strategy planning of distribution of insurance products. The approach will need to be defined and primarily depends on the business model of the insurance company and their marketing strategies. Today, some insurance companies have developed supportive service applications, such as pension calculator or an application for emergency calls, where other insurance companies are beginning to work with new partners among intermediaries in the sale of insurance. Start-up of digital brokers offers an application based on an algorithm for the management of client's insurance. In such cases, communication, sales, and development of insurance company's portfolio will be redirected to the mobile. In order to manage these digital relations, some intermediaries in insurance enter into partnerships with the IT specialists. A significant number of intermediaries upgraded their communication channels and digital behavior. Distribution of insurance is no more limited to the paper and phone, then it can be monitored by Facebook, Twitter, and social networks.

Follow the needs and requirements of customers is not only the main area in the regulation of insurance distribution but also it's an important focal point for insurance companies. Today, customers expect a wider and more frequent use of digital communication. Consequently, they have expectations that insurance companies react to their requirements through selected communication channels.

Distribution channels of insurance products

The transformation of the insurance sector is manifested in the fact that insurance companies, as one of the most important financial intermediaries, going through essential changes regarding the manner of placement of insurance products. Insurance companies, formed as joint stock companies, can sell their insurance products through various distribution channels, such as brokers, agents, agencies as a distribution channel of insurance products and bank assurance.

Individual insurance companies can use and combine different distribution channels. However, in developed market economies, they used some specific distribution channels:

- internet as a distribution channel for insurance products,
- intermediaries as a distribution channel for insurance products,
- banks as a distribution channel for insurance products, and
- agents as a distribution channel for insurance products.

Although the potential of digital and new media is detected, traditional media still have successes. Some of the highly developed countries such as Germany in the field of automobile insurance industry, in 2013 almost 50% of new jobs were done through the exclusive brokers. Traditional marketing is still very important marketing tool for this segment of the insurance offer. Letters to customers, advertising in magazines and outdoor advertising are still present in some European countries.

Internet as a distribution channel in insurance has great potential for further development, but it's currently not well developed in most countries, especially in the insurance market in Serbia. There are many reasons, but the most essential are: the monopoly in the market of electronic payments and privileged contract of the only service for electronic payments in Serbia and one insurance company, as well as the high price of this service:

- insufficient extension of quality (broadband and mobile) internet access,
- poor purchasing ability of the younger population, which more used electronic services,
- technical limitations in the way of tariff and contracting of insurance services,
- insufficient investments of insurance companies in this distribution channel.

The results are: until March 2013, only three insurance companies offered the contracting and buying some insurance services via the Internet. It can conclude that results are modest but they have growing trend. By improving the economic situation in the country, it can expect increased interest in this distribution channel on the side of the insured and insurer.

DISTRIBUTION CHANNELS OF INSURANCE PRODUCTS IN SERBIA

Twenty-four insurance companies and twenty banks realize placement of insurance products on the Serbian market and also 95 legal entities (intermediaries and agents), 113 insurance agents (natural persons-entrepreneurs) and 15.545 individuals.

Direct sales of insurance products continue to be a dominant sales channel for the insurance market in Serbia. First of all, it's the sales realized by employees of the insurance companies with full-time work which they have regular income and generate additional bonuses during the implementation of sales plans and are also called internal agents. This sales channel also includes *garages* that carry out technical inspections of motor vehicles during their registration in which insurance companies have branch offices where organize sale of insurance policies.

The main advantage of internal agents is greater reliability and job's commitment, especially maintaining a good relationship with clients, while on the contrary, guaranteed regular income in a number of cases affecting the lower productivity of sales. Domestic insurers consider this channel of sales as the main and it's the largest distribution channel with 78% of the gross premium.

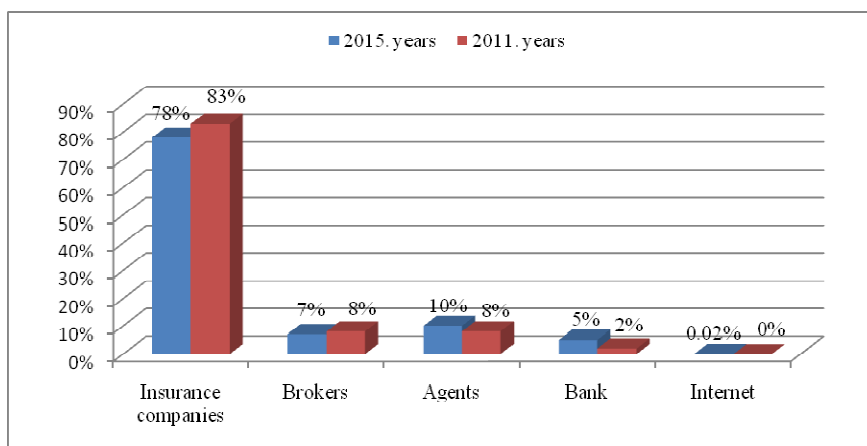


Figure 1: Distribution channels of insurance products in Serbia

The second largest distribution channel represents external agents, which generate 10% of the gross premium, 2% more than four years ago. This group consists different individual categories, but the most important among them are the agencies for insurance and natural persons - entrepreneurs. They realized a profit on the basis of fees charged by insurers were sold insurance policies and fee is determined as a percentage of gross premium.

Intermediaries or brokers in insurance generate about 7% of the gross premium, for 1% less than four years ago. It's characteristic that a fee for their services may be charged by the insured or the insurer, but not at the same time from both sides. In most cases, it charged by the insured, because their main job is to recommend the best offer in accordance with the client interests. The main reason for the stagnation of the distribution channels is unfair competition from agents and not clear determined conditions of participation in public tenders.

The channel which recorded the highest growth of the relative share is bancassurance, which was 2% in 2011 and rising to 5% in 2015. It's generally known that bancassurance is the main engine of growth in life insurance, but it's interesting that in the last years it represents channel where certain types of non-insurance life are sold. Although the level of statistical error (0.02%), Internet represents the youngest distribution channel of insurance.

When it comes the types of insurance in Serbia, it's relevant to note that some types require various distribution channel for insurance products.

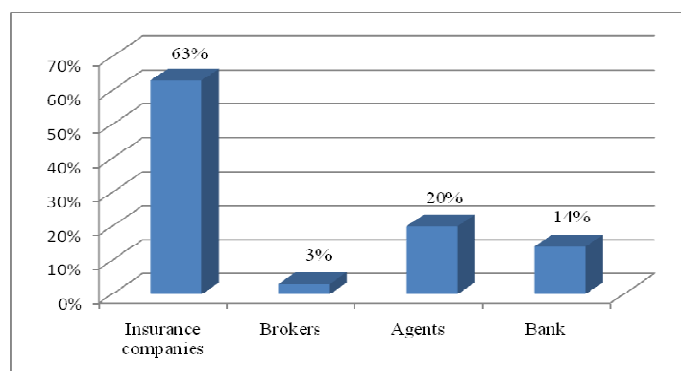


Figure 2: Gross premium by distribution channels of life insurance in Serbia in 2015

Analyzing the distribution channels of insurance products, it can be noted that employees of insurance companies are the dominant sales channels in the life insurance and non-life insurance sectors. It's notable the increased representation of indirect distribution channels in life insurance sector, where brokers, agents, and banks generate in the sum of 37% of revenue, in contrast to the non-life insurance, where it's 17%.

In the future, it's expected to increase the share of bancassurance regardless to the slowdown in sales of life insurance policies which are required or recommended part of the package when approving mortgage loans, banks are trying to offer increased policies of mixed life insurance and improve the partnerships with insurers through the organizational parts of asset management of their clients.

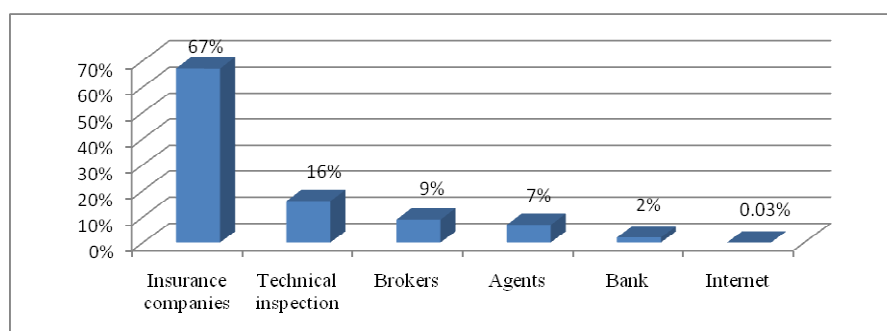


Figure 3: Gross premium by distribution channels of non-life insurance in Serbia in 2015

A very important part of the sale of non-life insurance (17%) through direct sales channels is achieved by the garage in which carrying out a technical inspection during the registration of motor vehicles. Even 34% of the gross premium for auto insurance was contracted on the spot by the officials in branch offices of insurance companies within the rooms for technical inspections.

"New generations" expect that can find all the necessary information of products, compare offers from different companies and be able to complete the purchase online, as well as any concerns before or after purchase, complaints or compliments also clarified via the Internet. The basic advantages of Internet sales are:

- lower prices for business processes,
- automation of business on the Internet reduces the number of employees,
- saving time and money,
- access to information and avoidance of paperwork,
- transparent and faster business conditions.

The basic disadvantages are:

- insurance companies are characterized by a fairly traditional and hierarchical structure,
- presence of fear of payments via Internet,
- customers don't always have adequate safety and protection against fraud,
- knowledge that customers don't have an agent or broker who advised them which insurance policy is the best and fact that they bear the risk alone, where could make wrong decisions.

DISTRIBUTION CHANNELS OF INSURANCE PRODUCTS IN EUROPE

In Europe the fastest growing business model are online and direct sales channels used by insurance companies, through which it achieved about 80 billion euros of realized gross premium in non-life and life insurance with that are not included in the growing alternative sales channels (retailers, related groups). Contracts of the Internet and direct insurance are mostly concluded online or by telephone, but also by mail, SMS or fax.

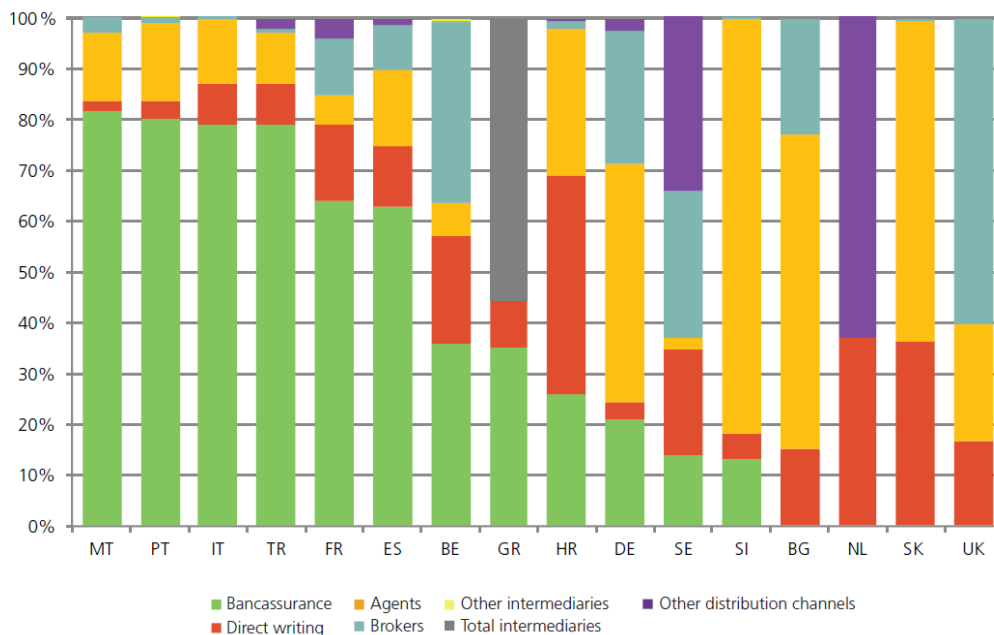


Figure 4: Structure of distribution channels in life insurance in Europe

In the 13 largest European insurance market, direct sales channels had an average annual growth rate of 26% by country, compared to the total market rate of 7%. The total insurance market in Western Europe had an average annual growth rate of 4% by country, where it was 10% in Eastern Europe. At the same time, direct sales channels of Western Europe had a growth rate of 14%, while the East European countries had 40%. In large countries of Western Europe, the pressure of online insurance sales on the market is steadily growing. Direct insurances become successful in other countries of Europe.

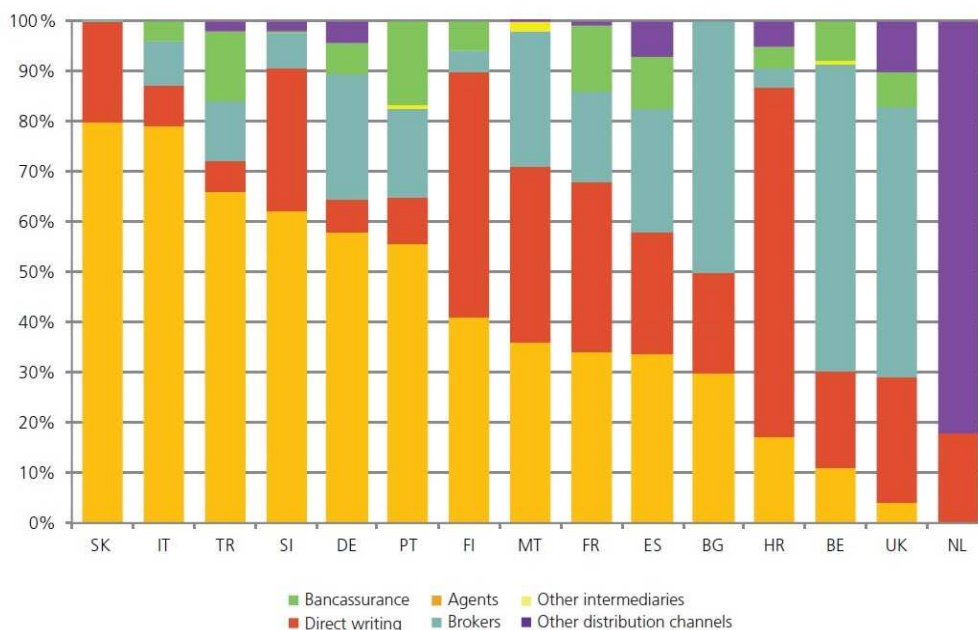


Figure 5: Structure of distribution channels in life insurance in Europe

In the non-life sector of developing countries, leaders on the direct market have become on average two to four times stronger per annum (8.1%) compared with the total market (1.8%). For example, in the life insurance sector in Germany, the leaders of the direct market were an average of seven to ten times stronger per annum (18.1%) compared with the total market (4.6%). Taking into account all

types of products, the share of clients who have completed insurance online and direct sales channels, compared to the population, is over 30%. The main target groups are private clients, but also small entrepreneurship (entrepreneurs, people of free professions, etc.).

CONCLUSION

Intermediaries, agencies, brokers and bank employees who were related to a third party have a dominant place in traditional insurance activity and they see the new model as competition, believing that their survival is threatened and therefore they discarded it. Today, customers are increasingly looking for online and direct service and that they get it. Around the world, insurance companies are currently planning and considering investment in the development of new distribution channels and giving more importance of aggregators as a sales channel or expansion of services and experiences by the Internet or phone. New online insurance complete traditional sales channels, but doesn't replace completely.

In recent years, the business environment for insurance companies in Serbia has been in the same or even greater extent disincentive to insurance companies, but this market segment had growth. Innovation in terms of product and distribution channels in the non-life insurance sector, as well as the exploitation of the growth potential in the life insurance sector, represent the main instruments for the further development of the insurance market in Serbia and rising living standard of the population. Internet appears as sales channels of less relevant lines of non-life insurance, and changing the system of electronic signature and full price liberalization of automobile insurance are significant preconditions of development.

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SLOVENIA'S IMAGE AS A TOURIST DESTINATION

UDC: 659.113:338.48(497.4)

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ABSTRACT

This paper aims to contribute conceptualization of tourist destination. Researchers and practitioners have concluded that an analysis of the tourist destination and perceived-image of the country is essential and should be intertwined, where appropriate. Tourism trends indicate a growth in tourist travel to distant as well as nearby destinations. Consequently, recognizing individual tourist destinations and also the countries where they are located are of exceptional importance. From its independence onwards, Slovenia has also been confronted with not being recognized and having a poor image, not only in distant regions but also with our close neighbours and potential visitors. People who had already visited Slovenia have a better image of Slovenia as a tourist destination, which is also understandable as the majority asked do not even know that Slovenia is a tourist destination.

Key words: tourist, tourist destination, image, Slovenia's image, tourist organization.

INTRODUCTION

Tourist destination as a complete or higher level of any tourism mix and in practice it is an unavoidable component of all services in the tourist industry, which tourist destinations are a part of.

A great deal of variety in demand leads to a diversity of services (transportation, hotels, restaurants, etc.), which characterizes the tourism offer of destinations and as a result acts as a preference when planning for a vacation. Typical features of this type of product - tourist destinations include: being untouchable, inseparability, diversity, short duration, seasonal duration and subjectivity. These features define the great complexity and diversity of tourist destinations and thus the difficulty in identifying characteristics that are important for tourists. (Garcia et al., 2004). The term destination is used to describe a country, a region outside of a country, a city or a coastal region (McElroy, et al., 2007).

In order to define, which area the tourist destination is, it is necessary to define where the visitors come from. If the area attracts mostly local inhabitants, who have not travelled for a long time then we would not call this area a tourist destination. Areas to which people travel for a longer period and go on at least a one-day trip are defined as a tourist destination (Ovsenik, 2003, pp. 393).

As a tourist destination, we look destinations that offer:

- Attractive possibilities for accommodations (natural beauty, thermal health spas, cultural-historical monuments, cultural, entertainment and sports events, etc.),
- communication possibilities (possibility for accessibility),
- transportation links, etc.,
- receptive possibilities (housing with accompanying retail, trade, postal and other services along with parks, walkways and swimming complexes etc).

IMAGE OF A TOURIST DESTINATION

The increasing significance in analyzing the image of a tourist destination has to be assigned the fact that a positive or negative image a tourist has about a certain tourist destination can have an impact on its selection (Konečnik, 2005).

The role of an image for a destination during the process of selecting a tourist destination was well defined by Goodall who believes that it is not possible that a tourist selects a certain destination, if their specific characteristics do not suit the potential tourist's image about it. A positive image, which a potential tourist creates about a certain destination, has an impact on their decision when making a selection from many possibilities. Two people will never feel the same about a destination, thus the perception of a destination is selective and differs amongst individuals and groups of people from different cultures.

The selection of a destination depends on the tourist's conception of a destination's capacity to satisfy their needs or desires regarding the journey. This is why different groups of tourists will select different destinations according to their needs, desires and expectations linked with different destinations.

In literature, there is a perception that the image of a destination slowly changes over time, however its components can really change with time. Just as well, it became evident that many tourist activities are seasonal and that many times they are dependent on the natural environment and the image, which is favoured by tourists changes from one destination to another. Just as well, different groups of tourists have different conceptions about the same destination, which can have an impact on the motives for travelling, desires or values (Hosany, et. al., 2007).

The image of a tourist destination emphasises their attractiveness in the eyes of a tourist, as well as the possibility in satisfying their needs and expectations (Garcia et al., 2004).

Many times the general image of the country also has an impact on a tourist's decision when selecting a tourist destination, where this destination is located. Just as well, the image of a tourist destination is co-shaped by the country's general image (Kislali et al. 2016).

The image of a tourist destination can be defined as a perception, opinion, impression and an understanding of a region and it is a simplified and abbreviated version, for which there is a presumption that it is true. In other words, we can view the image of a destination as an imagined picture, which the promoter would like to inculcate into the minds of the target public. Through marketing images, tourism employees create identities, which represent certain methods with which you can see reality and images. As a result, this reflects and strengthens a certain attitude within society (Tuohino, 2001).

In general, we can define the image of a tourist organization as the total of all convictions, ideas and impressions, which an individual has about a certain destination or the perception of an individual about the possibilities a certain destination offers. In its research on the image of tourist destinations from the standpoint of tourists or potential tourists, The World Tourism Organisation – WTO defines image as an aura, angel or a subjective perception linked with different views of the same message. The WTO's research (World Tourism Organization) connects the existence of an image under the condition that at least a minimum amount of knowledge about a tourist destination exists (Konečnik, 2005).

Individuals are supposed to create the image of a tourist destination in two stages: a general one and a stimulated one. Information about a destination, which an individual has acquired throughout their lifetime, has an impact on the general image of a tourist destination. The stimulated image of a tourist destination is the consequence of marketing efforts by tourism organizations. Their goal must not be to blind people from seeing that they are different than they really are. Without strategic

communication a tourism country can become the »victim« of unsuitable stereotypes and uncontrolled gossip, which aggravates their competitive position on the tourism market. Thoughtful market communication has an impact on the deliberation of potential tourists about it (Brezovec, 2001).

In new European states, the strategy for stimulating an image in tourism has three common goals: to persuade about its Europeaness, to persuade about a safe and friendly environment and strengthen the image of their own country. These countries have a special interest to accelerate the creation of a positive general image of the country by stimulating the image of a tourist destination and just as well, they expect a return benefit for the continuing development of the country as a tourist destination.

SLOVENIA'S IMAGE

According to Konečnik (2005) many reasons exist why it is logical to study Slovenia as a tourist destination. Slovenia has a relatively short history, its geographical area in Central Europe is small, which ranks it amongst the smallest countries in the world and has an exceptionally diverse landscape in a small area. Furthermore, foreigners do not know Slovenia well. They frequently link Slovenia with the socialist system of the past and see it as part of the former-Yugoslavia and the Balkans. As a result, according to the opinions of certain authors, Slovenia especially has a neutral, weak or in a certain context even a negative image in the eyes of foreigners.

Konečnik (2013) established that only they perceive Slovenia as a friendly country, with beautiful mountains and lakes, interesting and friendly people and a relaxing atmosphere. She also established that a preliminary visit to Slovenia as well as experience with the citizens of Slovenia significantly aid in improving the image in the eyes of foreigners.

After its independence, Slovenia was confronted with the problem of finding and presenting its individual identity. The consequence of a short history of statehood and the incapability of creating clear views on its identity, which the country is supposed to present to the world is sponsored by the ascertainment that Slovenia has a neutral or weak negative general image in the eyes of the international public (Brezovec, 2001, pp. 749).

A neutral or poor image of Slovenia is the consequence of not knowing the country well and is indicated by the fact that much of the foreign public with a lack of information do not see the need to categorize Slovenia in certain stereotype frameworks. Due to a lack of information about the country, the public frequently derives its image from the current existing image, with which it is linked to. In the case of Slovenia, the image is frequently derived as being negative, as it is derived from the currently negative image from the region of the former Yugoslavia and Balkans. For much of the public on the international tourism market, this means that Slovenia's »postcard« is empty, really faded or pushed with motives for war. If we ignore the latter image, which tourism above all excludes, we have a situation that remains where tourists do not know what they can even expect from the tourism offer in Slovenia as an unrecognized country. Uncertainty is one of the key braking factors of selection and with this, the development of the country as a tourist destination.

We can conditionally label the current image of Slovenia with the term neutral or derived image. A neutral or a non-existing image is linked with the fact that for once the foreign public does not have the need to place Slovenia in a defined stereotypical framework. It is also frequently substituted with Slovakia or Slavonia. For the public that has contact with Slovenia, it is often true that they form an image about it directly through an already existing image of some other entity. The image of the country is carried out and defined according to the »la« principle (similar to Austria, a part of former Yugoslavia, the Balkans, a former communist country, southern Switzerland, etc.).

The image of Slovenia as a country of tourism for various types of sport is being built in six areas, which cover numerous recreational sports programs. Slovenia represents itself as a youthful, refreshed, unburdened tourist destination, which follows the modern trend of active and recreational tourism.

The attractiveness of a certain region especially depends on the diversity and connectedness of individual types of active holidays (Binter et.al. 2016).

Random foreign tourists who were on holiday in Portorose were asked their opinion about the Slovenian tourist offer on the Slovenian coast. An Italian female tourist who is a regular visitor said that she liked the tidiness of the hotels and the quality of the food. She was surprised by the beautiful arrangement of the parks and walkways. A married couple visited Slovenia for the first time. They were surprised how well-kept the hotels in Portorose, Koper and Piran were. Tartini's Square in Piran fascinated him and Portorose with its avenue of hotels remained him of French summer holiday resorts. He pointed out the "garbage« as being negative, which could be noticed everywhere in his opinion and the nightlife, which is poorly organized. A Hungarian male tourist was especially bothered by the high prices because for that amount of money almost nothing is offered. Furthermore, he expected a more complete offer (Verovnik, 2005).

The German national television station ZDF broadcast a tourism program about Slovenia that lasted several minutes as a new EU member state. They took Bled and Portorose under the magnifying glass, which according to German journalists they are amongst the most well known and attractive tourist spots in Slovenia. The Germans assessed that Slovenia is a country with many opportunities; however, Germans do not know the country well. According to them, a penetrating promotion of tourism on the German market would be needed. According to German tourists, the freshness of the trademarks of Bled and Portorose deserve to be ranked as excellent summer holiday resorts. They also assigned Portorose a »beauty mark«, which is the poor night life scene. They were fascinated by Bled especially by its untouched nature and did not like the garbage that could be noticed in the more remote parts of the region.

The general impression by Germans in becoming familiar with Slovenia was good. »A tourist finds peace and relaxation in this small country and can enjoy this untouched natural environment to their heart's content as well as the splendour that is offered by the more known world class Spanish holiday resorts. If we also add the Balkan temperament, which is characteristic of Slovenes then the cup is filled to the brim", ending their travels across Slovenia on ZDF (Verovnik, 2005).

EMPIRICAL FINDINGS

The survey included Germans tourists that had already visited Slovenia and those who have not visited yet but are familiar with it through word of mouth and the media. We tried to establish what kind of image they have of Slovenia as a tourist destination and how well recognized Slovenia is amongst Germans. The survey included 552 participants.

The participants answered questions about recognizing Slovenia as a tourist destination and evaluated the statement indicators regarding image for individual segments of tourism indicators in Slovenia:

- modern health spa centers
- developed casino – entertainment tourism
- many possibilities for relaxation
- great variety of sport and recreation
- rich traditional meals and culinary specialties
- quality wines with developed wine regions
- a country with many performances
- interesting regions and cities
- marvelous mountains, lakes and rivers
- a beautiful coast
- mysterious caves
- a country with attractive cultural sights
- a country with an untouched natural environment

- a diverse landscape
- an interesting and attractive country
- a hospitable and friendly country
- high quality offer of accommodations
- good prices for a tourist destination
- a developed infrastructure
- a developed economy
- a safe country
- a small country but worth seeing.

We can sum up the results of the survey into the following statements:

1. The survey included 57% women and 43% men.
2. The age structure of those surveyed was as follows:
 - a) 44 % up to 30 years of age
 - b) 30 % from 30 to 45 years of age
 - c) 13 % from 45 to 60 years of age
 - d) 13 % over 60 years of age
3. Furthermore, 24% were Germans from the former East Germany and 76% were from former West Germany.
4. 38% of those surveyed were familiar with Slovenia as a tourist destination and 62% were not.
5. Half of those surveyed who were familiar with Slovenia as a tourist destination had already visited Slovenia.
6. From all those that were surveyed 42% of them already had personal contact with Slovenes. Only 15% of them were not familiar with Slovenia as being a tourist destination, while 27% of those who were surveyed knew Slovenia as a tourist destination.

CONCLUSION

Tourism trends indicate a growth in tourist travel to distant as well as nearby destinations. Today, there are many agencies offering different tourist destination packages and there is a battle amongst them for potential customers. Agencies are offering more and more because of great competition. Furthermore, people in the computer science age are well informed about the offers on the market.

Consequently, recognizing individual tourist destinations and the countries where they are located are of exceptional importance. Of course, a big aid in recognizing an individual tourist region is if it contains a world famous natural, historical or some other points of interest, which attract great numbers of tourists.

From its independence onwards, Slovenia has also been confronted with not being recognized and having a poor image, not only in distant regions but also with our close neighbours and potential visitors. Although the Slovenian Tourist Organization as well as the Ministry of Economy had tried to increase the recognition of Slovenia and improve its image outside of our borders, they were not that successful. It is true that more and more tourists are visiting Slovenia; however, they visit Slovenia only by chance or as a tourist in transit on their way to the seaside. The increase in the number of foreign visitors to Slovenia is also the result of being the member the European Union and the introduction of low fare air travel, especially between Slovenia and Great Britain, whereby Slovenia is seen as "cheap" destination.

A research study carried out on a sample of 95 German citizens did not show any surprising results. Only 38% of those surveyed knew Slovenia as a tourist destination and exactly half of them had visited Slovenia.

People who had already visited Slovenia have a better image of Slovenia as a tourist destination, which is also understandable, as the majority asked do not even know that Slovenia is a tourist destination.

If Slovenia wishes to improve its image, people will have to know more about the country and become familiar with it. This does not only mean visiting it. If they decide to do this, they will have to acquire a lot of different information about the country so as not just to visit it on their way to the seaside or a neighboring country but also discover it intentionally. Slovenia is still going to have to do a lot to become more recognized in the eyes of potential tourists.

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Session D: ECONOMY AND FINANCIAL MANAGEMENT

Papers (pp. 221-260):

Jelena Andrašić, Vera Mirović, Nada Milenković ANALYSIS OF BUSINESS RESTRUCTURING IN THE SERBIAN MARKET	...221
Savina Čolić SUSTAINABLE DEVELOPMENT: HOW FAR ARE WE FROM THERE?	...226
Marko Ivaniš, Lazar Ožegović, Luka Filipović LIQUIDITY MANAGEMENT BY FINANCIAL INDICATORS	...231
Marko Ivaniš, Lazar Ožegović, Milan Mihajlović COST-BENEFIT ANALYSIS IN INVESTMENT MANAGEMENT	...237
Lejla Terzić IDENTIFYING THE CONSTRAINTS OF SMALL AND MEDIUM SIZED ENTERPRISES COMPETITIVENESS IN BOSNIA AND HERZEGOVINA	...243
Yuri Treshchevsky, Tatyana Pankova, Elena Trakhtenberg THE ASSESSMENT OF INVESTMENT'S ACTIVITY LEVEL IN CENTRAL BLACK EARTH REGIONS OF RUSSIA	...249
Marko Vlahović, Mila Kavalić, Savina Čolić, Darko Bađok, Arben Lunjić THE FASTEST-GROWING FOUR CONTINUE THEIR TREND DESPITE THE CHALLENGES	...255

ANALYSIS OF BUSINESS RESTRUCTURING IN THE SERBIAN MARKET

UDC: 338.2(497.11)

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ABSTRACT

After the fall of the Berlin Wall in 1989, began the transition in all socialist countries. The transition involves a series of measures aimed at building a new economic, legal and institutional system. However, due to the disintegration of the former Yugoslavia and a series of events that took place during the nineties Serbia's transition to a market economy has stopped. The transition in Serbia has re-started the 2000s with the adoption of a series of laws, with the aim of ensuring macroeconomic stability, deregulation, liberalisation, regulation of relations with international financial institutions and attracting foreign investment. The aim is to analyse the business restructuring in the Serbian market in the period from 2000 to the present, in order to come up with the answer that the transition process affected the business restructuring of the economy, and attracting foreign capital through various models of investors entering the company into foreign markets.

Key words: business restructuring, transition, capital, foreign investor.

INTRODUCTION

Business restructuring imagines a necessary prerequisite of economic recovery, growth and development of the company. The choice of growth strategy means analysing the critical success factors of internal companies, the competitive structure of the industry in which the company operates, the position of companies in this branch of the economy and the driving factors that dictates external environment.

The market opening was preceded by a process of deregulation and privatisation, particularly those companies in which the prevalent state ownership. Since the privatisation of the company, one of the pillars of the transitional economy, it actually represents the first phase of transition in the enterprise market economy system. Deleting national boundaries and converting the state and social property enterprises in the private, increase the competitiveness of the market, but also the enterprise's market mechanisms, which further compels companies to think globally and to constantly review their strategic decisions in a rapidly changing and intermittent setting (Stefanović, 2010).

RESTRUCTURING OF BUSINESS MODELS

The choice of model business restructuring companies, mostly motivated by the following strategies: (1) strategy of searching for the market, (2) the strategy of searching for strategically important assets/resources, (3) a strategy of searching for efficiency (4) strategies for monitoring clients. Analyzing this strategy when selecting external growth model when entering the Western European

countries in the early years of the transition to the markets of Central, Eastern and Southeastern Europe, the authors (Gill et al, 2006) in its work to conclude that an investment of seeking to market much more frequently selected property, because they are motivated high market share. This is consistent with previous studies that have also suggested that an investment from Western countries were mainly motivated by the growth of the market potential and the search for new clients (Aulakh & Kotabe (1997).

Strategy quest for resources (Tarzi, 2005) is based on the key resources, capabilities and competencies that the company can develop independently or provide them. If the company lacks key resources (natural resources, cheap and highly educated workforce, research and development) that can not develop independently, and on the other hand wants to reduce transaction costs and risk in business, then the company selects some form of cooperative arrangements he ensure transfer of technology, knowledge and skills, such as joint ventures and strategic alliances (Brouthers et al., 2001). Within the strategy of monitoring clients, western countries are attracted to other Western countries, because they are most often used their services. Strategy quest for efficiency is suitable for developing countries and countries in transition so that they can attract foreign capital through some of the investment models because they work in addition to low prices offered to foreign companies and substantial tax breaks. Location factors (Stefanović, 2008) are also important factors when choosing a model of external growth. Thus, the high market growth rate (typically expressed in the growth rate of the gross domestic product), high growth rate of GDP per capita, which represents a high level of competitiveness, market opening (through a high share of the import and export of GDP) represent stimulating factors. High political risk, high uncertainty, underdeveloped infrastructure are limiting factors in the selection of external growth model. However, in the Serbian market, in the past, for the most part, were represented models for restructuring the ownership of state enterprises to download ie. through privatisation. Investment models that include partial ownership such as joint ventures and strategic alliances have existed in very small numbers.

TRANSITION IN SERBIA

Serbia after a decade of facing international isolation, hyperinflation, recession, continued transition process began in 1989. The second "wave" of transition reforms, which began in 2001, according to the program, which was ten years earlier applied the countries of Central and Eastern Europe after the fall of the Berlin Wall.

The lifting of sanctions by the international community in Serbia to create the conditions for the establishment of mechanisms inherent in the country operating in market conditions. The adoption of several laws regulating the institutional framework of a market economy began a process of transition in Serbia. There was an increase in macroeconomic stability, privatisation of a large number of social enterprises, an increase of trade liberalisation and market opening, and thus the gradual recovery of the Serbian economy. This trend has been the emergence of the global financial and economic crisis.

As for the markets of Serbia, as a result of the financial crisis in developed countries, there has been a reduction in the inflow of funds from foreign investors through the reduction of loans that foreign investors approve certain financial institutions and companies in Serbia and the reduction of foreign direct investment in the Serbian economy. Reducing cash inflows further influenced the economic slowdown, the deterioration of many companies, large-scale redundancies and falling living standards.

Domestic banks were affected by decreased demand for credit in the period of large layoffs and bankruptcies of many companies, as well as the inability of a collection of already approved loans. In the real economy, there was a sharp reduction in demand of the population, whose decline was felt most industries, especially the construction industry and production of cars, while the food industry has not suffered such huge losses.

Table 1: Rating transition indicators Serbia

SERBIA	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
The privatisation of large enterprises	2.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
The privatisation of small enterprises	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Enterprise restructuring	2.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Price liberalisation	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trade and foreign exchange system	3.0	3.3	3.3	3.3	3.7	4.0	4.0	4.0	4.0	4.0	4.0
Competition	1.0	1.0	1.7	2.0	2.0	2.0	2.3	2.3	2.3	2.3	2.3
Infrastructure	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.7	2.7	NP	NP

Source: www.ebrd.com, European Bank for Reconstruction and Development

European Bank for Reconstruction and Development monitors the reform process over the transition indicators in six dimensions of reform: privatization, restructuring and management of enterprises, price liberalization, trade system, competition policy and infrastructure. The highest rating for progress in transition is 4.33, and the lowest 1. A value of 1 represents little or no change from a rigid centrally planned economy, while 4.3 represents the standards of market economies. It can be seen that the biggest problems exist in the work of restructuring and management of enterprises and competition policy, where the score is now at a level of 2.3, which is quite a low assessment of the reform.

Slow restructuring is present because the first wave of privatisation is excluded large public companies in the field of infrastructure and utility companies because until the adoption of the new Constitution of 2006 did not have clear ownership relations company. However, it is obvious that the reformist score privatisation of large enterprises is quite low. In Serbia after more than a decade of implementation of transitory changes is still a social ownership (Uvalić, 2012).

Table 2: Number of enterprises by organisational form and size of the entity

Number	94.362
Partnerships	1.479
Limited partnership	241
A limited liability company	87.76
Stock company	1.812
Socially owned enterprise	349
Public company	510
Cooperatives and cooperative union	1.799
A branch of a foreign legal entity	241
Other entities	171
Small businesses	90.597
Medium-sized enterprises	2.846
Large companies	919

Source: www.apr.rs

In Table 2, it can be concluded that the Republic of Serbia has 349 operating social enterprises. Also notice that 96% of companies are small businesses, 3% of medium-sized enterprises, while only 1% are large business entities.

Regarding the management of enterprises, reform score is low because they are different processes ownership restructuring and the existence of various forms of ownership after 2001 further open the issue of corporate governance. It was not clear the rights of various stakeholders - employees, managers, state, foreign owners of the privatised enterprises.

According to the law on privatisation from 1991 to 1997, where the privatisation of enterprises conducted mainly through insider model, in most Serbian companies, the manager of the enterprise was the owner of the company, so the problem of corporate enterprises did not exist. But now after a decade, in Serbia, there is still a problem of corporate governance, primarily due to the underdevelopment of capital markets. Therefore there is also the absence of an external disciplinary mechanism of control managers who would enable greater management discipline, and therefore the

effective functioning of the internal mechanisms for disciplining managers. The presented examples show that by 2006 the reform of economic competitiveness score was 1, indicating that Serbia does not fulfil a condition of business competitiveness. Running since 2006, a slight increase since 2006 adopted important laws: the stock exchange, investment funds and taking companies. Also, in 2006 he started working with the Commission for Protection of Competition, while the new Law on Competition was adopted in 2005. However, although reform is 2.7. To score today could be attributed to the slow growth of the private sector.

Serbia and Bosnia and Herzegovina have the lowest share of private sector in GDP stood at 60%. Because in 1989 it amounted to 40% of GDP, an increase of only 20% that Serbia has made a little more than 10 years has ranked in at least six countries in transition privatised. Such an increase was recorded in the Czech Republic for the year, in Estonia for two, three in Hungary, Bulgaria and Romania, four in Poland and Slovenia (Uvalić, 2012).

In the area of infrastructure, reform assessment Serbia is also quite low. As already mentioned delayed privatisation of large state-owned enterprises in the energy, railway, traffic affected the bad result of this indicator. Since 2006 the situation has improved positively privatisation of one mobile operator which is considered one of the most significant investments in terms of value in the Republic Serbia. Only in the area of price and trade liberalisation, Serbia has achieved significant results, because, as already pointed out cooperation with international institutions and openness of markets affected by the reform of the high assessment of this indicator.

RESTRUCTURING OF SERBIAN ECONOMY THROUGH PRIVATIZATION PROCESS

According to a report on the economic development of Serbia, Serbian Chamber of Commerce, for the privatisation of the remaining 708 commercial companies - 494 subjects of privatisation, with 214 subsidiaries. Most of them will be privatised by the sale of capital and assets, while strategic partnership submitted by 23 companies. Bankruptcy, the privatisation process will be completed in 188 enterprises in which there is no interest in privatisation. Although improved enforcement of bankruptcy legislation, the problem is growing competition and corporate governance. Also, for the completion of structural reforms is very important privatisation of large public companies that are of strategic interest for the country (such as energy, rail and air transport).

Table 3: The results of privatisation from 2002 to 2013

	The number of sold enterprises			Number of employees in these companies			Revenues from privatisation		
	Tenders	Auctions	Capital	Tenders	Auctions	Capital	Tenders	Auctions	Capital
2002	11	151	48	11.719	10.763	14.802	200.7	34.9	83
2003	16	515	107	13.966	42.776	20.183	594.7	177.3	67.8
2004	6	183	45	9.411	17.606	11.227	11.2	90.3	52.2
2005	9	157	147	5.688	17.656	34.132	67.2	144.6	125.2
2006	14	155	102	11.34	16.596	15.931	62.4	97.2	70.1
2007	7	167	120	6.77	14.507	17.77	27.3	178.8	162.1
2008	12	133	105	6.948	4.356	14.623	33.5	98.2	91.7
2009	4	44	40	1.89	2.367	4.377	3.5	33.7	10.5
2010	2	18	13	178	603	1.141	0.5	6.6	11.6
2011	1	2	14	340	112	1.794	0.9	0.1	17.9
2012	0	2	10	0	231	1.479	0	2.2	13.3
2013	0	0	4	0	0	94	0	0	8.8
Total	82	1.527	755	67.8	127.573	138.553	1.001.9	863.9	714.2

Source: Bulletin of Public Finance 6/2013, In: Eric, D., Stošić, I.: Corporate Restructuring, the Institute of Economic Sciences, Belgrade, 2013, p.2

From the presented table it can be seen that the majority of enterprises sold through tenders and auctions was realised in 2003. The first "wave" of privatisation after the adoption of the new law

included the most attractive parts of the economy - industry, tobacco, cement, beer, drugs. In order to speed up the privatization process, the government in 2003 and 2005 adopted several amendments to simplify the process of auction and tender sales, then on the basis of amendments to the Law on privatization, the state has conducted a conditional write-off of debts with the non-privatized companies in which it had accounts receivable, which resulted in a reduction in debt, and thus to increase the attractiveness of these companies (Uvalić, 2012). During 2005 and 2006 there was an increase in the number of enterprises sold to the process was halted by the outbreak of the global economic crisis in the summer of 2008 that during 2012 the number of terminated contracts exceeded the number of signed contracts. From the presented table it can be seen that after 2009 there was a sharp drop in the number of enterprises sold through tenders, auctions and capital markets. In 2012, not one company has been sold through tender and auction while through the capital market sold four companies. In 2013, 179 companies restructured.

CONCLUSION

On the basis of summarizing the research results can be concluded that Serbia, although it started again the transition process after ten years when they embarked on transition of the former socialist countries, their experience in implementing the transition was not enough not to repeat the same mistakes, or that they are do not pay enough attention. Serbia has had a worse starting position of transition, and are, therefore, challenges that have stood in front of her were much higher. For many years in Serbia is guided by the policy of soft budget constraints and selective in lending to certain public enterprises which are often in a monopoly position and that the state protected by non-tariff barriers. Serbia still lacks an institutional framework that would be the more competitive economy, insufficient incentives for the establishment of new private enterprises, greater support for SMEs, and strengthening the mechanisms of corporate governance. Also, it is necessary to abandon the policy of soft loans to the budget of some state-owned enterprises that generate huge losses and at the same time start the process of their restructuring. Serbia's 2014 adopted a new Law on Privatization and 2015 and a new Law on Investments which is actually expressed its willingness to continue implementing reforms. A new law on privatization in addition to sales of capital defines the strategic partnership model to sell part of state capital company by the owners they would all together should not affect the completion of the privatization process.

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SUSTAINABLE DEVELOPMENT: HOW FAR ARE WE FROM THERE?

UDC: 502.131.1(497.11)

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ABSTRACT

Since The Earth Summit, held in 1992, and consequent Declaration on Environment and Development, the notion of sustainable development has become central to environmental policy in majority of countries, largely affecting all aspects of economy and everyday life. The third principle of the aforementioned Declaration (1992) cites: 'The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.' However, while the developed countries have the sufficient standard to focus on the ecological impact of their industry, the developing ones are still trying to mitigate the problem of unemployment and low standard of living, therefore primarily focusing on the economic aspect in their development. One of the countries in question is ours, and in this light, this paper reflects on the strategic documents introduced and practices in the area of energy production, and observes the state of waste management and food production implemented in Serbia, with the aim to establish to what extent Serbian economy has developed in these aspects, regarding sustainability.

Key words: sustainable development, energy production, organic food production, waste management, Serbia.

INTRODUCTION

Having been a central notion in management and eco policy for almost three decades now, sustainable development should be a guide for all economic activities, introducing three equally important factors: economic development, technological development and ecology. A significant shift towards this triangular set of imperatives has been noticeable in the developed countries for decades now. On the other hand, the developing economies still do not have the sufficient standard so as to be able to focus on the ecological and sometimes even technological aspect of the three, having the problems of unemployment, pension fund, low quality of living and such to solve.

Therefore, the focus in these countries, including the one we live in, is still primarily on the economic factor, partially or completely neglecting the other two. The practice in industry sectors like energy and food production on one and waste management on the other hand, is far from what has been established as the guidelines in the late 1980s of the previous century and intensively practiced throughout the developed world. Nevertheless, the majority of ecological consequences reflect to the entire world. This has led to the state where a question occurs: is it too late?

THEORY

The humanity has come to the point of uncertainty about how much of the non-renewable energy supplies there are left and how big the ecological impact of the solely profit-oriented development is. There are evidence of air and water pollution, large-scale patches made of plastic waste covering the oceans' surface, irreversible loss of natural habitats and wildlife, damage to public health and ultimately global warming, all having impact on the global level. Thus, a shift towards using

renewable energy sources throughout the world is urgent, including the prior consideration of the environmental impacts of such a shift in order to make this strive worthwhile.

In 2012, The European Commission introduced a brochure named 'Energy roadmap 2050', with the goal to cut greenhouse gas emissions significantly (up to 95%) by the year in the title. This effort has several challenges, including the growing population, developing industrialization and therefore an imminently higher demand for energy sources. The first challenge is that two thirds of the sources need to be renewable and electricity production in its entirety needs to be emission-free. It is clear that the current energy systems, even the ones in the developed countries, are not ready for such challenges yet and therefore need to be changed. Although problems like jobs, pensions and public deficits seem more important than future energy needs at the moment, investing in better energy framework should solve these and other problems in the long-run.

As of Serbia, although there are sufficient resources for domestic energy production, our country is still dependent in this area. The trend of importing energy is relatively stable, according to the data by Republic of Serbia Ministry of Energy, and amounts to about 30%, whereas 70% of the energy is produced within the country. One characteristic feature (and problem) here is a high proportion of coal – mainly domestic low-heat lignite use, which on the long run has negative ecological effects. The novelty in consumption should be the biofuel, currently used to only about 30% of the available resources. Next to it, Serbian economy currently uses about 50% of the available hydropower and only a fraction of available geothermal and wind energy.

However, low energy efficiency in households and industry, including low capacity usage and obsolete technologies, results in energetic intensity (total primary energy consumption per GDP unit) being almost twice the size of the EU average. Since primary gas consumption per capita in our country amounts to only about 34% of EU average, this sector has a great potential for development. Finally, as with the rest of the world, our country should significantly shift towards greener economy. This includes improved energy industry, greener agriculture and more diversified waste management. Certain movements towards this have been undertaken, but they are still in their initial phase.

METHODS

Research Problem and Subject

The problem of this research is observation of the current situation of Serbian legal framework and incentives for implementation of sustainable development goals in the country. Positive strategic and legal documents, as well as undertaken measures are taken into account. The subject of this research is comparison of Serbian progress in this way with the European one; the aim is to establish the strategy which our country should follow in order to achieve higher standard of living and preserve natural resources for the future generations.

Research Objective

The scientific objective of researching the level of implementation of sustainable development goals in Serbia is to recognize the potentially best practices for our country's further development in the area, whereas the social objective of the research is to point to ways in which better living conditions shall be obtained.

Research Organisation

This paper uses the analytical method, overviewing and analyzing the research findings in the field of sustainable development in Serbia and EU. Moreover, positive legislature and other strategic documents in the field of sustainable development introduced in Serbia in the recent years shall be given and compared to the European strives in the field, with the aim to point to the potential methods

to be implemented with sustainable development of the economy and higher standard of living for Serbian citizens as the main goal.

FINDINGS

Renewable energy sources (RES) usage

According to Karakosta et al. (2012), the majority of EU countries have renewable energy sources as the major issue of concern, being a part of the framework of achieving the European environmental targets climate change mitigation. This reflects in these countries' endorsing the initiatives to foster RES implementation development and inclusion of the aforementioned into the energy mix. However, despite the high RES potential of the countries like Serbia, only few sporadic efforts have been made to examine the requirements for promoting RES implementation in countries that lack specific RES obligations, including Serbia.

Golušin et al. (2010) mark the use of RES as a competitive and obligatory activity, and energy potential of Serbia as still insufficiently explored, noting that the only form of currently used RES accurately measured and recorded in the energy balance sheet of Serbia is hydroelectricity. It is only partially utilized, amounting to about 60% of its potential. When taking NRES (new renewable energy sources) into account, their negligibility is striking. The implemented technology and equipment are non-compliant with EU standards, having low reliability, production stability, energy efficiency and maintenance as a result. The cause to this state is in fact low support and problems with regulations, whereas the same situation is promoted in European countries by feed-in tariffs, tax exemptions, and such, implemented solely or in combination into subsidy programs, tax allowances, soft loans, and similar.

Finally, an overview of the strategic documents and positive legislature introduced in Serbia with the focus on greater exploitation of renewable energy sources shall be presented, as the first step in shift towards sustainable development. The following is observed:

- In 2005, the Energy Sector Development Strategy of the Republic of Serbia was introduced, emphasising the special advantages and requirements of the Republic within organized exploitation of renewable energy sources, through decentralised production of electricity and thermal energy. This is done by combustion of biomass and collecting solar radiation. (Government of the Republic of Serbia, Ministry of Mining and Energy. Energy Sector Development Strategy of the Republic of Serbia by 2015, Official Gazette RS 44/2005)
- 2006 saw the adoption of the 6-year National Strategy for Economic Development of Serbia, prioritising selective usage of renewable energy sources in order to lower the energy import rate, create business opportunities for domestic industry and increase employment. Moreover, one of the things in focus is alignment with EU practices and legislation in the field. (Government of the Republic of Serbia, Ministry of Economy, Republic Development Bureau. The National Strategy for Economic Development of Serbia 2006–2012)
- In 2008, the National Sustainable Development Strategy of the Republic of Serbia was adopted, defining national priorities within the field of sustainable development. It includes the incentives for using RES in order to protect and improve environment, but in such a way so they remain available to future generations. (Government of the Republic of Serbia. National Sustainable Development Strategy of the Republic of Serbia Official Gazette RS 57/2008)
- In 2009, the National Environmental Protection Program was adopted, recognising the shift from fossil fuels and other similar energy sources towards renewable ones, in order to protect the environment. (Government of the Republic of Serbia. The National Environmental Protection Programme, Belgrade; 2009)

State of Agriculture

Having fairly low conditions and incentives in the field of agriculture, our country currently faces the situation in which, instead of growing domestic and organic food on vast fields it has as a natural wealth, it promotes import of food from faraway countries. Therefore, even being fairly behind the world technologically and conceptually, our country has the advantage in its relatively preserved natural resources. While other countries fight production of genetically modified organisms today, production of organic food gains its significance, providing our country with a way to recover its economy. However, in order to make this viable, it is necessary to address certain issues first. In order to be able to compete with the subsidized European farmer, Serbian farmer needs to be provided with adequate conditions and support.

A shift towards multifunctional agriculture, as a paradigm in which the outputs of such an activity is not only produced food, but also non-market functions – development of rural areas followed by the increase of life standard for the inhabitants of these, as well as the environmental protection. In this way, currently very unpopular and diminishing field of economy will regain its strength and fulfil its potential. Increasing the desirability of rural areas is a national goal in almost every country and if the fact that our country has a significant natural potential is added into the equation, this should not be neglected. Finally, since mankind is in the most direct contact with the nature through agriculture, it is clear that the negative externalities in the form of water, soil and air pollution, as well as biodiversity loss should be minimised.

Nevertheless, the main problem of such a form of agriculture is the low support by greater authorities, such as World trade organisation, which do not approve grants for agriculture with this rationale.

Waste Management in Serbia

One of the not very proud images of our country is the landfills. Today, Serbia has over 3700 of these, the very small number of which (less than 200) are the registered and officially approved. The rest of them, having appeared without any plan and approval, are most frequently found in the immediate proximity of settlements and roads. Apart from the esthetic, landfills (both the legal and illegal ones) are a great ecological problem due to their inexistent or relatively shallow cover layer. Finally, the vast majority of waste materials, which could be used as a resource – either a recyclable or energetic one, still get irreversibly disposed on already saturated landfills in our country.

The rate of urbanisation of Serbian cities was excessively fast in the past century and therefore certain infrastructure, such as the solid waste management one, could not follow this trend. Therefore, a larger amount of waste generated as a consequence of changed lifestyle could not (and still cannot) be managed properly. Thus, the largest proportion of it is still only disposed to landfills, without being properly classified. The result is not only visually unpleasant, but potentially carries disease, greenhouse gases, wildfire and such. Only a small number of landfills have a form of waste processing and the overall structure on the majority of them is of a very low condition.

DISCUSSION

The currently present declarative level of progress at our country is a good beginning point, which needs to be used more extensively at all levels and areas of economic activities. The purpose should not be per se, but with the main aim to establish a basis for future sustainable development. Although problems like employment rate, unbalanced ratio between retired and working people and such seem as higher priority at the moment, investing into sustainable development schemes shall have positive results in these areas on the long run.

The notion of multifunctional agriculture is closely related to the organic production, which should be used as a tool for gaining competitive advantage over GMO produced in developed countries with

poorer natural resources. Although being technologically and conceptually late behind the developed countries, Serbia still has relatively preserved natural resources in both plain and mountain region. A more intensive use of these, using the principles of organic farming, could significantly help recover and develop national economy on the long run. Already having the channels which are already opened towards international market, it can be said that the Serbian agriculture is at an unjustifiably low level. Combining the organic farming with multifunctional agriculture should help increase the life standard and desirability of rural areas, which is a national goal in almost every country, having large impact on all areas of economy and life.

Finally, the state of waste management as presented in the previous section, being similar to one existing four decades before in developed countries, shows a large area of potential improvement. The problem of solid and liquid waste management has two possible solutions, which should ideally be used in combination – recycling and waste-to-energy process. The former can be done on at least 70% of waste materials, saving energy, production time, raw material and other resources. The current level in Serbia is about 6% of total waste recycling. The latter, being present only in traits, has an immense potential for solving multiple problems, including our country's energy dependency on import from foreign countries. Both processes, if planned and implemented in a proper way, result in preserving and improving the environment. In addition to these benefits, the processes form the newest industry sectors, opening new workplaces.

CONCLUSIONS AND IMPLICATIONS

As presented, the current state of practice in Serbian economy is worrying, but carries large potential if adequate measures are undertaken. Although numerous indicators are at a very low level, good business practice from developed countries could serve as a guideline for large-scale improvements which could solve numerous problems of Serbian economy on long term.

Since requiring building the infrastructure and changing certain bad habits, the shift towards renewable energy sources, better waste management and organic farming combined with multifunctional agriculture shall take certain time. Therefore, it needs to be strategically planned and implemented. Investing in better energy framework, greener agriculture and smarter waste management should all solve numerous economic problems in the long-run.

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LIQUIDITY MANAGEMENT BY FINANCIAL INDICATORS

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ABSTRACT

Respecting the concept that one can only manage what can be measured, there has been a strong tendency in recent decades to improve the measurement system in order to improve the control system as an integral part of the corporate governance process. It is also the main reason that the problem of performance measurement of a company has become extremely current and the subject of numerous studies, articles and research in the last decade. Similarly, the paper outlines the main features of the so-called traditional concept of financial ratios of liquidity and solvency of a company. However, the contemporary crisis atmosphere in which the domestic companies operate today imposes the need to use the model parameters by which the management of a company can realistically observe the processes and developments in business activities of the company. The aim of this paper is to highlight the need to use adequate measures of liquidity and solvency of corporate governance in the crisis atmosphere.

Key words: liquidity, solvency, financial ratios, cash flow.

INTRODUCTION

Bearing in mind all the negative aspects of the global economic and financial crisis that has also had impact on our domestic economy, it is an indisputable fact that any discussion of any problems concerning the economy of companies has special importance and currency. In this context, liquidity deserves special attention. Namely, most companies today find themselves in difficulties that are primarily reflected in the following: difficulty maintaining continuous production process, problems in the marketing of products and services, lack of proper fulfillment of liabilities to business partners, creditors, government (budget), salaries for workers, as well as indebtedness of a large number of companies with the presence of a constant risk of total bankruptcy. Generally, one could say that in the current difficult economic conditions, our domestic companies operate under the constant threat of illiquidity and insolvency.

The state of the economic environment in which our companies operate is further complicated by the determining factors that arise from the incompleteness of the economic system and the inadequate ownership transformation that was not aligned with all the standards of the market economy. As a result, we have a constant presence of several significant problems, such as: (a) unprofitable business operations with reinvestment losses in a large number of companies, (b) low utilization of production capacities and high operating costs with reduced sales of products and services, (c) insolvency and chronic shortage of working capital.

The abovementioned facts are nowadays more or less known, and they need not be further addressed here. However, if one takes into account the ongoing process of transition of our economic system and in the light of the observations of its main actors (companies), a qualitatively different sense of understanding of the "standard" market economy we aim for is necessary. In other words, it means the necessity of knowing and understanding not only the so-called "traditional thinking" of enterprise economy, but also the recent "financial thinking" which is becoming increasingly important in modern enterprise management. Generally speaking, it is the mutual permeation of opinions based on the contents of the "economic company theory" and "financial company theory", and the common focus of both of these is based on the three basic principles. *First*, the principle of profit (revenue) as the predominant motive that determines the behavior of the company, with clear delineation of risk (loss) of benefit (profit). *Second*, the principle of equity and risk management based on it, instead of result management. *Third*, the principle of continuous maintenance of liquidity and strengthening of a company's financial power.

Similarly to the abovementioned, it seems quite justified to direct further discussion towards attempts to define adequate models and criteria (indicators) by which the actual processes and developments in business activities of enterprises can be expressed and realized (examined and evaluated). In this regard, and observing the methodological framework and objectives of this study, we believe that the most appropriate approach is if the liquidity complex is shown from the following aspects: (1) understanding, expressing and measuring liquidity, and (2) obtaining knowledge of the importance and needs of the cash flows analysis from the aspect of company liquidity management in modern business conditions.

UNDERSTANDING AND EXPRESSING LIQUIDITY

It is generally regarded that liquidity should be understood as a company's ability to duly settle its liabilities to creditors. In other words, liquidity is the ability of the company to settle its outstanding financial liabilities, while maintaining the necessary scope and structure of resources and the preservation of an adequate credit standing. In this usage liquidity includes three basic elements: (1) due liabilities, (2) time frames, and (3) the means of payment. To achieve and maintain the liquidity, these elements must be aligned in time and value. This means that the amount of available funds must be equal to the amount of due liabilities at the time of maturity. Accordingly, in order to maintain the continuity of liquidity, an alignment of time and value of due obligations, terms and means of payment is required.

When it comes to liquidity ratios, it should be noted that they measure the ability of companies in terms of the possibility of settling due short-term liabilities. These indicators are constructed as the ratio between cash and other current assets and short-term (current) liabilities. In addition, liquid assets involve current assets or more precisely current assets without inventory. Therefore, the basis of the approach to recognition, measurement and analysis of liquidity must contain the criterion of unconditional settlement (payment) of short-term liabilities if the short-term financial balance of the company is to be maintained. In addition, the actual production of appropriate parameters (indicators) starts from the following general relationship: liquid assets to due short-term liabilities (financing sources). As a minimum for monitoring the purchasing power of a company's business operations, i.e. its liquidity, the following liquidity ratios are commonly used:

- Current liquidity ratio
- Overall liquidity ratio
- Rigorous liquidity ratio
- Future liquidity ratio

1. *Current liquidity ratio (CLR)* refers to liquidity of a company if the liquidity is provided on the observed day. Therefore, the current liquidity shows only the current ability to pay company's due liabilities. The current liquidity ratio is calculated in accordance with accounting and not balance sheet

data, because securities in the balance are not presented either per day of cashing or per day of due liabilities. Current liquidity ratio is calculated by using the following form:

$$CLR = \frac{\text{Current assets}}{\text{Current liabilities}}$$

Current liquidity ratio can be greater, equal or less than 1. If the calculated ratio is 1 or greater than 1, then the company can settle amounts of due liabilities to the creditors with the available financial resources. However, if the ratio is less than 1, then the company is not able to pay its due liabilities with the amount of available funds. Generally, there is no standard to which the current liquidity ratio can be compared, but it is commonly considered that its value must be at least 1.

2. *Overall or current liquidity ratio (OLR)* indicates the coverage of short-term borrowed capital with total current assets, i.e. it shows how many dinars of current assets cover one dinar of short-term liabilities, which are taken as the first indicator of security protecting the interests of short-term creditors of the company. Overall or current liquidity ratio is calculated based on the data from the balance sheet and by using the form:

$$OLR = \frac{\text{Total current assets}}{\text{Total short-term liabilities}}$$

Overall liquidity ratio of a company should be interpreted with extreme caution, especially because of the unidentified structure of its numerator and denominator. However, regardless of the limiting factors in its interpretation, it is necessary to point out the following: (a) if the overall liquidity ratio is less than 1, it shows an unsatisfactory liquidity of a company, (b) if the overall liquidity ratio is equal to 1, it indicates the lower limit of liquidity, and (c) if the overall liquidity coefficient is equal to 2, this shows the standard relationship when a company can be considered liquid.

3. *Reduced or rigorous liquidity ratio (RLR)* is derived from the ratio of current assets minus inventories and short-term liabilities. The liquidity ratio is often called the stock market liquidity ratio, and also the "acid" test of a company's liquidity. In this regard, we can say that rigorous liquidity ratio shows how many dinars of funds cover each dinar of short-term liabilities. It is a stricter (more rigorous) measure of liquidity compared to the previous indicator because it eliminates inventory from current assets when measuring liquidity, since they are considered long-term bound assets. The reduced or rigorous liquidity ratio is calculated by using the form:

$$RLR = \frac{\text{Liquid assets (Current assets - Inventories)}}{\text{Short-term liabilities}}$$

Normal liquidity assumes that this ratio is 1. If it is greater than 1, then it means that the company is too liquid. Conversely, if the ratio declines below 1, it means that the short-term liabilities exceed short-term receivables, placement, cash and cash equivalents, which certainly warns of insolvency.

4. *Future or prospective liquidity ratio (FLR)* refers to the ability of companies to pay liabilities that will mature for payment in a given time interval (e.g. in a month, in the next three months, etc.). Future liquidity ratio is calculated by using the form:

$$FLR = \frac{\text{Monea on the day of liquidity measurement} + \text{Receivables and securities to be cashed}}{\text{Due liabilities on the day of measurement} + \text{Liabilities which mature during the observed period}}$$

Future liquidity ratio should be equal to or greater than 1. Only then will the company be able to settle its outstanding liabilities to creditors with available cash resources during the observed period. Unlike current liquidity ratio that represents the static measurement of liquidity, future liquidity ratio

represents dynamic measurement of liquidity. In addition, it is necessary that this ratio is always greater than 1, because only then the company can be certain that the liquidity will be maintained over a certain period.

BALANCE OF CASH FLOWS AND KEY INDICATORS OF LIQUIDITY

Most financial indicators (numbers ratio) are used to quantify the positions of balance sheet statement and income statement. In addition, analyzing data from the balance of monetary flows (i.e. the balance of cash flows), which comprises the third segment of financial reporting, is far less pronounced, since the balance of cash flows, balance sheet statement and income statement comprise an inseparable whole. However, given the importance of cash management for the overall operations of the company, it is highly recommended that the company thoroughly analyzes the data from the realized cash flows, primarily in order to formulate the basis for planning and control of cash flows. This is particularly important in the so-called crisis business conditions or under general insolvency of companies when it is extremely important to take account of income and expenditure, on the one hand, and cash flows, on the other hand. Therefore, in modern business operations of companies the importance of financial indicators based on cash flows is being increasingly emphasized.

Previous considerations of liquidity measurements were based on the scope of monetary assets which are used for settlement outstanding short-term liabilities at a given time. Therefore, a certain static quality of liquidity indicators, as we have previously discussed, is dominant. However, a newer approach to liquidity management of companies pays far more attention to the dynamic relations of possibilities of cash inflows and outflows of these funds in relation to the payment of due short-term liabilities. Generally, it is about the affirmation of the extremely "financial thinking" in terms of receipts and payments, which is focused on the examination of the following: (a) wherefrom payments converge, and (b) where to they flow. Therefore, in this context, liquidity is expressed not only in the given time but also in a time interval, aimed at its future realization. Dynamic liquidity shows inflows and outflows of money in a particular accounting period. In addition, information on the dynamic liquidity is obtained primarily based on data from the cash flow statement.

It is believed that the primary objective of the analysis of cash flow statement is to provide information on the inflow and outflow of cash from operating activities of the company, while the secondary objective is to provide access to investment and financial activities of the company. In addition, it is essential that the net cash flow from operating activities is positive, because it creates an important prerequisite for investment and financing. There is a consensus that the analysis of cash flows should ensure the following: *first*, analyzing the company's ability to generate cash, and *second*, the assessment of its liquidity and solvency. Similarly, the analysis of cash flows is also called solvency assessment. This means that the assessment of solvency is a significant segment of the analysis of cash flows and consists of the analysis of key positions of the balance of cash flows related to operating, investing and financial activities of the company. In doing so, the subject of analysis can be not only the statement containing cash flows in the past period, but also planned cash flow statements. When it comes to planning the cash flow statement, its main purpose is reflected in the fact that it contributes to establishing and maintaining *optimal liquidity zone*, which is one of the key tasks of financial management of cash. The most important financial indicators of company performance based on cash flows are the indicators of liquidity and solvency of the company. Among them, we wish to emphasize the following:

- Current cash debt coverage ratio
- Total cash debt coverage ratio
- Cash interest coverage ratio
- Cash dividend coverage ratio

1. *Current cash debt coverage ratio (CCDCR)* - is a newer concept of testing the company's liquidity created in the context of the fact that in a set of annual bills of the company there is also a cash flow statement. The numerator of this indicator of the company's liquidity is the net cash flow generated

from operating activities, i.e. the net cash inflow which is generated from operating activities of the company after the necessary investment into current assets and settlement of business liabilities during the accounting period. This data is taken directly from the cash flow statement and represents the difference between cash inflows and cash outflows based on operating activities. The denominator of this ratio is current liabilities (taken from the balance sheet of the previous and current reporting period) and the average current liabilities, since it is the case of the reporting period of one year. Similarly to the above, the current cash debt coverage ratio is determined by using the following formula:

$$CCDCR = \frac{\text{Net cash provided by operating activities}}{\text{Average current liabilities}}$$

The quotient of the above formula shows the company's ability to pay current liabilities, i.e. how much cash generated by operating activities covers each monetary unit of current liabilities. If the ratio is greater, it is less likely that the company will have problems with liquidity. The experience of contemporary economic practice shows that if this ratio is 40 percent or over, the company is considered liquid.

2. *Total cash debt coverage ratio (TCDCR)* is a very important indicator of the company's solvency, i.e. the ability of companies to service their liabilities from cash provided by operating activities of the company, while they do not have to liquidate assets used in business operations. The numerator of this ratio represents net cash generated from operating activities, while in the denominator is total liabilities (including long-term reserves) determined from the balance sheet of the given accounting period. Total cash debt coverage ratio is determined by using the following formula:

$$TCDCR = \frac{\text{Net cash flow from operating activities}}{\text{Total liabilities}}$$

The quotient of the above formula indicates a time period that is required to settle the total liabilities of a company, under the assumption that the whole cash flow from operating activities is directed at the settlement of debt. The lower the ratio, the higher the probability that the company will have financial problems in the future. The experience of contemporary economic practice shows that if this ratio is 20 percent or more, it is considered that the company can finance its total liabilities with cash provided by operating activities.

3. *Cash interest coverage ratio (CICR)* - is another important indicator of liquidity of the company in terms of its ability to service its liabilities. In general, this indicator is used to determine the ability of companies to make interest payments on their total debt and shows the number of times the cash outflows for interest payments were covered by cash flows from operating activities. The numerator of this ratio represents net cash inflow from operating activities plus paid interests and paid taxes. In the denominator there are paid interests on long-term and short-term liabilities. Similarly to the above, cash interest coverage ratio is determined by using the following formula:

$$CICR = \frac{\text{Net cash flow from operating activities} + \text{Paid interests} + \text{Paid taxes}}{\text{Paid interests}}$$

There is no general criterion in terms of the amount of the cash interest coverage ratio, but this is largely a matter of subjective estimates of analysts in the company. However, it is believed that this ratio should always be greater than 1. This means that if it is less than 1, an immediate risk of inability to pay overdue interest will arise, which will cause the need to obtain money to service these liabilities from external sources of financing.

4. *Cash dividend coverage ratio (CDCR)* is also one of the important indicators of liquidity of enterprises in terms of its ability to pay dividends. For this reason, shareholders are particularly interested in this financial indicator, since they are reluctant to invest money into a company that does not have sufficient cash provided from operating activities, in order to pay dividends. The numerator of this indicator consists of net cash flow from operating activities, while the denominator includes paid dividends. Similarly, the cash dividend coverage ratio is determined by using the following formula:

$$CDCR = \frac{\text{Net cash flow from operating activities}}{\text{Paid dividends}}$$

As with the previous indicator (cash interest coverage ratio) this ratio must always be above 1. However, if the quotient from above formula is less than 1, then the company will undoubtedly have to be subsequently debited so that it could settle liabilities towards shareholders from dividends.

CONSLUSION

The fact is that business conditions in the economic crisis impose an obligation for companies to increasingly take care of their liquidity or ability to timely settle their payment liabilities. In addition, this ability cannot be measured by the amount of funds that the company has at its disposal, but it can only be done through the ratio of available funds to due liabilities, in every moment of their maturity. This requires that the company's management is aware at all times of the needs of the company for cash, the amount of cash and a place where it is located. Therefore, a company's monetary management today is not only a necessity but also a particularly complex task for financial managers.

The state and dynamics of the liquidity of companies are best monitored through financial indicators, i.e. liquidity ratios. In addition, the management of liquidity in today's crisis conditions of doing business, necessarily imposes the need for the following: *first*, the acceptance of indicators (criteria) of liquidity which can be used to meet the real possibilities for maintaining the liquidity of the company; *second*, the focus of analysis of enterprise liquidity on the dynamic (contemporary) aspect, by necessarily observing the static (traditional) approach to analysis; and *third*, contemporary (broader) perception of liquidity, primarily as a function of risk management of enterprise over indebtedness in terms of the chronic lack of working capital and the chronic illiquidity that is present in the domestic economy.

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COST-BENEFIT ANALYSIS IN INVESTMENT MANAGEMENT

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ABSTRACT

In order to estimate realistically the investment process and assess the justification of realization of an investment project, it is necessary to establish and analyze the total effect brought by the realization of certain investments. The effects of an investment project can be assessed and analyzed both from the aspect of a company and from the aspect of a wider social society. Companies as investors are most often interested only in direct economic effects of an investment which can be measured with sufficient exactness and expressed in quantitative terms, whereas they are usually not interested in indirect economic effects which are harder to measure and express quantitatively. However, it should be borne in mind that some investments are such that they must be considered and assessed, first of all, from a broader aspect (e.g. in transportation system, energetics and alike). In that context, cost-benefit analysis presents the method used at making investment decisions which influence the development of broader social society – certain region, economy, society as a whole. The aim of this supplement is to point to the basic elements of cost-benefit methodology for the assessment of investment projects.

Key words: cost-benefit analysis, investments, cost, benefits, investment criteria.

INTRODUCTION

The investment process is characterized by single or multiple investments which are made in the present, but whose effects are expected in the future. In order to realistically observe and assess the justification for the realization of an investment project, it is necessary to identify and analyze the total effects that the realization of certain investments can have. Companies as investors, for the most part, are interested only in direct economic effects of investments that can be accurately measured and quantitatively expressed. On the other hand, companies are not particularly interested in indirect, non-economic effects of investments which are very difficult to accurately measure and quantitatively express. However, when assessing the justification of an investment project realization, the effects that the project has on other companies or the wider society should always be borne in mind. In this context, cost-benefit analysis (CBA), i.e. the benefit-cost analysis, represents a technique which determines, analyzes and compares total costs and benefits from a specific investment.

In cost-benefit analysis, the costs and results of an investment project are not predetermined, but the selection of projects is compared to the predetermined values of costs and results. In addition, there is a possibility that all alternatives for reaching of a development goal are to be rejected as unsatisfactory. Namely, cost-benefit analysis starts from the idea that the same effect may not be positive for the company and for society as a whole, which means that the goals of individual companies and society as a whole may not always be perfectly aligned. An investment project can bring investors significant positive economic effects, but at the same time it can be detrimental to society as a whole (e.g. due to environmental pollution,

etc.). Because of such potential differences in with respect to the individual and the social objectives, cost-benefit analysis insists on the social effects of investments, i.e. the perception and evaluation of their effects in terms of the society as a whole, and that is exactly the main feature of this method.

The basic concept of cost-benefit analysis has to take into account and calculate or assess all social benefits and costs of an investment project, and that based on comparison (weight) of the total costs and benefits its viability is assessed. Thereby, only projects where the total benefits outweigh the total costs may be perceived as positive, meaning that they are acceptable for the implementation. Therefore, no matter which of them is concerned, cost-benefit analysis requires taking into account the total costs and total benefits that the society can have from a particular investment project.

Cost-benefit analysis is carried out in a very complex manner, through methods that include identification of a large number of assumptions with regard to the exactness of the scale and evaluation of the benefits and costs, a time frame, the method for measuring and so on. However, it should be noted that the results obtained depend on the type of cost-benefit analysis. The exceptional complexity of the problem of cost-benefit analysis, as well as its adequate implementation in practice, requires knowledge of several important issues that we will discuss briefly below, namely:

- Determination of costs and benefits of an investment project;
- Evaluation of costs and benefits of an investment project;
- Basic execution phases of cost-benefit analysis;
- The criteria used in cost-benefit analysis.

DETERMINATION OF COSTS AND BENEFITS

Cost-benefit analysis is based on the concept that should be taken into account to determine, quantitatively assess and financially express all the costs and benefits that an investment project brings to the whole society. Similarly, the identification and measurement of social costs and benefits is of great importance in the application of cost-benefit analysis, but because of the many peculiarities and difficulties, it also represents the biggest problem in the whole procedure of using this method in the evaluation of investment projects. Cost-benefit analysis is used in the so-called economic analysis of projects, and it defines the contribution to total social objectives, as opposed to the so-called financial analysis which determines their effects from the point of view of a private investor.

The application of cost-benefit analysis is especially recommended by the World Bank. In this regard, it suggests that, when determining costs and benefits for the society as a whole (economic analysis) we should start from the effects which a specific project provides for the investor (financial analysis), and that through the inclusion or exclusion of certain groups of costs and benefits total results in terms of society as a whole are reached. In this regard, there are:

a) Transfer payments – refer to payments that do not involve the actual use of resources, but make them. These are repayments and interests on domestic loans, taxes, subsidies, grants and premiums. Since these payments do not represent actual spending of resources, from the standpoint of society as a whole, they should be excluded from the analysis. This is because transfer payments do not represent an economic cost, but only a financial transaction.

b) Unforeseen costs - refer to costs which may appear during the implementation of a project. In this regard, it is necessary to pre-determine the way they will be treated in the evaluation of the investment project. In addition, any unforeseen costs, which are excluded from the basic data, should be examined in the context of risk analysis and sensitivity analysis.

c) Previous costs - refer to all costs incurred before the project evaluation, and thus cannot be avoided. They should be excluded from the total cost when deciding whether or not to continue with the project since they can no longer be avoided.

d) External effects – refer to actions which are beyond the scope of the project. They should be included in the economic analysis, although they are sometimes very difficult to identify and even harder to measure.

However, regardless of whether they are quantifiable or not, they should be taken into account and a qualitative analysis should be made.

e) Multiplier effects - are typical of the economy suffering from excess capacity and in which the investment can lead to revenue growth, because the realization of investments causes additional consumption and reduces excess capacity. However, this is not typical for developing countries since they often do not have excess capacity. Multiplier effects should be included in the analysis, although they are difficult to assess.

f) International effects - refer to the results of projects beyond the borders of the observed country and are treated as international. For example, if the implementation of an investment project in one country adversely affects the environment of another country (pollution of the river), then it makes the international effects. They should be included in the analysis for certain projects, but they are difficult to assess.

EVALUATION OF COSTS AND BENEFITS

After determining all social costs and benefits of an investment project, they need to be evaluated and expressed in the monetary form. In this regard, a suitable price system that allows translating a variety of effects in monetary terms is utilized. In order to measure social effects effectuated by projects, cost-benefit analysis uses corrected market prices, which are usually called shadow prices. They are usually significantly different from market prices, which are used in the financial evaluation of the project and are not able to express all of their social effects, and therefore are not suitable for use in cost-benefit analysis. Market prices are a valid indicator of valorization of results only in conditions of perfect market. In imperfect market conditions, market prices do not present a reliable measurement of the effects of projects on development goals, and should be corrected and replaced with shadow prices. In the above context, transfer prices represent a way of correcting distortions and anomalies that exist in market prices due to imperfect markets, poor economic policy of the country, the existence of monopolies or other reasons.

Generally, shadow prices represent a principled approach to measuring and evaluating the effects of projects, while the exact way of their calculation may be different and quite complex. The basic question that should be resolved in determining shadow prices is whether there are the so-called tradable (market) or non-tradable (non-market) goods, but it depends primarily on whether these goods, merchandise or services, can be exported or imported. Tradable (market) goods are those that can realistically be imported or exported, a non-tradable (non-market) are those whose domestic production costs (including transportation costs) are too high to enable competitive exports, or too low to enable competitive imports. In other words, it is a price that is higher than FOB price for exports and lower than CIF price for imports.

There are two basic methods for determining shadow prices: (1) the Little Mirrlees method (LM method) and (2) the UNIDO method. They differ primarily according to the adopted system of prices and choice of accounting units of measure. While the LM method starts from the assumption that the world price (CIF for export, FOB for import) is a very good approximation of shadow prices, the UNIDO method determines them based on the characteristics of domestic demand and willingness of users to pay for a product or a service. The LM method is based on world prices as the basis for determining shadow prices, while the UNIDO method starts from domestic prices as the basis for determining shadow prices. However, for methodological reasons and the character of this work, we will not go into a more detailed explanation of these methods.

PHASES OF THE PROCESS OF COST-BENEFIT ANALYSIS

Cost-benefit analysis is very complex and usually quite an extensive process, with much evaluation, calculation, forecasting and comparisons. Therefore, the use of cost-benefit analysis in the assessment of investment projects requires observance of certain procedures based on several basic phases or steps. Generally, it is very similar to the general procedure of investment decision making between several alternatives, and is realized in the following ten phases:

- Definition of projects for analysis;

- Definition of the time period for which the analysis is applicable;
- The determination of all the benefits and costs for individual projects;
- The calculation of costs and benefits in the monetary form for individual projects;
- Determination of analysis criteria;
- Determination of the discount rate to be used;
- Calculation of the values of certain criteria for each project;
- Comparison of the criteria values for individual projects with a certain measure;
- Determination of the additional criteria of the analysis;
- The final choice - making investment decisions.

In the first phase, the number and types of investment projects whose justification should be examined are identified. Those can be alternative solutions of a single project (A, B or C) or a number of different projects that achieve the same developmental goal. However, cost-benefit analysis still insists on more potential projects and the selection of the best one and finds that it is necessary to start from a given development objective and identify projects, i.e. alternatives that allow the objective to be achieved.

In the second phase, the time period to which the analysis refers is defined. Therefore, the time in which certain costs and benefits are calculated should be taken. With the analysis of a number of different projects, the longest lifespan of one of them is always taken.

In the third phase, costs and benefits of each project are determined, as well as their direct and indirect, primary and secondary, and measurable and non-measurable effects. This is a very important and very complex task. Bearing in mind that the effects of the projects are very different, it is logical that the benefits and costs vary.

In the fourth phase, costs and benefits are measured, and then expressed in the monetary form. This is a very important and complex phase in which there are numerous problems. The outcome of cost-benefit analysis depends on their solution. First of all, the key problem is that prices will be used to reduce the effects expressed in the monetary form. In this regard, in spite of the various proposals and possibilities, it seems that the most acceptable solution to use is shadow prices.

It should be noted that *the third and the fourth phase* constitute the main part of cost-benefit analysis. They reflect its basic ideas and principles and it is necessary for them to be very well done so that the whole analysis could be valid. Due to the presence of many problems, these two stages are difficult and very complex, but it is necessary to perform them in the best way, because without them there is no proper cost-benefit analysis.

In the fifth phase, the criteria to find the best cost-benefit analysis are determined. There are several of those, such as: the present value of net benefits, the ratio of benefits and costs, internal rate of return and repayment period on investment. Whether all four criteria will be used, or only one of them, depends on the particular case or the specific project and the very approach to cost-benefit analysis.

In the sixth phase, the value of the discount rate used in the transformation of future values to the current value is determined. This phase is very important, given the large impact of the discount rate on the value of certain decision criteria, and thus the final decision on the project.

In the seventh phase, the actual values of individual criteria for each project are calculated. Bearing in mind the availability of mathematical apparatus and mathematical expressions for the selected criteria and the availability of all necessary input parameters, it can be concluded that the calculation of the values of certain criteria in this phase of the analysis should not be a problem.

In the eighth phase, calculated values of criteria for individual projects with predetermined normative values are compared, and a mutual comparison is also carried out. The purpose of this phase of the analysis is to find a project that has the highest value of certain criteria and determine whether their values meet the required normative sizes. This comparative analysis is used to find projects which give the best results according to the chosen criteria.

In the ninth phase, it is necessary to carry out further analysis if it is estimated that the previous phase is not sufficient to choose the best solution. In this phase it is necessary to do new calculations of existing or additional criteria, as well as make certain changes to the new analysis. In this regard, it is necessary to perform the so-called sensitivity analysis if it is considered that certain types of costs (benefits) are exposed to a higher degree of variation.

In the tenth phase, which is the last phase of cost-benefit analysis, the final selection of the best project is carried out, i.e. an investment decision on the selection of the best from the available ones is made.

THE CRITERIA USED IN COST-BENEFIT ANALYSIS CRITERIA

The basic principle of cost-benefit analysis of the project implies that a project meant for realization is justified only if the total benefits it brings are greater than the expected costs. This principle is also used in defining appropriate criteria for assessing the efficiency of investment projects, of course paying attention to the other elements which are necessary to consider in these cases. When assessing investment projects, by applying cost-benefit analysis, it is possible to use a larger number of assessment criteria. Four criteria will be presented here, namely:

1. Criterion of the net present value of a benefit
2. Criterion of the internal rate of return,
3. Benefit-cost criterion
4. Criterion of the time of return on investment.

1. Criterion of the net present value of a benefit is the difference between the discounted total benefits and total discounted costs in the realization of investment projects. Accordingly, this criterion can be expressed using the formula $K_{ns} = K_s - T_s$, where: K_{ns} is the criterion of the net present value; K_s is the total discounted benefits; T_s is the total discounted costs.

The evaluation of investment projects, using this criterion, is done in a way that each of them with a value greater than zero ($K_{ns} > 0$), is considered to be economically efficient and justified on this basis for implementation. In the selection among multiple mutually exclusive projects, most suitable for implementation is the one that has the largest positive value of the criterion of the net present value of benefit. As an indicator which operates with absolute values, costs and benefits, this criterion is much more suitable for the assessment of individual projects, rather than for selecting one among multiple investment alternatives. Namely, in the evaluation of the validity of a project there are no major interferences in the decision because the decision-maker relies on a positive net present value of the benefit. However, when choosing between multiple projects, there are observed differences and further factors of influence are taken into account, which in turn greatly hinders the application of this criterion.

2. Criterion of the internal rate of return represents the discount rate at which the sum of the discounted benefits is equal to the sum of discounted costs, i.e. its net present value of the benefit is equal to zero. Defining this criterion can be expressed by the following form: $K_{ns} = K_s - T_s = 0$.

Evaluation of investment projects using this criterion is performed in a way that each project, in which the size of the internal rate of return is higher than the interest rate on the capital market (or than the adopted discount rate), is considered reasonable and economically justified for implementation. If it is a choice between several mutually exclusive projects, in principle, the one that has a higher internal rate of return is considered to be more favorable. However, this postulate is rarely applied in practice, because it is considered that the criteria of internal rate of return are not suitable for selecting and deciding between several projects. In addition, the calculation of internal rate of return is quite a complicated operation which is the biggest obstacle to the application of this criterion in practice.

3. Benefit-cost criterion is expressed, in fact, with the ratio of their mutual relations and represents, quantitatively speaking, relations of the total discounted benefits and discounted costs of such an investment project. The ratio of benefits and costs shows how many benefit units are brought by each unit of the funds spent. Defining this criterion can be represented by the following form: $K = K_s / T_s$.

Evaluation of investment projects using this criterion is performed in a way that each project in which the value of this criterion (benefit-cost ratio) is greater than 1 ($K > 1$) is considered to be economically efficient and justified on this basis for implementation. When selecting among multiple mutually exclusive projects, the most suitable one for implementation is the one which has the highest benefit-cost ratio. This criterion is quite suitable for use in practice, especially for switching between multiple projects and it should be used in these cases. It is not sensitive to the different structure of benefits and costs, and in such cases it is more realistic in relation to the criterion of the present value of net benefits. Therefore, it is preferable when selecting between multiple investment projects.

4. *Criterion of the time of return on investment* is a period expressed in years, for which the present value of net benefits from the investments will pay off the total funds invested. Defining this criterion in the above sense, can be represented using the $t = I_s / K_{sk}$ where: t - time limit for the return of investment; I_s is the present value of total investments; K_{sk} is the annual discounted value of net benefits.

Evaluation of investment projects by using this criterion is performed in a way that each of them is considered to be economically effective and thus justified for the realization if its repayment period is shorter than any pre-determined, normative return period. The normative return period can be approximately represented by the economic life of the equipment installed in the investment. In the case of opting for one among several mutually exclusive projects, priority shall be given to the one with the shortest period of return. It should be said that the test time of the return of investment can be used for evaluation of projects, but it happens only in the case of the same projects or projects with multiple variants of the same one. In other cases, this criterion is unreliable because its drawbacks become apparent, since it does not account for the entire period of exploitation of investment projects.

CONCLUSION

This paper gives a brief overview of the basic elements of cost-benefit methodologies for the assessment of the economic feasibility of investment projects. No matter what the project concerned is cost-benefit analysis requires taking into account total benefits and costs that society has from them. The basic idea of cost-benefit analysis has to take into account, calculate and evaluate all social benefits and costs of a project, and then based on a comparison of total costs and benefits assess the validity or profitability of a specific investment. Given that the importance and complexity of this methodology requires a systematic and serious work in the field of training of human resources in science, economy, banking, etc. A wider application of this methodology in practice requires a time-consuming process that should lead to an improvement of the situation in the field of investment in our country, especially to improve the efficiency of investment projects of broader social significance (investment projects in energy, water management, agriculture, etc.).

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IDENTIFYING THE CONSTRAINTS OF SMALL AND MEDIUM SIZED ENTERPRISES COMPETITIVENESS IN BOSNIA AND HERZEGOVINA

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ABSTRACT

Primary research has been carried out to identify the constraints to small and medium sized enterprises (SMEs) competitiveness in Bosnia and Herzegovina (B&H). Primary data used in this study were collected from SMEs in the different sub-industries. A rigorous pattern was applied for collecting the data, between others, the selected enterprises must be: SMEs (with not more than 150 employees); in major business performances longer than three years; and directed by the owner or manager. A survey was conducted with in aid of a predetermine questionnaire. A total of 284 SMEs all over the B&H participated in the study. The main constraints are identified and classified into three groups. Factor analysis was used in identifying the extracted factors that express constraints to the growth of SMEs competitiveness. Recommendations can be useful for public (government), private (business) and social (non-profit) sector.

Key words: Competitiveness, constraints, SMEs, Bosnia and Herzegovina

INTRODUCTION

The paper aim is focusing on the factors constraining the competitiveness of small and medium sized enterprises (SMEs) development in B&H. Recognizing the constraints facing SMEs survival in B&H which is a crucial step in avoiding the breakdown of this crucial sector has obligated the author to research this topic which is important in terms of the growth of SMEs. SMEs growth is also a deliberate obligation taken by B&H's government to develop this sector as an important part of an economy. However, a large number of SMEs in B&H are struggling to survive in today's competitive surroundings, since most SMEs are challenged with a number of constraints in their exploration for competitiveness. To remove these constraints, the government, business and non-profit sectors should comprehend and investigate the existing constraints to SMEs competitiveness, in order to give useful solutions to obstacles extraction.

THEORETICAL BACKGROUND: SMALL AND MEDIUM SIZED ENTERPRISES COMPETITIVENESS CONSTRAINTS

The concept of small and medium sized enterprises competitiveness nas been developed since the discussion of issues related to the role of SMEs to economic development (Capó-Vicedo, Expósito-Langa & Molina-Morales, 2007, Gunasekaran, Rai, & Griffin, 2011). Regardless of the stage of economic development, small and medium sized enterprises (SMEs) establish and persist to be a main source of economic growth (Hyz, 2011; Hessels & Parker, 2013). SMEs are crucial for the achievement of creation of new jobs, economic development and social stability. An expanded literature review was the major step to identify constraints for SMEs competitiveness. According to Trianni and Cagno (2012), there are the various potential constraints faced by SMEs, but they especially emphasize information constraints to SMEs'accessibility and the information needed for

business growth. Deficiency of information about market opportunities, technology alteration is viewed as other constraints to SMEs innovation (Kamalian et al., 2011). Information about a SMEs external climate, such as market opportunities, technology alteration, and government policies help enterprises to become more competitive (Guijarro, Garcia, & Auken, 2009). According to Okpara and Kabongo (2009) deficiency of management experience and difficulties with infrastructure development are major constraints to SMEs competitiveness. Today's business surrounding is characterized by corruption and unfair competition that often jointly obstruct SME growth. Additionally, corruption as a socioeconomic phenomenon is one of the main constraint in transition countries, causing damage to the economy and society. Okpara and Kabongo (2011) discovered that the most common constraints that obstruct SMEs growth and survival are: corruption, and low demand for product and services. Wieneke and Gries, (2011) underline the two prominent constraints for SMEs: corruption and finance.

APPLIED METHODOLOGY: FACTOR ANALYSIS OF THE CONSTRAINTS OF SMEs COMPETITIVENESS IN BOSNIA AND HERZEGOVINA

Primary data were collected by interviewing the rules of random sampling. A survey was conducted with in aid of a predetermine questionnaire. The main structural characteristics of the sample of 284 SMEs in B&H are the following:

- In terms of ownership status, 227 SMEs in majority domestic ownership, 25 in mixed (50%: 50%) and 32 with majority foreign ownership.
- In terms of regional distribution, 115 SMEs from the northern, central and 101 from 68 in the southern parts of the country.
- In terms of how organizations, 236 SMEs are limited liability companies and 20 are joint stock companies. Others are limited partnerships, limited partnerships and entrepreneurs (28).
- In terms of dominant market orientation, 75 SMEs are predominantly export-oriented (export accounts for 50% or more of their turnover) and 209 are predominantly oriented to the domestic market.
- Questionnaire is reliable in a sectoral and geographic way.

The essential for the utilization of factor analysis is that the data are evaluated on interval scale. Applicants had to evaluate each particularized declaration, where 1 means "completely disagree" and 7 "strongly agree". Despite the scale is ordinal, it can be deliberated, and if the interval is based on the premise that the intervals on a scale are equal. In many empirical investigations ordinal scale is used, but it is typical that the collected data are examined as if they were collected on interval scale. In this paper data were examined on interval scale. Factorial analysis was conducted in following steps:

- appropriate examination of the data for the applicance of factor analysis,
- establishing the initial results for the extraction of factors,
- creating the matrix of the factor structure and the concluding results after factors extraction,
- application of the factors rotation if the initial matrix of the factor structure is not interpretable,
- resolving the factor matrix and the complete results after the rotation of factors and
- explanation of extracted factors afterward rotation.

Factor analysis of small and medium sized enterprises competitiveness in B&H was performed on set of original variables. Matrix of correlation coefficients of simple linear correlation of each combination of variables is the foundation for the application of factor analysis. Requirements for factor analysis application is the correlation between the original variables, which is the ground for determining a set of relevant variables in the correlation matrix. The correlation matrix of original variables revealed a correlation among particular variables. Exploration of the correlation matrix has proved the rightness of the data for the factor analysis utilization. Kaiser-Meyer-Olkin measure following the criteria by which we research the appropriateness of the data for the use of factorial analysis. The value of the Kaiser-Meyer-Olkin scope (K) is estimated by utilizing the next formula:

$$K = \frac{\sum_{\substack{i=1 \\ i \neq k}}^p \sum_{k=1}^p r_{ik}^2}{\sum_{\substack{i=1 \\ i \neq k}}^p \sum_{k=1}^p r_{ik}^2 + \sum_{\substack{i=1 \\ i \neq k}}^p \sum_{k=1}^p q_{ik}^2}, 0 \leq K \leq 1$$

where, r_{ik}^2 , ($i \neq k$) correlation coefficient square among the variables i and k , q_{ik}^2 , ($i \neq k$) square partial correlation coefficient among the variables i and k . Kaiser-Meyer-Olkin (K) is spreaded in the locked interval, from 0 to 1. If the value of this quota is less than 0.5, the correlation matrix is not appropriate for factorial analysis. Kaiser-Meyer-Olkin measure calculated based on the previous formula is 0.891. The value of the KMO scope affirms that the data on the constraints of SMEs competitiveness are acceptable for application of factor analysis. In addition to the value of the KMO measure can be calculated for the entire matrix and individual variables. Kaiser-Meyer-Olkin for particular variable (s) are estimated using the following formula:

$$k_i = \frac{\sum_{\substack{k=1 \\ k \neq i}}^p r_{ik}^2}{\sum_{\substack{k=1 \\ k \neq i}}^p r_{ik}^2 + \sum_{\substack{k=1 \\ k \neq i}}^p q_{ik}^2}, 0 \leq k_i \leq 1, i=1,2,\dots,p.$$

By estimating the Kaiser-Meyer-Olkin scope, based on the earlier formula, could be tested the appropriateness of individual variable in the analysis and can not reject the variables without adequate value. This increases the value of the Kaiser-Meyer-Olkin measure of the whole matrix. Factorial analysis of principal components (PCA) was applied in this research. PCA is grounded on the total variance, and does not discriminate the ordinary and specific variance before contraction of variables in the factors. As a result extracted factors involve specific variance. The support for the factor analysis application is completed correlation matrix, where the total initial communalities are used, and the principal diagonal of the correlation matrix are units. Subsequently the orthogonal conversion of variables is resolved.

RESEARCH RESULTS: IDENTIFIED CONSTRAINTS OF SMEs COMPETITIVENESS IN BOSNIA AND HERZEGOVINA

Considering the principal diagonal of the correlation matrix which is examined for initial communalities, the total amount of the initial communality is balanced to the number of variables. Though the primary value of particular factor is detached by the sum of eigenvalues, ie. the number of variables and multiplied by one hundred, a percentage of the total variance of that factor (p_j) will be disposed as outcome:

$$p_j = \frac{\lambda_j}{p} * 100, j=1,2,\dots,n.,$$

where λ_j is the constitutional value of specific factors ($j = 1,2, \dots, n$), and p is the sum of eigenvalues.

$$p_1 = \frac{9,986}{16} * 100 = 62,411$$

Calculated results detected that the percentage of variance clarified by three extracted factors is 84,996. Communalities (h_i^2) of confident variables demonstrate how much of variance is revealed by these common factors of variables. It is estimated as the total amount of squares of factor loadings crosswise entire hidden factors for certain variable:

$$h_i^2 = \sum_{j=1}^m \lambda_{ij}^2, i=1,2,\dots, p.,$$

where λ_{ij} is the factor loading of variables i and common factor j . For instance, the distribution of interpreted variance by common factors of variable 1 and communality of that variable is equivalent to:

$$h_1^2 = 0,966^2 + 0,042^2 + 0,046^2 = 0,937$$

Table 1. exposes the factor structure matrix of the 16 variables afterwards determining varimax rotation of factors. The results exhibit that the structure of factor loadings is improved, which was not the case with the unrotated matrix. The form of factor loadings after rotation admits improved perception of the factors correlated to the primary factor matrix.

Table 1: Factor structure matrix after Varimax rotation of factors (constraints of SMEs competitiveness in B&H)

Variables	1. Factor	2. Factor	3. Factor	Communality
1. Inadequate ICT infrastructure	0,847	0,364	0,294	0,937
2. The quality of road infrastructure	0,836	0,400	0,265	0,929
3. The quality of railway infrastructure	0,827	0,462	0,140	0,917
4. The lack of government measures to support employment	-0,004	0,889	0,249	0,852
5. Protecting the interests of minority shareholders	0,891	0,308	0,227	0,941
6. The inefficiency of the state administration	0,920	0,225	0,171	0,925
7. The quality of human resources	0,326	0,863	-0,085	0,858
8. Government instability	0,934	0,191	0,132	0,926
9. Lack of financial support to SME development	0,133	0,897	0,295	0,908
10. The quality and cost of telecommunications	0,674	0,100	0,202	0,504
11. Political instability	0,970	0,133	-0,037	0,960
12. Corruption	0,979	0,076	-0,056	0,968
13. Tax regulations	0,433	0,319	0,655	0,718
14. Inefficacy of corporate boards	0,886	-0,028	0,075	0,791
15. The quality of air transport infrastructure	0,690	-0,123	0,302	0,583
16. Tax rates	0,084	0,177	0,919	0,882

Source: Calculations by the author.

Total amount of factor loadings squares of particular variables is equivalent to the communality of these variables. E.g. communality of the first variable afterwards rotation of factors is corresponding to:

$$h_1^2 = 0,847^2 + 0,364^2 + 0,294^2 = 0,937$$

Table 2: Results of applied factor analysis for constraints of SMEs competitiveness in B&H

Factors	Variables	Factors			Communality	
		1	2	3	Initial	Extracted
F1 The institutional and non-institutional infrastructure	Corruption	0,979			1,000	0,968
	Political instability	0,970			1,000	0,960
	Government instability	0,934			1,000	0,926
	The inefficiency of the state administration	0,920			1,000	0,925
	Protecting the interests of minority shareholders	0,891			1,000	0,941
	Inefficacy of corporate boards	0,886			1,000	0,791
	Inadequate ICT infrastructure	0,847			1,000	0,937
	The quality of road infrastructure	0,836			1,000	0,929
	The quality of railway infrastructure	0,827			1,000	0,917
	The quality of air transport infrastructure	0,690			1,000	0,583
	The quality and cost of telecommunications	0,674			1,000	0,504
F2 The institutional framework and regulations	Lack of financial support to SME development		0,897		1,000	0,908
	The lack of government measures to support employment		0,889		1,000	0,852
	The quality of human resources		0,863		1,000	0,858
F3 Tax rates and tax regulations	Tax rates			0,919	1,000	0,882
	Tax regulations			0,655	1,000	0,718

Source: Calculated by author on the basis of questionnaire.

Observing orthogonal rotation of factors, total amount of factor loadings squares of particular variables afterwards rotation should be equivalent to total sum of the squares of these factor loadings analyzed before the rotation:

$$\sum_{j=1}^m \lambda_{ij}^2 = \sum_{j=1}^m \lambda_{ij}^{*2}, \quad i=1,2,\dots,p.,$$

wherein the factor loading of variable i and common factors j before the rotation of factors, and λ_{ij}^{*2} is factor loading of variable i and common factor j after rotation of factors. Comparing the results presented in Table 1 and Table 2 affirms that the communality after rotation of factors are equal before the communality implemented rotation. Explanation of factors beginning from the factor structure matrix afterward the rotation factors and identifying the variables that possess high absolute loading on the same factor. In the process of rotating the factors, three iterations were conducted. In the rotated results, three factors fulfill the criteria eigenvalues and the percentage of total variance criterion. The structure of factor loadings after the accomplishing the rotation presents improved comprehension of the factors in correlation with original factor matrix. It can be concluded that the three extracted factors and associated variables for each factor and their factor loadings: 1. The first factor is called "Institutional and non-institutional infrastructure" and consists of the following variables: Corruption (0,979), Political instability (0,970), Government instability (0,934), The inefficiency of public administration (0,920), Protection of the interests of minority shareholders (0,891), The inefficiency of corporate boards (0,886), Inadequate ICT infrastructures (0,847), The quality of road infrastructure (0,836), The quality of railway infrastructure (0,827), The quality of air transport infrastructure (0,690), The quality and cost of telecommunications (0,674). 2. The second factor is called "The institutional framework and regulations" and consists of the following variables: Lack of financial support to SME development (0,897), The lack of government measures to support employment (0,889), The quality of human resources (0,863). 3. The third factor is called "Tax rates and tax regulations" and consists of the following variables: The tax rates (0,919) and Tax regulations (0,655).

CONCLUSION

Concerning to identify constraints of SMEs competitiveness in B&H, factorial analysis was conducted. Results indicate that enhancing SME competitiveness depends on: 1) Institutional and non-institutional infrastructure and its variables: Corruption, Political instability, Government

instability, The inefficiency of public administration, Protection of the interests of minority shareholders, The inefficiency of corporate boards, Inadequate ICT infrastructures, The quality of road infrastructure, The quality of railway infrastructure, The quality of air transport infrastructure, The quality and cost of telecommunications. 2) The institutional framework and regulations (Lack of financial support to SME development, The lack of government measures to support employment, The quality of human resources), 3) Tax rates and tax regulations. It is necessary to analyze the result of governmental and international programs for supporting the development of infrastructure of advisory service institutions to SMEs, and then determine the strategy of development for SMEs. In addition to strengthening road, rail, shipping and aviation infrastructure through improving the quality of regional transport networks, it is necessary to strengthen the business infrastructure. It is therefore necessary to improve the business infrastructure: stimulating export orientation of SMEs, and the development of legal and institutional framework for effective implementation of policies. Technology transfer and support for the newly established knowledge-based SMEs, aimed to increasing the competitiveness of the economy by improving the conditions for the development of innovation and collaboration within the business sector.

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THE ASSESSMENT OF INVESTMENT'S ACTIVITY LEVEL IN CENTRAL BLACK EARTH REGIONS OF RUSSIA

UDC: 330.322(47-15)''2005/2014''

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ABSTRACT

Our aim is to examine the level of region's investment activity and analyze the dynamics of constituent entities' investment activity of the Russian Federation making up the Central Black Earth region (CBE). In order to analyze the investment activity, we used a two-component structure of indices. The article shows the quantitative characteristics of innovation activity in the Central Black Earth regions in 2005-2014. On the basis of this study, we have determined the level and dynamics of investment activity in the Central Black Earth regions and proposed recommendations for increase of investment activity in the Voronezh Oblast. The estimation of the investment activity level in the CBE regions included the following stages: standardization of selected indices of investment activity in attraction and using of investments, calculation of the integral index of investment activity in both fields, calculation of the general estimation of investment activity in the CBE regions. During the period in question (2005-2014) the leader has changed: in 2005 it was the Lipetsk Oblast, but in 2014 – the Voronezh Oblast.

Key words: investments, investment activity, region, Central Black Earth region.

INTRODUCTION - DEBATABLE POINTS IN CATEGORICAL FIELD

Investing is a very important thing in fundamental socioeconomic processes of regional development. The Federal Law of the Russian Federation 'On Investment Activity in the Russian Federation Pursued in the Form of Capital Investments' dated February 25, 1999 No. 39-FZ contains the following definition: investment activity is pursuing of practical actions with a view to realize profit and (or) achieve other useful effect (The federal law, 2000). In fact, this interpretation of investments is close to the one that was earlier proposed by J.-B. Say (investments represent a part of monetary resources of the society aimed at productive goals (Say, 2000). G. Friedman and N. Ordway think that investments represent placement of funds in order to derive revenue or profit and property purchased to derive revenue or profit (Friedman, 1995). Though these wordings are generally similar, here is a distinct notion of 'placement' representing not a combination of actions, but their specific content connected with purchasing of means of production.

J.B. Clark divided tangible and monetary form of means of labour by showing that the former should be lost in order to ensure reproduction of the latter (Clark, 1992). K. Marx demarcated investments in fixed and variable capital (Marx, 1978). He thought that investment in fixed capital was a pre-requisite for investments in variable capital (manpower) ensuring direct increase in advanced value. J.M. Keynes divided investments into two groups: current and net investments. Keynes' net investments represent net increase in capital property (Keynes, 1993). K. McConnell and L. Brue think that investments represent production costs and accumulation of means of production, as well as increase in inventories (McConnell et al., 2003). Various aspects of categorical apprehension are considered by Y. Treshchevsky and V.

Krugliakova (Treshchevsky et al., 2016); G. Podshivalenko (Podshivalenko, 2006). The general idea is that investments represent fixed capital formation.

Quantitative condition depends on a combination of quantitative characteristics. Measuring of quantitative characteristics with the use of a system of indices allows us to identify the level of investment activity achieved in a particular constituent entity of the Russian Federation. The dynamic aspects of investments are highlighted by D. Yendovitsky, Y. Treshchevsky, V. Krugliakova (Yendovitsky et al., 2010). At present, the overwhelming majority of indices and indicators are oriented at estimation of investment attractiveness, investment climate and investment potential of particular regions. Indices used for measuring of investment activity are almost absent.

We think it is necessary to pay attention to a viewpoint expressed by D. Krutskikh (Krutskikh, 2008) who offers to present the composition of investment activity indices in the form of two blocks. The first block includes indices reflecting the activity of constituent entities in the field of investments' attraction. Indices of the second block reflect the meaningful results of development of regional socioeconomic system with high level of correlation to parameters of investment activity 'output'.

DYNAMICS OF ACTIVITY INDICES OF INVESTMENT IN REGIONS OF CENTRAL FEDERAL DISTRICT (CFD) AND CENTRAL BLACK EARTH REGION (CBE)

The composition of regional investment activity, as think D. Krutskikh, indices includes: Volume of fixed investments, Volume of fixed investments per capita, Volume of public investments per capita, Gross regional product (GRP), GRP per capita, Number of advanced production technologies created and used, Volume of innovation products, works and services in the overall volume. Analysis of dynamics of fixed investments by constituent entities of the Central Federal District is shown in Table 1 (ROSSTAT, 2015).

Table 1: Dynamics of fixed investments by constituent entities of the CFD (million RUB)

Subjects	Years					
	2005	2010	2011	2012	2013	2014
Russian Federation	3611109	9152096	11035652	12586090	13450238	13557515
Central Federal District	964158	2099824	2458312	2961584	3331629	3435974
Belgorod Oblast	35022	96313	125994	136820	129405	120391
Bryansk Oblast	8496	41989	48014	46551	60864	66825
Vladimir Oblast	17327	50088	59769	61013	65354	75667
Voronezh Oblast	28652	125826	155245	182334	216983	243260
Ivanovo Oblast	12068	29961	32373	28762	33938	29803
Kaluga Oblast	13624	74489	77354	95970	98084	99786
Kostroma Oblast	14083	15100	17648	21169	22264	27513
Kursk Oblast	17864	46093	58521	66639	71546	71743
Lipetsk Oblast	30312	101600	112531	93327	101093	110101
Moscow Oblast	181260	394284	449666	516872	587645	594495
Oryol Oblast	9610	21451	34072	40429	43741	44931
Ryazan Oblast	23629	40622	53163	66705	75531	58210
Smolensk Oblast	14371	48833	56872	56435	55931	56747
Tambov Oblast	14698	53980	68302	82921	98227	112713
Tver Oblast	23845	82618	94276	80464	80536	74491
Tula Oblast	20804	71526	77703	84059	91046	95435
Yaroslavl Oblast	42466	72291	80386	81019	86348	76492
Moscow	456025	732761	856424	1220097	1413094	1477372

The leader is the city of Moscow, though its share in the overall volume of investments has slightly decreased – from 47.3% in 2005 to 43% in 2014. We can see that in 2005-2014 all the constituent entities of the Central Federal District were characterized by the upward (but very diverse) trend of changes in volumes of fixed investments. Dynamics of GRP are shown in Table 2 according to the official source (ROSSTAT, 2015).

The leading regions with GRP growth rates higher than average for the Central Federal District (3 times) are: Moscow Oblast, Tambov Oblast, Belgorod Oblast, Kaluga Oblast and Voronezh Oblast.

Volumes of gross regional product per capita are shown in Table 3 (ROSSTAT, 2015).

Table 2: Dynamics of gross regional product by constituent entities of the CFD (million RUB)

Subjects	Years				
	2005	2010	2011	2012	2013
Central Federal District	6278359,2	13444440,1	16062123,8	17432294,6	18975900,1
Belgorod Oblast	144987,8	398361,4	507839,8	545517,2	569414,1
Bryansk Oblast	66692,3	147024,0	174211,8	207397,5	223324,3
Vladimir Oblast	86926,8	224759,2	261222,6	286018,6	307486,0
Voronezh Oblast	133586,6	346568,2	474973,9	563965,4	606667,7
Ivanovo Oblast	44415,4	109884,5	128905,4	136115,0	157735,1
Kaluga Oblast	70953,9	188601,3	234749,0	285256,6	293433,8
Kostroma Oblast	44684,7	98130,7	116629,8	130840,4	143108,2
Kursk Oblast	86624,9	193648,6	228851,4	248213,1	272238,0
Lipetsk Oblast	145194,4	248544,9	287816,8	293301,3	314790,4
Moscow Oblast	708062,1	1832867,3	2176795,3	2357081,9	2551284,2
Oryol Oblast	53181,9	106196,7	131198,2	146103,2	164525,8
Ryazan Oblast	84382,7	179127,9	214142,6	253881,6	278731,8
Smolensk Oblast	65525,6	154681,1	180811,5	201817,0	225594,8
Tambov Oblast	63614,8	143902,4	173283,1	203331,5	235859,7
Tver Oblast	96897,4	219004,9	255073,0	268063,9	291408,1
Tula Oblast	116221,2	237629,2	279879,3	311240,3	347060,2
Yaroslavl Oblast	131252,1	239644,0	286967,5	327279,6	360731,5
Moscow	4135154,6	8375863,8	9948772,8	10666870,5	11632506,4

Table 3: Dynamics of GRP per capita by constituent entities of the CFD (RUB)

Subjects	Years				
	2005	2010	2011	2012	2013
Central Federal District	164887,9	350204,2	417288,1	451517,2	489708,3
Belgorod Oblast	95911,2	260015,6	331010,0	354570,6	369139,1
Bryansk Oblast	49923,4	114777,6	137187,1	164726,6	178926,9
Vladimir Oblast	58261,0	155494,2	181842,6	200456,4	216916,6
Voronezh Oblast	56534,5	148432,6	203575,5	241947,4	260409,5
Ivanovo Oblast	40039,1	103280,0	121945,5	129448,3	150791,8
Kaluga Oblast	69192,2	186347,8	232722,0	283299,9	291955,0
Kostroma Oblast	63304,4	146536,9	175626,6	198142,5	217606,0
Kursk Oblast	72995,3	171322,1	203676,0	221537,3	243267,5
Lipetsk Oblast	121376,2	211610,6	246213,8	251960,8	271125,4
Moscow Oblast	104738,3	259421,5	304342,6	336650,6	359799,4
Oryol Oblast	64180,4	134533,8	167464,9	187659,7	212867,4
Ryazan Oblast	70665,8	154844,8	186187,2	221430,1	243913,8
Smolensk Oblast	63687,0	156567,3	184184,9	206391,7	232202,8
Tambov Oblast	55573,9	131456,7	159543,0	188418,7	219948,4
Tver Oblast	68048,7	161305,0	189484,3	200327,2	219160,7
Tula Oblast	71587,4	152571,7	180866,3	202302,5	227287,4
Yaroslavl Oblast	99335,1	187875,5	225777,7	257426,7	283656,6
Moscow	381997,1	730774,2	859355,1	895017,9	965842,7

The leading regions with GRP growth rates per capita higher than average for the Central Federal District (3 times) include: Belgorod (3,8 times), Ivanovo (3,8 times), Tambov (4 times), Kaluga (4,2 times) and Voronezh (4,6 times) Oblasts. Data about the number of advanced production technologies as an important result of investment activity are shown in Table 4 (ROSSTAT, 2015).

The number of regions generating the great bulk of new production technologies did not change throughout the selected time frame (2005-2014), however the dynamics are very irregular. The number of advanced production technologies is shown in Table 5 (ROSSTAT, 2015).

The number of regions introducing the bulk of advanced production technologies is quite limited. Thus, in 2005 the regions (without Moscow) with this index above the average for the CFD (the average value – 2095.6) included: Kaluga, Moscow and Tula Oblasts. In 2014 (the average value for CFD – 2938.0) these were Vladimir, Lipetsk, Moscow and Tver Oblasts.

Table 4: Advanced production technologies developed in regions of the CFD

Subjects	Years					
	2005	2010	2011	2012	2013	2014
Central Federal District	200	361	411	382	509	429
Belgorod Oblast	16	10	13	19	12	10
Bryansk Oblast	-	5	9	9	7	7
Vladimir Oblast	11	-	9	7	3	11
Voronezh Oblast	11	21	19	9	59	31
Ivanovo Oblast	-	-	8	10	11	1
Kaluga Oblast	4	26	34	42	65	29
Kostroma Oblast	1	2	1	5	1	-
Kursk Oblast	1	-	1	3	2	-
Lipetsk Oblast	-	-	2	1	1	2
Moscow Oblast	32	66	123	68	101	70
Oryol Oblast	8	5	2	-	-	-
Ryazan Oblast	-	1	2	2	7	5
Smolensk Oblast	2	2	1	1	2	9
Tambov Oblast	-	-	-	-	-	-
Tver Oblast	1	3	3	2	5	5
Tula Oblast	3	10	2	13	7	7
Yaroslavl Oblast	7	5	8	18	29	37
Moscow	103	205	174	173	197	205

Table 5: Advanced production technologies used in regions of the CFD

Subjects	Years					
	2005	2010	2011	2012	2013	2014
Central Federal District	46683	68945	63078	62796	60829	65591
Belgorod Oblast	550	1215	1030	1614	1421	1837
Bryansk Oblast	690	1021	1066	1221	1225	1281
Vladimir Oblast	1653	2972	3239	3211	3310	3446
Voronezh Oblast	1805	2293	1755	1666	1897	1974
Ivanovo Oblast	432	512	486	624	744	856
Kaluga Oblast	2130	4858	2316	2094	2057	2130
Kostroma Oblast	1027	1623	1069	1302	1541	1634
Kursk Oblast	1341	1525	1588	1571	1314	1323
Lipetsk Oblast	646	2212	2265	2511	3653	3174
Moscow Oblast	12771	11686	15159	14310	14458	17174
Oryol Oblast	1013	1377	1471	1424	1479	1559
Ryazan Oblast	390	528	1076	1032	1362	1311
Smolensk Oblast	1262	1076	1171	1302	1252	1278
Tambov Oblast	1336	2086	2248	2005	1966	2069
Tver Oblast	1501	2488	2394	2746	3356	3761
Tula Oblast	5678	8185	4898	3540	2123	2250
Yaroslavl Oblast	1401	3267	2642	2675	2841	2889
Moscow	11057	20021	17205	17948	14830	15645

Using these and other statistical data, we have estimated the level of investment activity in CBE regions. The average value for the CFD was 1.0. Designations of the calculated indices are: Volume of fixed investments - X1, Volume of fixed investments per capita - X2, Volume of public investments per capita - X3, GRP - X4, GRP per capita - X5, Number of advanced production technologies created - X6 and used - X7, Volume of innovation products, works and services in the overall volume - X8. Standardized values of particular indices of investment activity in attraction and using of investments by constituent entities of CBE are shown in Tables 6 and 7.

In 2005 the best volume of fixed investments was in the Belgorod Oblast, in 2014 - in the Voronezh Oblast. The best value in the volume of fixed investments per capita in 2005 was in the Lipetsk Oblast, in 2014 - in the Kursk Oblast. The highest value in the volume of public investments per capita in 2005 was shown by the Lipetsk Oblasts, in 2014 - by the Voronezh Oblast.

The Belgorod and Lipetsk Oblasts were the leaders in terms of gross regional product in 2005, in 2014 - the Voronezh Oblast. In terms of gross regional product per capita in 2005 it was the Lipetsk Oblast, in

2014 – the Belgorod Oblast. In terms of number of advanced production technologies created in 2005 – the Belgorod Oblast, in 2014 – the Voronezh Oblast. In terms of number of advanced production technologies used in 2005 – the Voronezh Oblast, in 2014 – the Lipetsk Oblast. The leader in terms of volume of innovation products, works and services in the overall volume of shipped goods, performed works and rendered services in both 2005 and 2014 was the Lipetsk Oblast. The integral index of investment activity in attraction of investments is shown in Table 8.

Table 6: Standardized values of indices of investment activity in attraction of investments by constituent entities of CBE

Subjects	Indices					
	X1		X2		X3	
	2005	2014	2005	2014	2005	2014
Belgorod Oblast	0,069	0,061	1,239	1,207	1,261	0,823
Voronezh Oblast	0,056	0,124	0,649	1,064	0,731	2,793
Kursk Oblast	0,035	0,037	0,805	1,426	0,991	0,877
Lipetsk Oblast	0,060	0,056	1,356	0,876	1,379	0,847
Tambov Oblast	0,029	0,058	0,687	0,800	0,958	1,856

Table 7: Standardized values of indices of investment activity in using of investments by constituent entities of CBE

Subjects	Indices									
	X4		X5		X6		X7		X8	
	2005	2014	2005	2014	2005	2014	2005	2014	2005	2014
Belgorod Oblast	0,068	0,078	1,217	1,343	0,165	0,045	0,015	0,037	0,026	0,043
Voronezh Oblast	0,062	0,083	0,717	0,947	0,113	0,138	0,051	0,040	0,077	0,046
Kursk Oblast	0,040	0,037	0,926	0,885	0,010	0,000	0,038	0,026	0,017	0,025
Lipetsk Oblast	0,068	0,043	1,540	0,986	0,000	0,009	0,018	0,064	0,083	0,117
Tambov Oblast	0,030	0,032	0,705	0,800	0,000	0,000	0,038	0,041	0,012	0,012

Table 8: Values of integral index of investment activity in attraction of investments

Subjects	Values of integral index	
	2005 г.	2014 г.
Belgorod Oblast	0,856	0,697
Voronezh Oblast	0,479	1,327
Kursk Oblast	0,610	0,780
Lipetsk Oblast	0,932	0,593
Tambov Oblast	0,558	0,905

In 2005-2014 there were considerable changes in development of investment activity in attraction of investments. In 2005, the leader was the Lipetsk Oblast, in 2014 – the Voronezh Oblast (by a significant margin), which outpaced the Tambov Oblast (ranking second) by 1.5 times. There is also some increase in the level of asymmetry between regions: in 2005, the gap between the minimum and the maximum values of the integral index of investment activity in attraction of investments was 1.9 times, while in 2014 it was 2.2 times. Values of integral indices of investment activity in using of investments in CBE regions are shown in Table 9.

Table 9: Values of integral indices of investment activity in using of investments

Subjects	Values of integral index	
	2005 г.	2014 г.
Belgorod Oblast	0,289	0,309
Voronezh Oblast	0,204	0,251
Kursk Oblast	0,206	0,195
Lipetsk Oblast	0,342	0,244
Tambov Oblast	0,157	0,177

Belgorod, Lipetsk, Kursk and Voronezh Oblasts were the leaders in 2005, in 2014 – Belgorod, Lipetsk and Voronezh Oblasts. Thus, we can say that the composition of leaders in both periods was stable. The level of asymmetry between regions is decreasing: in 2005, the gap between the minimum and the maximum values of the integral index was 2.2 times, in 2014 – 1.7 times. The final estimate of investment activity in CBE regions is shown in Table 10.

Table 10: General estimation of investment activity in constituent entities of the CBE region

Subjects	Values of integral index	
	2005 г.	2014 г.
Belgorod Oblast	0,573	0,503
Voronezh Oblast	0,342	0,789
Kursk Oblast	0,408	0,488
Lipetsk Oblast	0,637	0,419
Tambov Oblast	0,358	0,541

CONCLUSIONS

In 2005-2014 the leader had changed: in 2005 it was the Lipetsk Oblast, in 2014 – the Voronezh Oblast. Investment activity in the Voronezh Oblast increased 2.3 times as compared to 2005. In 2014 this oblast was leading by a significant margin and outpacing the Tambov Oblast (ranking the second) by 1.5 times. Moreover, the range of leaders had also changed: in 2005 it included Belgorod, Kursk and Lipetsk Oblasts, while in 2014 – Belgorod, Voronezh and Tambov Oblasts. We should note that most Central Black Earth regions demonstrated the upward trend of investment activity: in the Kursk Oblast this index has increased 1.2 times, in the Tambov Oblast – 1.5 times, in the Voronezh Oblast – 2.3 times. However, in two regions this index was decreasing: 1.1 times in the Belgorod Oblast and 1.5 times in the Lipetsk Oblast. The asymmetry level had not decreased: the gap between the maximum and the minimum value of this index in both 2005 and 2014 was 1.9 times.

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THE FASTEST-GROWING FOUR CONTINUE THEIR TREND DESPITE THE CHALLENGES

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ABSTRACT

This paper shows the results of the fastest-growing grocery retail markets in the world. Special attention is paid to the countries of BRIC, proven to still be the strongest countries in the world from the viewpoint of the total market. On the other hand, with consumption per capita in focus, these countries are still ranked much lower on the scale. According to these results, Russia and Brazil are in the first third of all the countries in the world, whereas China and India have their position in the second half of this list. Although all these countries are in the very top, it is important to notice that China and India continue their strong growth, Brazilian economy is currently stagnant and Russia records the negative trend.

Key words: retail market, BRIC, Macroeconomy.

INTRODUCTION

In recent several years, the combination of economic growth and growth of population in developing countries (with underdeveloped markets) has stimulated and accelerated globalization of retail and trade as a whole. One of the key reasons of retail development in the entire world, including the developing countries, are certainly innovations in trade (Reinartz, Dellaert, Krafft, Kumar, & Varadarajan, 2011). In the previous two decades, developing countries have also seen the so-called 'supermarket revolution'. The fast growth has been first recorded in China, Indonesia, Malaysia and Thailand around the year of 2000, and then India and Vietnam joined in, starting to grow even faster (Reardon, Timmer, & Minten, 2010). The demography and increase in the purchasing power in developing countries – Brazil, Russia, India and China (BRIC) offer a significant trade potential for companies from the USA and other developed countries, so BRIC markets continue their strong growth in spite of the world economic crisis (Ghosh, Lucy, & Lepage, 2012). It has been fifteen years since the main economist of Goldman Sachs, Jim O'Neill, used the acronym BRIC. A decade later, the economies of Brazil, Russia, India and China have multiplied several times, and the countries themselves are inhabited by almost half of the humanity. Jim O'Neill predicted that these countries' economies will take less than 3 decades to surpass the former Group Seven. Economists of today admit that his research has marked a turning point in analysis of world economy growth, and transformation of G7 into G8 and then G20 is the official acknowledgement of O'Neill's work. However, the situation is somewhat different nowadays. The economies of BRIC have endured a

rough path from the moment when this well-known economist forged the acronym in 2001. The Chinese economy recorded an increase of GDP by 6,9% in 2015. Although these are the official records, a lot of people believe they were 'boosted'. India, the second country with over a billion inhabitants, has surpassed China by its growth since its GDP in 2014 and 2015 has grown by approximately 7,3%. The remaining BRIC countries – Russia and Brazil are currently facing a deep recession since their economies have a declining trend, and according to the IMF's predictions, this is expected to continue. The case of Brazil is considered a specific challenge since the country is currently both in economic and political crisis (Barnato & Hungerford, 2016).

THEORETICAL FRAMEWORK

The question of the rhythm of growth, product launch and technology speed, i.e. market penetration, get a special significance when doing business on BRIC markets, due to the instability of the business environment in these countries. Multinational companies use both the pioneer and the follower strategy, the latter one occurring in two forms – early and late followers. The pioneering is achieved by creating new demand for products or services (technological pioneer) or servicing the demand before other companies enter the given market or its segment (marketing pioneer) (Kaličanin, 2008). The BRIC pioneers strive to materialize the potential competitive advantage on the basis of priority in relation to the followers. This priority enables the pioneers to influence the level and character of competition, control rare resources and build other barriers to entry on markets with low or no competition. In this way, they secure their dominant market position. The process of managing the competitive advantage based on pioneering consists of: period of build-up, period of materialization of benefits, and period of erosion (Thompson & Strickland, 2003). In the first phase, the pioneers tend to develop the market and gain the competitive advantage. The phase of building the competitive advantage takes certain time determined by the company's resources and the business environment. The size of the competitive advantage and the period of its use depend on the large number of factors (including the company resources, barriers to entry, stability and development of the environment, the followers' activities and such), out of which some are under the company's control, and some have the external character. Aggressive moves by the followers can lead to the erosion of competitive advantage and shortening the period of benefiting from it. The question of whether the competitive advantage based on pioneering will erode or not, depends on the skill of the pioneer to develop and constantly improve the 'mechanisms of competitive advantage protection'. The theory widely accepts and cites the classification of these, presented by Lieberman and Montgomery in their praised paper First Mover Advantage. These two authors have classified the 'mechanisms of isolation' of sources for competitive advantage into: 1. Technological priority, 2. Preventive resource control, 3. Connection to pioneers. All these types of isolation mechanisms gain their full meaning upon entering BRIC markets (Lieberman & Montgomery, 1988).

Based on the research done by McKinsey, including 9,759 TOP managers of USA companies, 61% of respondents said that they base their decision to enter a new market on the market's size and growth. On the other hand, only 17% of respondents mentioned political and economic stability as a dominant factor in choosing the investment location, whereas 13% of them mentioned the degree of institutional development (Tarun, Krishna, & Jayant, 2005). Another reason is gaining experience and improving risk management strategies based on doing business in countries characterized by relatively inefficient institutions. The practice sees four ways of managing this type of risk: avoiding, ensuring, contracting the environment and structural adjustment (Rakita, 2006).

The last decade was marked by BRIC countries as the epicentre of global economic development. Namely, the annual growth rate of GDP for this group of countries ranged from 6% to 16%, according to (data.worldbank.org). When analysing these data, the size of GDP in BRIC group of countries should be taken into account. It is true that it is much easier to achieve high growth rates by low level of GDP; moreover, it is true that the growth rates for this group of countries were several times higher than the global growth rates, especially those in G7 countries. The achieved high rates of growth, even in the period of world economic crisis, have led to the substantial increase of GDP in this group of

countries, by which they threaten to undermine the economic domination of the USA. The analysts' predictions say that the following decade might as well be marked by the strong growth of these economies. The appeal of certain markets is not measured only by the number of inhabitants and GDP growth, but also their distribution over society. The middle class was given a great deal of attention by the researchers during the previous period. They considered it the bearer of the economic development, and in the developed countries – the core of social values as well. On the long term, the appeal of BRIC markets will be marked by the development of the middle class. The research done by Goldman Sachs has shown that the following period will have countries with medium GDP per capita and growing middle class as the main shaft of global economic development. For the purpose of this research, affiliation to middle class is defined on the basis of income between 6.000 and 30.000 USD PPP (Wilson & Dragusanu, 2008).

RESEARCH METHODOLOGY

Research Problem and Subject

The problem of this research is observation and analysis of retail market in 20 best-developed countries in the world, with the special focus on BRIC – Brazil, Russia, India and China. The volume of total retail in these countries is taken into account, as well as the retail power per capita. The subject of this research is the analysis of the results in these countries, with the aim to establish whether BRIC is still the group of the fastest-growing markets in the world.

Research Objective

The scientific objective of researching into retail of groceries on the world level is the recognition of countries in which this segment of retail has a significant growth, while the social objective of this research is the identification of markets where, due to their significant development, domestic producers need to export the goods.

Research Organisation

Using the results of research by the IGD Global Retail Analysis agency, the comparison of results obtained in the period between 2010 and 2016 has been made. This was done on the basis of information whether BRIC grocery retail markets have maintained their development trend from the previous years.

RESEARCH RESULTS AND DISCUSSION

The Analysis of Total Grocery Retail Market

In order to see the trends on the retail sector in BRIC countries, Table 1, with TOP 15 world's biggest retail markets shall be analysed. According to the results of the IGD Global Retail Analysis agency, presented next in this paper (Table 1), it is clear that Brazil, Russia, India and China are among Top 6 countries with the biggest retail volume. The same table shows that the period between 2010 and 2016 has seen the changes, which occurred as a result of various factors influencing the economy.

Table 1: Review of 20 biggest grocery retail markets (IGD Global Retail Analysis)

Rank	2010		2012		2014		2016	
	Country	Grocery Retail Market (bn)	Country	Grocery Retail Market (bn)	Country	Grocery Retail Market (bn)	Country	Grocery Retail Market (bn)
1	USA	672.72	USA	764.7	China	864.66	China	1032.92
2	China	489.44	China	716.5	USA	788.65	USA	989.17
3	Japan	361.04	Japan	429.17	Japan	324.6	India	404.84
4	India	273.05	Russia	339.28	India	320.05	Japan	387.95
5	Brazil	267.71	Brazil	312.47	Russia	312.07	Brazil	266.58
6	Russia	233.24	India	306.02	Brazil	302.5	Russia	239.27
7	Germany	199.15	United Kingdom	214.55	United Kingdom	226.45	Germany	233.84
8	France	191.73	Germany	210.3	Germany	221.65	United Kingdom	224.45
9	United Kingdom	187.37	France	209.71	France	213.89	France	221.79
10	Italy	168.95	Mexico	168.8	Mexico	171.45	Indonesia	181.13
11	Mexico	144.57	Italy	168.54	Italy	168.3	Italy	171.27
12	Turkey	129.84	Indonesia	157.15	Indonesia	147.51	Mexico	169.9
13	Indonesia	124.3	Turkey	136.27	Turkey	127.87	Turkey	142.83
14	Spain	105.52	Spain	103.96	Nigeria	121.59	Nigeria	110.02
15	Nigeria	77.95	Nigeria	87.35	Spain	100.6	Spain	105.78
16	Canada	76.93	Canada	85.4	South Korea	82.62	South Korea	96.92
17	Australia	66.81	Australia	84.32	Canada	79.93	Egypt	91.21
18	South Korea	64.12	Argentina	79.05	Egypt	75.2	Philippines	86.35
19	Poland	58.85	South Korea	77.03	Australia	74.95	Canada	82.81
20	Argentina	58.76	Egypt	73.48	Philippines	67.51	Pakistan	79.17

China - the First, India - the Third Biggest FMCG Market in the World

Due to the big number of inhabitants, the growth of average income in this country, and development of economy and economics, China was to become the best developed grocery retail market in the world from 2014 onwards. Next to China, India has also seen the development. This country has been the fourth best-developed grocery retail market in the whole period. After this, surpassing Japan by its total turnover, it has become the third market in the world. Next to China and India, a constant growth in this segment is marked by the USA as well, which currently keeps the second place in the world.

Stagnation of Russia

Russian market of grocery retail had a strong growing trend for years, which is indicated by its position in the Table. Since 2010, Russia has marked its economic growth, but the total retail turnover in 2016 returned to the level as from 2010. This is mainly caused by economic sanctions introduced to Russia due to its participation in Ukrainian political crisis.

The Analysis of Grocery Retail Market per Capita

The data on total grocery retail markets are not a very clear representation of the development. Therefore, if a more comprehensive comparison of the countries is necessary, a comparison of markets by their strength per capita is desirable. This information, given the differences in numbers of inhabitants, gives a clearer idea of economic strength of a market, as well as the development of this strength.

Table 2: 20 biggest grocery retail markets per capita (IGD Global Retail Analysis)

Rank	2010		Rank	2012		Rank	2014		Rank	2016	
	Country	Grocery Retail Market Per Capita		Country	Grocery Retail Market Per Capita		Country	Grocery Retail Market Per Capita		Country	Grocery Retail Market Per Capita
6	France	3054.48	4	Australia	3678.88	4	United Kingdom	3505.42	5	France	3434.88
7	Australia	3013.53	5	United Kingdom	3367.6	7	France	3343.08	8	United Kingdom	3423.06
8	United Kingdom	3009.48	6	Japan	3364.72	10	Australia	3174.5	13	Japan	3065.83
11	Italy	2854.37	7	France	3308.77	13	Italy	2769	14	USA	3049.89
12	Japan	2829.69	13	Italy	2837.85	16	Germany	2729.68	16	Germany	2825.18
18	Germany	2496.09	16	Germany	2611.77	21	USA	2471.25	17	Italy	2800.82
22	Spain	2266.32	22	Canada	2461.1	24	Canada	2251.55	27	Canada	2288.2
23	Canada	2265.31	23	USA	2432.33	28	Spain	2165.3	28	Spain	2283.68
24	USA	2171.75	24	Russia	2367.62	30	Russia	2133.08	34	South Korea	1906.37
30	Turkey	1775.23	27	Spain	2222.79	39	Turkey	1662.81	39	Turkey	1818.1
35	Russia	1632.19	33	Argentina	1894.32	42	Poland	1641.5	47	Russia	1635.48
38	Poland	1547.87	36	Turkey	1812.58	43	South Korea	1638.64	66	Mexico	1320.84
40	Argentina	1440.55	43	Brazil	1568.31	44	Argentina	1555.11	67	Brazil	1293.58
45	Brazil	1369.36	46	South Korea	1540.6	47	Brazil	1491.84	83	Egypt	1011.2
47	South Korea	1297.71	52	Mexico	1382.81	52	Mexico	1367.33	96	Philippines	828.69
55	Mexico	1218.77	92	Egypt	891.75	93	Egypt	867.36	101	China	747.71
113	Indonesia	523.06	112	Indonesia	640.3	108	Nigeria	699.03	107	Indonesia	699.88
116	Nigeria	499.52	119	Nigeria	530.2	114	China	632.14	116	Nigeria	599.11
126	China	365.01	120	China	529.16	117	Indonesia	584.96	134	Pakistan	416.97
148	India	228.48	151	India	246.19	154	India	250.84	149	India	309.11

Table 2 clearly shows that when perceiving these countries from a different angle, a different picture is shown. The state is completely different from the one presented in Table 1. Even though, when observed in total, China and India represent the fastest growing retail markets, Table 2 shows that these two countries take only just the places in the second half of the list of grocery retail, when observed from the per capita viewpoint. Russia and Brazil are much better in their position by this parameter, compared to China and India, but not nearly as well as in Table 1.

CONCLUSION

The results shown above clearly show that, from the viewpoint of the total retail market of groceries, the markets in BRIC countries (Brazil, Russia, India and China) are the strongest in the world. However, if observed from the viewpoint of grocery retail consumption per capita, these countries are positioned far lower. Brazil and Russia take the places in the first third among all the countries in the world, whereas China and India are in the second half of the list. Nevertheless, despite the fact that all the four countries in question are all among top world economies, it is important to notice that China and India still have a strong growth on grocery retail market, that Brazil has seen a drop in 2012 and 2014, and that it had the same result in 2016 as in 2010. Russia has also seen a negative trend, so after the bad results in 2014, only 2 years later, in 2016, it returned to the level achieved in 2010.

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Session E: IT MANAGEMENT

Papers (pp. 263-290):

Saša Bošnjak, Tatjana Davidov COMPONENT BASED SOFTWARE DEVELOPMENT, THE PAST AND THE FUTURE OF SOFTWARE INDUSTRY	...263
Nataša Đalić, Irena Đalić, Bojana Ristić IMPACT OF INFORMATION TECHNOLOGY ON COMPETITIVE ADVANTAGE ON THE MARKET IN THE GLOBAL CRISIS	...269
Žarko Jokšić, Nebojsa Tatomirov BASIC CHARACTERISTICS SQL SERVER TO CREATE A DATABASE	...273
Ljubica Kazi, Dragica Radosav, Biljana Radulović, Zoltan Kazi, Dijana Karuović, Miodrag Ivković, Branko Markoski MODEL OF AN INFORMATION SYSTEM FOR UNIVERSITY SCHOOL MANAGEMENT SUPPORT	...278
Bojan Vukov, Dobrivoje Martinov, Zeljko Velickov HOSPITAL INTRANET PORTAL AS AN ADDITIONAL TOOL FOR INTERNAL KNOWLEDGE MANAGEMENT – A CASE STUDY	...284

COMPONENT BASED SOFTWARE DEVELOPMENT, THE PAST AND THE FUTURE OF SOFTWARE INDUSTRY

UDC: 004.41

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ABSTRACT

Component-based software engineering (CBSE) has some well-established principles that build software artifacts or components, which are independent and reusable units of the software development architecture. Software artifacts represent a technique to improve the productivity and profitability of software solutions. The framework as component-based development model (CBDM) combines many characteristics of Boehm's traditional "Spiral" model and is still present somewhere between traditional and modern agile software development methods (ASD) (Agile Methodology, n.d.). The aim of this paper is to emphasize the inherited traits and a possible upgrade of CBDM as one of the most applicable model for software development ever. Flexible integration of two methodologies creates conditions for the development of large and small software systems. Development activities of CBSD method can be divided into phases, and the incorporation of agile processes can be executed within each phase that supports these processes, regarding the fact that it is necessary to precisely define input parameters and performance specification artifacts that are developed or modified.

Key words: Component-based, agile, development, Reusability, methodology.

INTRODUCTION

Software Engineering (SE) is a layered technology engaged in the quality of a software product. Connecting layers of software engineering creates a working area in which a software product is efficiently developed. This process unites technology and methods into one whole which rationally builds a system and generates results in due time. SE formulates techniques and technologies inside the working area where integrated software processes are involved in: (1) the quality of software product, (2) controlling processes and iterative phases of development, (3) methods of software development (4) contemporary tools and techniques. Software engineering is based on the objective oriented programming, where the same program code is spitted and applied on completely different projects. The advantage of the objective approach over the traditional, structure development software, is the possibility of the reused program code, data type, classes, in a new instance or object. An objective approach is concerned with the development of classes and types of objectives and components, which are independent, have attributes, behavior and functionality with their identification and working characteristics, embedded features and applicable standard that interprets the public interface. Component-based software engineering (CBSE) has some well-established principles that build software artifacts or components as objects, which are independent and reusable units of the software development architecture. With the expansion and growth of CBSE, development of the environment for the usage of components, tools, libraries (Alonso, Sánchez-Ledesma, Sánchez, Pastor, & Álvarez, 2014), the component architecture is built which exceeds the principles of the object -oriented programming. Component-based software development (CBSD) is used for the development of unique independent reusable software solutions, which have reliable characteristics and are often used in big and complex software systems. Although CBSD is almost three decades the unmistakable software development practice (Tassio et al., 2015) it still has some unexcelled drawbacks which practical and research work tend to eliminate software Components

The importance of components in software development was emphasized by Wolfgang Pree in the nineties of the last century (Pree, 1997). A component is a software unit which simultaneously provides and requires services from other units within the system. CBSD architecture creates conditions for building complex software systems by integrating versatile software components (Mandal & Pal, 2012), which are defined as "independently distributed software composition elements with specific functionalities that are consistent with the architecture of the software in which it will be integrated" *Ardhendu Mandal*.

Components as independent software solutions are either produced or used. Therefore, the CBSD methodology and approach nowadays, and many years ago, is very popular, since it allows the utilization of ready-made software solutions, or some already written code that has a purpose, role and place of application. Reuse software values or "Reusability assets" have multiple meanings in software engineering. This is a technique that can improve the productivity of software solutions within the company, regarding the costs and benefits as well as its broad implementation plan (Ronald J. Leach, 2011). "Reusability" (R) is in fact the key and the most effective way of raising the level of productivity and quality of software based on components due to the possibility of their multiple use. The effects of R components paradigm are proved by necessary measurement of the parameters, meaningful procedures and metrics (Yadav, Pradeep, & Kumar, 2014). Although the software industry has largely developed in the recent decades, R components are still encountered with many challenges and they also lack the attitudes of professionals regarding the architecture and usage policies of R components. So far there is no clear framework that describes R software and the structure of the corresponding metrics that accelerate the adoption and assessment of multiple benefits in software development based on R components (Hristov, Hummel, Huq, & Janjic, 2012).

CBSD ARCHITECTURE

Barry Boehm (1988) tries to point out the drawbacks of the traditional "waterfall" model of software development, introducing a new "spiral" model, in which he emphasizes the importance of each phase during the software life cycle. In this regard, he emphasizes the role of the model in software development. The primary feature of the process model is to determine the sequence of phases during software development and to establish criteria for the transition from one phase to another in phases of progression. The process model refers to the following questions: "What are we going to do next and how long will it take?". Accordingly, the model of process is different from a software method, which generally defines the methodology. The model is primarily focused on each phase of development and the way it develops within each phase. Steps of the sequence development are called iterations. For each iteration: data, control, breakpoints, hierarchies, partial functionality, allocation requests for functionality, etc., are defined. The result of each phase is designed part of the software product, which is presented in the form of: structural graphs, topics, answers, diagrams of new demands. The specific product for each phase is called prototype solutions. Software prototyping is applied to generate rapid software artifacts so as to be tested and evaluated in accordance with the requirements. The requirements represent input parameters for each phase of software development. Why is the process model very important? Because it primarily provides guidance to the direction of: the phases, promotion, prototypes, validation tasks and concrete responses to the initial requirements. This directs the project to generating the main project objectives. Many software projects have failed because they followed an incorrect evaluation and development phases or phases of the wrong direction. In this regard, Barry B. proposes a framework for software development (Barry Boehm, Prasanta Bose, / Greg Toth, 1993), which is now not only the theme of practical and scientific experimental papers, but also the basic development area that is implemented in various software platforms and contemporary development models.

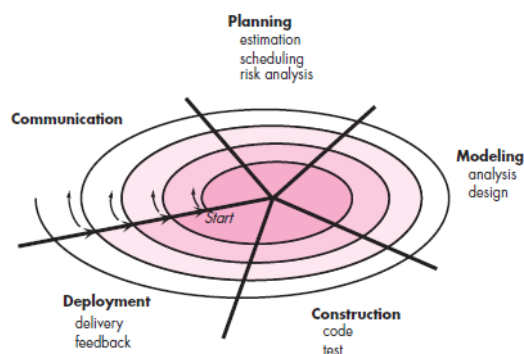


Figure 1: A typical Boehm's spiral model (Pressman, 2010)

Following the example of the spiral model, proposed by Barry B. and his team, modern component software development is based precisely on these project phases.

The modern CBSD model

Component-based development model (CBDM) combines many of the features of the spiral model and has evolved into a natural complex and iterative approach in software development through which applications are constructed from "well-packaged" software components. Modeling and development activities of the component model begin with the identification of the possible components. Components are designed as conventional software modules contained in the repositories of software components. Regardless of the technology used in the creation of components, the development component model includes the following steps:

1. finding the available component products and their evaluation for the corresponding domains of their application,
2. consideration and adoption issues of component integration,
3. designing of software architecture that can implement ready-made components and their already developed software interface,
4. the integration of components into the existing architecture,
5. comprehensive testing so as to ensure the proper functioning of the integrated system.

CBDM generates and integrates R software, which brings a large number of measurable benefits to software engineers: decrease of the amount of development time, decrease of costs, increase profitability, thus R components become part of the engineering culture (Roger S. Pressman, 2010). The most important preconditions for the successful project are described as:

- properly defined development steps,
- the coverage of all relevant activities,
- the execution of each phase according to defined phase tasks,
- generating prototype solution as a result of the development of each phase individually,
- the analysis of completed tasks and concrete measurement of the results achieved in relation to the requirements of direct and indirect users of the system.

All software models can be based on the general framework of the activities which realize relevant software processes, but each of model emphasizes development activities differently and defines process steps in a different way. CBSD becomes the predecessor and the backbone of a new approach in the production of software systems (Lata Nautiyal, Umesh Kumar Tiwari, & Sushil Chandra Dimri and Shshidhar G. Koolagudi, 2012). Since the traditional methodology has become slow and rigid, economically unjustified and inefficient, in that regard, CBSD has become a model whose characteristics and development phases should be simplified. This would create conditions for the faster development and a closer relationship, including members of the development team and users. With the expansion of information technology, a flexible customizable multidimensional approach in the development of software products is created which includes new alternative methodologies, such as: agile methods software development (ASD) (Agile Methodology, n.d.), Dynamic Systems Software Development Model (DSDM), Extreme Programming (XP) and unified process. (Paul I. Pazderski 2010). CBSD still exists somewhere between traditional and modern agile development.

The exhaustive research in the field of two methodological directions lead us to the following conclusion: the component development model can be improved and directed towards light agile methods of software development. In this regard, we suggest that each single phase of component development model, which is basically derived from the popular Boehm's "spiral" model, transforms and upgrades with agile processes, phases and requirements of the system development. Each single phase such as: planning, risk assessment, development and implementation, testing and introducing, experience and communication with the user, can be developed by using the component and agile methodological approach in parallel, because these two methodologies can be complementary one to another. Hence, the secure and reliable development phases of software components and artifacts, which result from the CBSD methodology, can also be flexibly upgraded with the agile development activities. Thereby, the rigid CBSD methodology would be refreshed and adjusted to the flexible, rapid and user-oriented development.

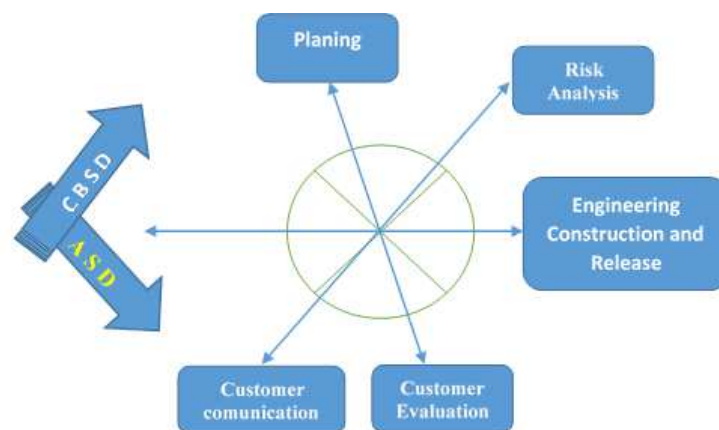


Figure 2: CBSD Model and agile software development as complementary methodologies

AN IMPROVED MODEL FOR CBSD ARCHITECTURE

Agile software development methodologies (Kent Beck, et al., 2001) have been proposed in 2001. The authors believe that the agile method is faster and better, and it also helps developers and users to improve existing capabilities and techniques of software development. Agile processes are above all emphasized and evaluated:

- people and interpersonal relations,
- the software which is usable,
- cooperation with end users,
- timely response to the resulting changes,
- the focus of the software product on technological superiority, good design, adaptation to the current technical requirements of the software market.

Agile methodologies are adaptive: agile processes allow the addition of new development activities, and thus, it modifying the developmental steps (Katuscia Mannaro, 2008). The most prominent approaches to agile methodologies are Scrum and XP, whose significant advantages were noticed by Kai and Claes through incremental agile practices (Kai Petersen & Claes Wohlin, 2008).

The benefits of agile software development have a significant improvement of communication and coordination among team members and communication with the end-users. Daily Scrum meeting is seen as an instrument, and is particularly useful for testing working activities both for users and developers simultaneously. Rapid realization is the result of communication and integration. Developers realize the demo releases every few weeks which was not possible in the past since the realization happened after several months or years. Short sprints (defined working activities as a phase iteration) in combination with pronounced user feedback, lead to changing requirements, internal processes, organizations or policies, which create conditions for a meaningful system development. Agile methods have the ability to adapt to the future anticipated events based on real data (Gurleen Singh & Tamanna, 2014).

By applying agile methods it is possible to solve a number of smaller, individual and partial assignments, in terms of changing requirements, working and business environment, social status, political and other variable trends. If the problems are not precisely defined, if the steps and tasks are unclear, or if the final results generated by a software solution are not recognized, the agile processes are then very useful, because the activities are carried out constantly, iterations are repeated, and the role of users and professional members of the team is constantly present. This affects directing unclear processes and tasks, which is reflected in the competitive power of the software generated product, and it also strengthens the competences of the development team and the company which appears on the market with this software project (Stanišević Ilja, Janković Marina, & Obradović Slobodan, 2012). Connecting agile and component based development, creates a methodology that promises success of the project.

A framework for improving CBSD model

Flexible integration of these two methodological approaches provides support in software development "in the large" - CBSD, and "in the small" - ASD. Both approaches have interesting and irreplaceable elements, whose

integration not only provides a lot, but also creates a new era in the software industry. As Boehm emphasizes, ASD methods are suitable for small changes in the project, but on the other hand, major projects require much larger changes. Hence it makes sense for a small amount of agility to be involved in large CBSD projects. CBSD is focused on a good analysis and documenting of the complete system architecture. In the development CBSD uses already completed component solutions, but in the case of its own development it is proposed to use the agile approach, because ASD is suitable for small projects and useful software units, such as components and other software artifacts.

Mellroy (1968) was the first who gave the idea of producing commercial components more than forty years ago. The component is "independently distributed" within the component model, whose phases are planned in accordance with the Component-Based Software Life Cycle (CSLC) which can be basically built within agile processes. Moreover, the complete specification of CSLC engineering is also the input for the development of components with the agile methods. Since the components are independent software units that fit into the component-based software architectures, their independent development can take place simultaneously through agile processes (Wolfgang Radinger / Karl Michael Goeschka 2003).

Each phase which aims to develop and implement the components can be replaced with a consolidated agile processes, because the component development is independent. The component model according to the requirements of engineering, must be specified in the planning phase. This complete specification performance of the component that develops, is input to the agile process. Since the components are independent, their development can take place simultaneously. The integration of component-based approach for software development, with the agile development method, enables the development of the long-lasting software system, of different performance and scalability. CBSD and ASD combination is a new paradigm aimed at developing big and complex software systems, with the flexible and user-oriented approach, for the development of coherent components. An easy integration of both methods is more promising than any so far (Wolfgang Radinger / Karl Michael Goeschka 2003).

Based of the framework that are proposed by Adnan Khan, et al, we came to the conclusion that the reuse software artifacts, which were previously developed, can be modified and upgraded in several phases and with the different methodological approach.

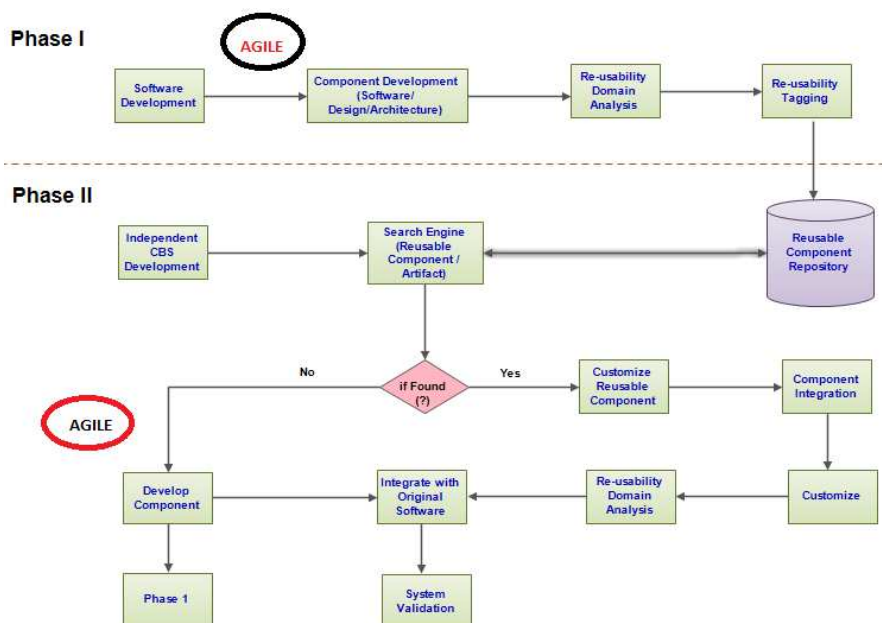


Figure 3: Reusability Framework for CBSE (Khan, Khan, Amir, & Khan, 2014)

The Framework is divided into two phases. In the first phase they are proposing the storing newly developed components for the future use in the storage. In the second phase they are dealing with the research and analysis of the stored reusable components. We propose to expand the defined model, with the role of agile methodologies within the development phases. Both phases of the development would be enhanced if some elements of agile processes and methods were implemented in the development phase activities. Software development includes new development, research, modification, code reuse, prototyping, reengineering, maintenance, and any other actions that result in a software product (Adnan Khan, Khalid Khan, Muhammad

Amir, & M. N. A. Khan, 2014). All these activities can be divided into phases. The incorporation of agile processes can be accomplished as a part of those activities which these processes can be supported. It is necessary to precisely define input parameters and the artifact performance specification that is developed or modified.

CONCLUSION

The combination of component software architecture and modern agile principles of software development has gained considerable attention in recent years. However, there is still no comprehensive overview of the current state of research on the implementation of agile approach to component software development architecture and their mutual combination (Chen Yang, Peng Lianga, & Paris Avgerioub, 2015). Proposed methods include significant theoretical and practical contribution of component-based working models. This paper emphasizes the importance and role of CBSD, and the power of transformation and its upgrading. The power of CBSD demonstrates the long-term existence in the software industry, not only the methodologies but also its artifacts, since 1968 (M. Douglas McIlroy, 1968) to the present day.

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IMPACT OF INFORMATION TECHNOLOGY ON COMPETITIVE ADVANTAGE ON THE MARKET IN THE GLOBAL CRISIS

UDC: 004:658.1

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ABSTRACT

Modern life requires managers who manage business organizations and enterprises, daily training and the introduction of innovation in the management process. Nowadays, one of the key elements of this is the application of information technology. The emergence of information technology in business offers certain advantages, affects the quality of operations, cost control, and also the company competitive advantage in the global crisis. The survey was conducted on the territory of the Republic of Serbian, on a sample of 136 companies. The research results show the great importance of modern information technology in business.

Key words: information technology, information system, competition advantage, market, global crisis.

INTRODUCTION

The last twenty years of information technology have found application in all aspects of business life, and thus become an indispensable segment of contemporary society. With the development of information technologies and structural reform, enterprises are encouraged to incorporate new technologies into their business.

Modern information technologies gaining importance every day, lead to changes in the way the business of the company and the company competitive advantage in the global crisis. The emergence of electronic commerce defines the role of certain companies on the market, but offers certain advantages and benefits (Rajcevic, S., 2008). Application of information technology affects the business more efficient, more successful flow of information, control of costs and time in the company competitive advantage in the market.

Advancing age and the introduction of new information technologies in business enterprises is a key role in achieving competitive advantage in the market in terms of the global crisis. The globalization of markets, the availability of access to competitive enterprises and large dynamic marketed conditioned room for the introduction of new tenologija in the company.

One of the key elements of survival and competitive advantage in the market in terms of the global crisis is the application of information technology in the enterprise. Modern business in a time of great expansion gotrovo would be inconceivable without the use of modern technology (Turban, E., 2009).

STRATEGY AS THE COMPETITIVE ADVANTAGE OF THE COMPANY ON THE MARKET

The survival and prosperity of enterprises in the market in terms of the modern economy is an imperative competitiveness. Competitive advantage is an organizational capability that allows the company to generate significantly more value for the customer compared to its competitors (Porter, E. M., 2008).

In order to achieve the company and maintain a competitive edge in the market, there is a need for constant changes that are manifested in the formation of frequent innovation. The survival of the enterprise market implies a successful struggle with competitors, as managers of companies claims to assess the real situation in the environment, potential opportunities companies, real competitive opportunities while reducing cane and provided positive results. The introduction and application of information technology can be successful only if the development of an information system in compliance with the development strategy of the business system.

An important application of modern information technology in all business enterprises have brought new opportunities for competition competitors in the market, and thus forced companies to rethink their business strategies, all in order to maintain their competitive advantage in the market in terms of the global economic crisis. Everyday the development of competition and the current global crisis requires that companies conduct frequent business process analysis (Turban, E., 2009).

Achieving competitive advantage in the market includes analysis of business processes, as well as daily monitoring of global business trends in the market. Competitive advantage is not a permanent structure, but it is viable. The main objective of any enterprise or jeda achieve and to maintain a competitive advantage in the market, and it is achieved innovation in the product or service. Most of the companies became aware of the fact that today only satisfying customers is not enough to be competitive in the market, but they have to exceed the expectations of customers, because only that can convince the buyer that they are the best. In terms of increasing competition can only survive companies in their strategic vision of seeking solutions to the highest quality products at the lowest cost, and performance of business processes in the shortest time.

What is most important for the management of the company is that in strategic planning properly the information technology and recognize their impact on business operations in the market to achieve a competitive position. Measuring performance has become a major component in the development of business strategy in times of global crisis and achieving sustainable growth and a high position in the enterprise market.

IMPACT OF INFORMATION TECHNOLOGY AS A PRIORITY OF COMPANIES IN TERMS OF GLOBAL CRISIS

In the modern daily life occur and different interests, then a variety of expertise in people who manage business systems and organizations, and ourselves levels of organizational complexity, and therefore different types of systems. Never one system can not provide all the necessary information needed an organization or a business system. The business activities of the company are held by the sectors within its scope of business has adapted to the appropriate information system. All these systems need to bound into a single unified system adi information on the operations of the company. Information systems are created in the application package, which, depending on the sector in which they are used, have formed the tool. They should be strategic, ie that they meet the company's main goals (Porter, E. M., 2008).

New trends in the development of information technology go hand in hand with the development of new business activities of the company, new production and information technologies that require continuous adjustment of the whole company management instruments in the line of realization of the set goals. The use of information technology plays an increasing role in the formation of new products and services.

The main role of the company's reengineering business relationships, improve business activities within the same, and thus achieve a competitive advantage in the market. New forms of application infomacionih services within the company allow the implementation of quality business policy. Using e-commerce,

buying at a distance and other information services, customer svakaodnevno assumes an increasingly important role in communication, and thus "classic" manufacturers are becoming multi-media representatives information using the Internet or its own database.

The impact of information technology on companies in the Serbian Republic, in times of global crisis, and a number of other benefits that are reflected in the modernization of business activities by reducing the number of employees, better financial management companies, the utilization of capacity resources as well as better distribution of materials and goods.

A survey on the impact of information technology on the company competitive advantage in the market was conducted on a representative sample of 136 business entities on the territory of the Republic of Serbian.

The aim of this study was to obtain data in order to define the role of information technology in the company competitive advantage in the market in terms of the global crisis. In the Republic of Srpskoj 93% of surveyed business entities confirmed that the benefits of modern information technologies in their operations.

Individual results of empirical studies have confirmed the very significant impact of information technology on the company competitive advantage in the market in terms of the global crisis. Of the 136 subjects surveyed more than half (55%) had confirmed that information technology significantly affect the competitive advantage of companies (Chart 1).

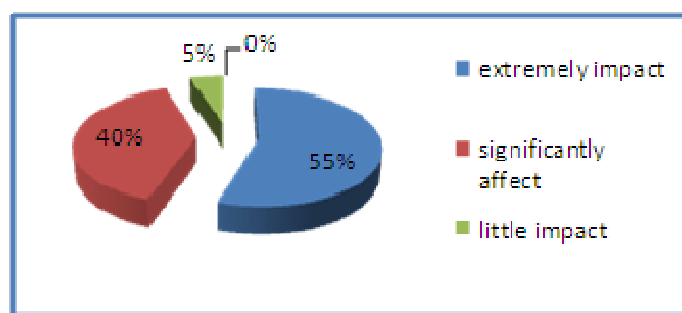


Chart 1: Impact of information technology on the competitive advantage of companies

Modern information technology at a rapid pace strive to improve all business activities of the company. Modernization of business activity in the company in order to increase the competitiveness of companies in the market is achieved by reducing the number of employees and thus reducing staff costs. Part of the research for this purpose conducted confirmed that the application of information technology greatly affects the number of employees, and thus saving on labor and workers' standard of work is becoming more complex in the process of achieving a competitive position in the market. Based on the very fast development of information technologies, the results of research relating to the contribution of information technology to reduce staff in the company, confirmed a significant contribution to reducing the need for labor force, even 75.55% of respondents confirmed that the introduction of information technology there is a need for reducing the number of employees in the company (Chart 2).

Empirical research that relates to the impact of information technology on the company competitive advantage in the market in terms of the global crisis confirmed their significant impact in maintaining competitive position in the market. Research has shown that over 70% of respondents in the Republic of Serbian has Internet access, but also confirmed the extraordinary awareness that information technology can play an important role, and in preparing them for integration into the international chain of business.

A survey has shown that management of the company in the Republic of Serbian aware of the role and importance of information technology to improve business performance, to achieve a competitive position in the market, but also the introduction of information technology in the enterprise is seen as a long term investment.

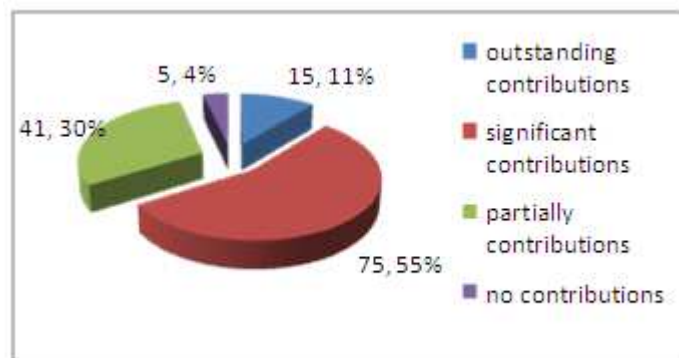


Chart 2. The impact of information technology to reduce the need for labor

An important segment of the study represent the views of users of information systems who consider the application of information technology is extremely important and necessary in the daily work of the company. Their application considered in order to overcome the problems in business, and to meet the habits, needs and expectations of customers, and thus achieve the competitive position of companies in the market during the crisis.

CONCLUSION

Everyday competitive conditions and the market situation requires rapid and continuous change in organizational behavior within the company to meet the needs of successful business enterprises in the market and maintain competitive positions. From the research it can be concluded that all government activities should be aimed at creating a more favorable business environment for business startups in the world market with providing conditions for enterprises everyday modernization with the use of information technology.

Businesses that its strategy for using the application of information technology to achieve competitive advantage, compared to the traditional way of doing business achieve increased workload, the greater the profit, the more dedicated customers and all this results in increasing their competitiveness in the market amid the global crisis.

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BASIC CHARACTERISTICS SQL SERVER TO CREATE A DATABASE

UDC: 004.655.3
004.652.4

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ABSTRACT

The basis of the information system the database, it is a computer for collection of query data relating to a particular keyword, or belonging to a particular business application. Base data helps in organizing data in the logical center for ease of access and loading. Computer database represents automated storage function and finding data. Base data are used to distinguish natural complex logical structure insignia finding

Key words: Information system, database, business applications.

INTRODUCTION

The basis of the information system the database, it is a computer for collection of query data relating to a particular keyword, or belonging to a particular business application. Baza data helps in organizing data in the logical center for ease of access and loading of.

Management System database is part of a database system which includes more data and are usually korisnici. Today were lucky with the systems of administration the relational and object-relational database, because it is precisely these types of systems usually occur in modern spatial systems.

The main task of the system for database management is to manage and control data stored in the database.

Database system consists of the following components

- Program database applications
- Input (chub components)
- The system for database management
- Databases

SYSTEM RELATIONAL DATABASE SQL SERVER SYSTEM

SQL Server is a system for uparvljanje databases (Base Data Management System) developed and placed on the market software Microsoft. Biggest part Mickrosoft Back Office business package, client-server applications, it is SQL Server, Windows NT Server, SNA Server, System Management Server, Internet Server, Internet Information Server and MSMQ Server.

SQL Server is tightly integrated saWindows systems, used only under Windows NT and Windows 95/98, so users do not have to learn another user interface to be able to use this database system, The disadvantage is no possibility of using some of the advantages of other OS, such as UNIX, since the sresredjen only on OS Mickrosoft (Vieira,2000)

Features of SQL Server is very easy to use, the range of its use ranging from laptop computers to process more Sistemas, is capable of storing data (data warehousing), which is only possessed Oracle and other expensive DBMS

SQL Server is made jjednostavniji system for deploying and managing database applications. This enabled the use of many wizard to carry out almost all tasks administriranja. Klijent provides one or more of the various user interfaces, which are used for the formulation of user requirements DBMS, which server and provides the results back to the client, Gehrke is almost always part of a client-server arhitekture. SQL server is a relational database, data model represents a set of concepts, principles, relations and their limitations, which are used for perfect data representation of a real problem.

MANAGING DATABASES AND FILES DATABASE

Management of data consists of the following tasks:

- Create a group of files
- Creating and modifying a database
- Creation and modification of transaction logs

Servers koristis usedne eprostora blocks on the disk for data storage. One such block is called a page. When creating a table or index SQL Server uses eight continuous page -Name scope for storing data belonging to a page or index (range can be used over a table or index). All files that are used to store databases and transaction logs have physical name- the name of the file, the operating system and logical name used by SQL Server components. (Petković,2000)

Files belonging to one disk drive can be grouped in sets of files, which can be located the various tables, indexes, or a particular file (or sets of files)SQL Server supports two different types of groups of files:

- PRIMARY
- User-defined

All groups of files belonging to the database can be viewed using the:

- SQL Server Enterprise Manager
- System procedure sp_helpfilegroup

Right-clicking on a database opens Properties dialog, where all groups are listed file of the current database in a column Group File System sp_helpfilegroup procedure shows the specified group of files with all the properties (the file names in their size)

Database management consists of the following tasks:

- Creating a database
- Observation and modifying options Data Base
- Modification and integration of databases

SQL SERVER SYSTEM ENRVIRONMENT

Disk storage - arhiktetura memory SQL Server includes two storage units eobjekata database:

- Page
- Extension

The main unit for storing data in SQL Server is a page. The page size depends on the version of SQL Server has a page header to save the information I closely followed by strings of data, which can be a long two or more pages.

System database

When installing SQL Server to generate four system databases:

- Master
- Model
- Tempdb
- Msdb

Master database is the most important, because it includes all the necessary system tables for work, information about all the other databases that manipulate SQL Server, system connections with customers and customer automation.

The model database is used as sablonka to create user-defined database, content subset of system table master database, which are in use each of the user-defined database,

The system administrator can change the properties of the model database, due to adjustment needs of your system.

Memory Database provides room for temporary tables and other temporary facilities. The benefit them all bases belonging to the whole system and their content is erased each time the user finishes process or system stops.

Msdb database is used for storing alerts, tasks and operator of record.

CREATE A NEW DATABASE

One of the first tasks to be executed in the use of SQL Server is to create a new database, and what can be done (Petković 2000)

- By using Create Database Wizard
- By using SQL Server Enterprise Manager
- By using Transact-SQL language

Database properties can be divided into:

- The general properties
- Properties log transactions
- Licenses
- Options Database

Each group has its own properties tab of the Database Properties box dijaloga. Opšta (general) properties of the database name, initial veličina file database, recording location database, the name of the file group to which the database pripada. Baza data can be placed in several files.

Log transaction database includes the name and the initial size of log files, all options on the level of the database can be viewed and modified in the Database Properties dialog box.

Three options relating to access control:

- Use the DBO Only: obično these fields used for database maintenance, because it restricts the use of a database to only the owners of database and system administrator.
- Single User limits the use of the base to only one user the same time.
- Read Only allows a transparent access to the database, modifikovanje prevents data from database

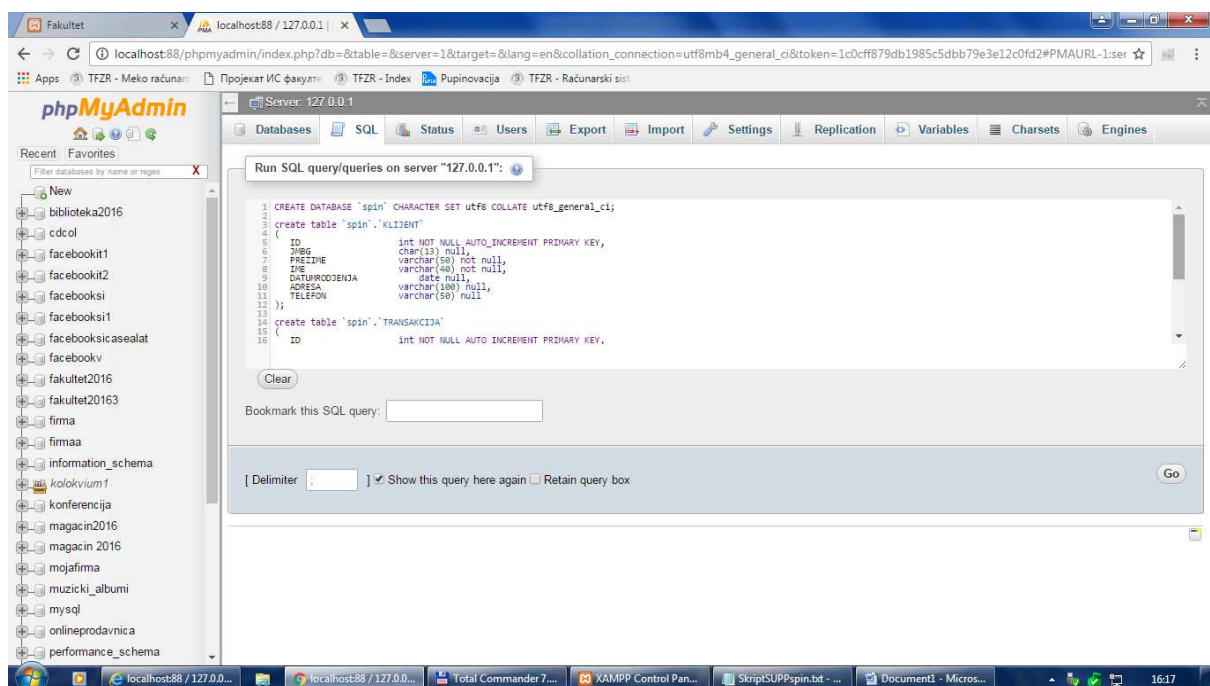
Right-click the folder in the tree Databases SQL .Server system and selecting New Database, appears in the New Database dialog.

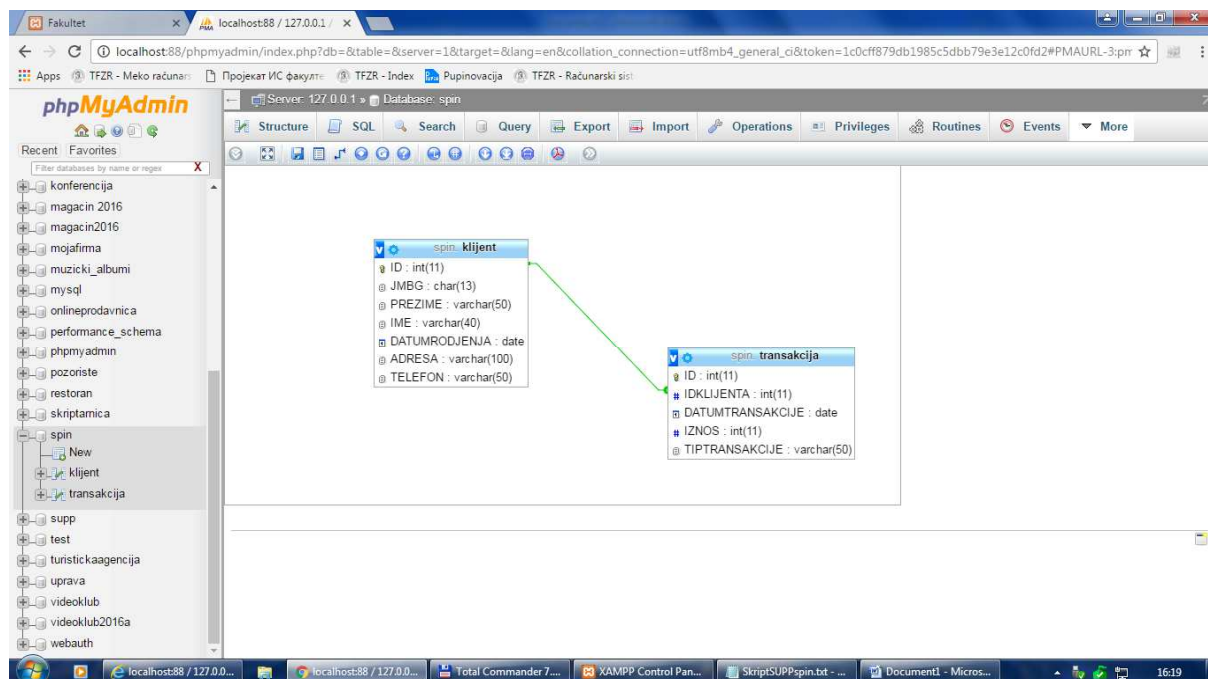
It must specify the name of the database, and all other optional specifications. To SQL Server dynamically manage the growth of database files must be enabled switch Automatically Grow File, otherwise you will be able to be used only to proctor diskukoji is assigned to the file in the database.

EXAMPLES MY SQL DATABASE AND PHP MY ADMIN TOOL FROM XAMPP PaketaDDL – CREATING A DATABASE

5.1

```
CREATE DATABASE `spin` CHARACTER SET utf8 COLLATE utf8_general_ci;
create table `spin`.`CLIENT`
(
    ID int NOT NULL AUTO_INCREMENT PRIMARY KEY,
    ID NUMBER char(13) null,
    LAST varchar(50) not null,
    NAME varchar(40) not null,
    DATE OF BIRTH date null,
    ADDRESS varchar(100) null,
    PHONE varchar(50) null
)
create table `spin`.`TRANSAKCIJA`
(
    ID int NOT NULL AUTO_INCREMENT PRIMARY KEY,
    ID CLIENT int not null,
    DATETRANSACTIONS date not null,
    IZNOS int not null,
    TYPE OF TRANSACTIONS varchar(50) null
);
alter table `spin`.`TRANSACTIONS` add constraint FK_ CLIENT foreign key (ID CLIENT)
references `spin`.`CLIENT` (ID) on delete restrict on update cascade;
```





CONCLUSION

SQL Server system database management enables us efficient use of databases and their creation, and is used every day to perform different actions and operations of the data. This system will definitely in the future to experience many more changes and improvements to work with databases and data, which are increasingly accumulating from day to day, was even simpler and efikasniji. The area data processing is very dynamic in its development, but should be expected to change and progress will not fail. Its simplicity of use and operation of the database is the result of a very complex system for managing databases, which in the background and regulates all actions and processes.

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MODEL OF AN INFORMATION SYSTEM FOR UNIVERSITY SCHOOL MANAGEMENT SUPPORT

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ABSTRACT

Management information systems support operative processes and certain level of management in organizations. This paper presents research in the area of applying management information systems at academic institutions, i.e. university schools. Particular concern is given to business processes at university schools and their support within information system. Existing technologies that are used within business information systems are analyzed in aim to be included in the proposed model of an information system that could support business processes within university school. Current results in improving information system of University of Novi Sad, Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia will be presented as comparison to the proposed model.

Key words: university school, management information systems, business process, model

INTRODUCTION

The role of information systems (IS) within an institution or business enterprise is expressed within the definition of an information system as a support to core business functions at operational and managerial level. Much research effort has been made in attempt to prove information system value within organization. Since information system development depends on hardware and software investments, (Ravichandran and Lertwongsatien, 2005) explored the effects of information system resources and capabilities on company performance. In (Perez-Mendez and Machado-Cabezas, 2015) research of relationship between management information systems and corporate performance presents positive effects of IS strategy development and IS quality to financial results of a company. One of the most important role of IS expresses as »organizational memory« (Stein and Zwass, 1995), to enable organizational effectiveness with subfunctions such as acquisition, retention, maintenance, search and information retrieval. Finally, the most important role of information system within an enterprise is decision support (Berisha-Namani, 2010) and strategic planning (Karim, 2011).

Previous research of this paper authors include published papers related to development of information systems, such as the impact of business reengineering to information system architecture change (Kazi et al 2011), as well as university information systems architecture (Kazi et al 2005).

The authors were engaged also in practical solutions in the general information system improvement of University of Novi Sad Technical Faculty “Mihajlo Pupin” Zrenjanin, Serbia, which were described (Kazi et al 2014). Particular solutions include information system support to project management in educational activities (Kazi et al 2012), as well as other solutions for administrative support, described within (Kazi et al 2014) and other papers.

This paper presents results in analysis of contemporary technologies that are used within business information systems. Aim of this paper is to present a model that could integrate modern information system technologies for the support of business processes of university school. Second section of this paper presents related work regarding management information systems at university schools, existing technologies and solutions. Third section describes contemporary technologies that are within for business information systems. Fourth section represents a model that integrates previously presented technologies. Fifth section includes description of results of improving information system of University of Novi Sad School of technical sciences (i.e. Technical Faculty) “Mihajlo Pupin” Zrenjanin, Serbia. Final section describes conclusion and future work.

THEORETICAL BACKGROUND

“Waston et al. (1987) describes management information system (MIS) as ‘an organizational method of providing past, present and projected information related to internal operations and external intelligence. It supports the planning, control and operation functions of an organization by furnishing uniform information in the proper time frame to assist the decision makers’. Telem (1999) defines MIS as ‘a management information system designed to match the structure, management task, instructional processes, and special needs of the school’. O’Brien (1999) referred MIS as ‘a term given to the discipline focused on the integration of computer systems with the aims and objectives of an organization’. Based on the foregoing definitions, MIS refers to a system that uses the information required by the organization’s management at every level in making operational, tactical, and strategic decisions. Its main objective is to design and implement procedures, processes, and routines that provide suitably detailed reports in an accurate, consistent, and timely manner. MIS plays a vital role in the area of decision making as it can monitor by itself disturbances in a system, determine a course of action and take action to get the system in control. It is also relevant in non-programmed decisions as it provides support by supplying information for the search, the analysis, the evaluation and the choice and implementation process of decision making (Obi, 2003). These systems have the ability to provide its users the processed information, analytical models, real-time updates and hypothetical scenarios to assist their decision making process.» (Shah, 2014)

The need for multi-methodological approach to research in the field of information systems is presented in (Nunmaker et al, 1991). According to (Laudon et al, 2013), the role of information systems in global business today could be described with several perspectives:

- Information systems manage activities, data and information
- The role of IS in business is supporting: operational excellence, new products and services, customer and supplier intimacy, competitive advantage, improved decision making, survival
- Dimensions of IS include: organization (business processes, people, business functions, culture and politics, organizational structure), management (strategy – action plans, decisions, challenges – problems), technology (hardware, software, data management, networking – internet, computer networks)
- Perspectives of IS are technical and social and fundamentals are in: management science, computer science, operations research, sociology, economics, psychology.
- Ethics in IS include several moral dimensions: information rights and obligations, property rights and obligations, accountability and control, system quality, quality of life.

According to (Laudon et al, 2013), management, organization, and technology elements work together to create an information system solution to the business challenges (Figure 1).

According to (Stankic, 2005), an information system consists of four components: Hardware, Software (including data), Orgware (organizational forms of IS development and usage), Lifeware (IS users and developers). One of the most comprehensive and largely accepted approaches to information system architecture is presented in (Zachman, 1999). The approach consists of a table with:

- Rows, representing certain level of detail : Scope (Contextual), Enterprise Model (Conceptual), System Model (Logical), Technology Model (Physical), Detailed Representations
- Columns, representing segments of IS: data, function, network, people, time, motivation.
- Different types of models represent cells of the table, having both aspects integrated, such as: data scope, function scope etc.

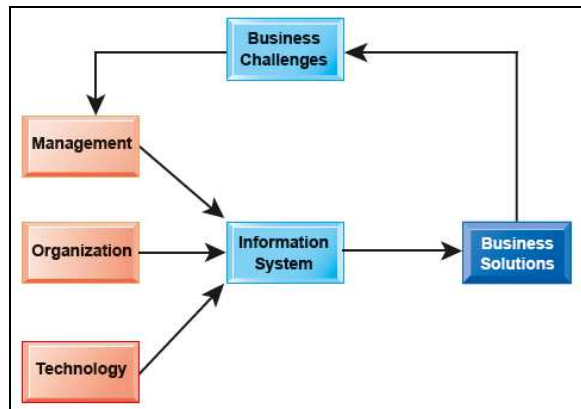


Figure 1: Information system support to business challenges (according to Laudon et al, 2013.)

RELATED WORK

Contemporary Technologies of Business Information Systems

“A continuing stream of information technology innovations is transforming the traditional business world. What makes the MIS field the most dynamic area of business is this continuous change in technology, management, and business processes. Examples of transforming technologies include the emergence of cloud computing, the growth of mobile digital business platforms based on smartphones, netbook computers, and, not least, the use of social networks by managers to achieve business objectives. E-commerce is generating global revenues which are growing at an exponential rate, and is changing how firms design, produce, and deliver their products and services. Likewise, the management of business firms has changed: With new mobile smartphones, high-speed Wi-Fi networks, and wireless laptop computers, salespeople on the road are only seconds away from their managers’ questions and oversight. Managers on the move are in direct, continuous contact with their employees and have online, nearly instant access to the important information they need for accurate and timely decisions.” (Laudon et al, 2013)

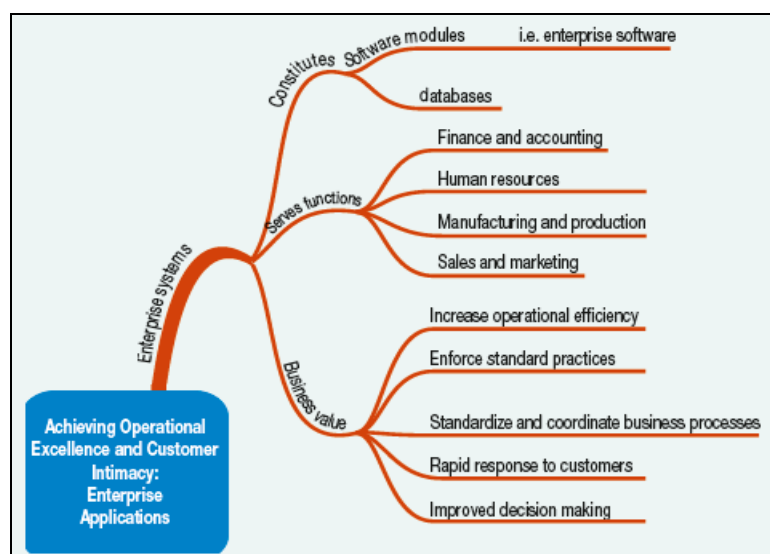


Figure 2: Information system modules for support to operations and customer relationships (Laudon et al, 2013)

Since information systems support various aspects of business processes, the technology solutions could be categorized as support to: Operational functionality and customer cooperation – solutions include document management systems, communication tools (e-mail, instant messaging, video conferencing, social networking) as well as enterprise applications (Laudon et al, 2013): Web applications, CRM (customer relationship management) solutions, ERP (Enterprise Resource Planning) systems, Supply chain management systems: Management support in decision making – solutions include: Rule management systems, business intelligence solutions (data warehouse, data mining), knowledge management solutions.

Management information systems at schools

In aim to effectively integrate with society, educational systems are exposed to using and constant adjustments of diversity of technologies. In (Privateer, 1999), higher education strategic issues regarding application of technologies is examined. Application of technologies is closely related to strategic paths that could be taken. In aim to become effective, strategic agenda for higher education institutions should change strategy from operation level of data storage to intelligent systems that could enable analysis and decision support. Digital era affects information systems, but also pedagogy introducing new instructional technologies.

Impact of management information systems to school administration has been explored from diversity of published papers in (Shah, 2014). Including information and communication technology into schools requires investment in hardware, software, networking and staff development (training of administrative and teaching staff), but the investments and efforts were proved to be worthwhile, since there were many research results showing evidences on positive impact to school performance and effectiveness. “Management information systems (MIS) are being used by schools to support a range of administrative activities including attendance monitoring, assessment records, reporting, financial management, resource and staff allocation. MIS provide managers with information required to manage organizations efficiently and effectively. Reduction of workload, beneficial impact on time management, and improvement in the quality of reports have been highlighted as major impact of MIS on school administration and management.” (Shah, 2014). According to (Shah, 2014), many related work present ICT use inhibitors, such as: lack of training, lack of senior management support, lack of technical support, lack of ICT resources, lack of a genuinely supportive culture, lack of staff individual confidence and motivation.

Duch schools experiences with computer-assisted management information systems were described in (Visscher and Bloemen, 1999). The process of school information system (SIS) inclusion in schools was described from design strategy perspective, having considered SIS features (quality of hardware, data entry, format etc) , implementation process features (training, help, encouragements from management), use features (extent of use, period of use), positive and negative effects (teaching quality, management quality, motivation) and school organizational features (motivation, freedom to use or not, computer experience, goals of SIS) that influence effects of SIS usage. Questionnaire was given to 498 (195 responded) Duch secondary schools related to SIS. Results show that the most used modules are student test scores, final examination registration and financial student administration. Less commonly used are absentee registration and timetable administration. In management modules, even large variety of reports and data analytics were provided, they were underused to a high degree or used only as administrative support. Management and teaching staff used the SIS in small percentage. The main dissatisfaction was with: training, innovation pace (too slow) and support in maintenance or using problem assistance. Positive opinions about SIS usage was in better insight into school functioning, improved use of resources, better basis for curriculum planning and internal communication.

THE PROPOSED MODEL

This section presents the proposed model of an integral information system of a university school. The model is designed to enable implementation of information system that could support business processes at university school. Business processes are grouped into sections and for each section there were several types of information and communication technologies listed as suitable within available contemporary technology solutions.

Table 1: The proposed functional-technological model for university school information system

MANAGEMENT			COMMUNICATION with institutions/companies and persons (students, researchers) - SMS service - E-mail - Instant messaging - Mobile applications
<ul style="list-style-type: none"> - Business rules management systems - Knowledge management systems - Business intelligence systems (data warehouse, data mining) 			
TEACHING	RESEARCH	TECHNOLOGY AND RESEARCH PROJECTS	
<ul style="list-style-type: none"> - E-learning (CMS) - Multimedia - Web applications 	<ul style="list-style-type: none"> - Internet - Academic and research networks 	<ul style="list-style-type: none"> - Project management tools 	
SUPPORTING LOGISTICS			
<ul style="list-style-type: none"> - Client/server applications for finance/accounting, library, human resources, legal service office - Web applications 			
ADMINISTRATION			
<ul style="list-style-type: none"> - Document management systems 			

The proposed model could be considered as generally applicable model to any university school, but the “underlying example” for the model is example of a typical Serbian university school. Listed technology solutions for particular types of business process models support will change during time and the proposed model includes the contemporary available ICT solutions.

CASE STUDY - RESULTS IN APPLICATION OF THE PROPOSED MODEL

This section presents results in implementation of the proposed model within University of Novi Sad, Technical faculty “Mihajlo Pupin” Zrenjanin, Serbia. The proposed model is used in this section to evaluate current state of information system and to enable systematic direction of future activities in information system improvement.

Current state of information system at within University of Novi Sad, Technical faculty “Mihajlo Pupin” Zrenjanin, Serbia is based on previously developed modules from external vendors (software companies and central university ICT sector) as well as from internal ICT staff (web administrator, IS administrator, students within special ISF project (ISF, 2014-2017)):

- Management support – tools available, but in use with teaching and research processes
- Teaching – e-learning system developed, but not used. Faculty web portal used as open-access source for teaching material, information dissemination and classes organization
- Research – Academic network and constant high quality internet access, University scientific network and access to all necessary journals papers via Kobson system.
- Technology and research projects – Project management tools available, used for teaching and research projects
- Supporting logistics – finance office (software from external programming company), library software supported from University central library, human resources and legal service office not supported with particular software.
- Administration – document management system developed in 2014-2017 internally within ISF project (students and teaching staff engagement in software development).
- Communication – business SMS software service available, Mobile (android) application developed internally (teaching staff engagement).

Final conclusion of application the proposed model is that future directions should lead toward better software support to management, administration and supporting logistics, while core business processes have appropriate software support.

CONCLUSION

This paper presents the role of information system within educational institutions, as well as current state in IS design and technology implementation for general business systems.

This paper proposes a model as a framework for evaluation of current state and future improvement efforts in information system development for the university school. This way, systematic way of information system development is proposed. Results of the proposed model application within a case study show suitability for general development planning and gives directions for future activities in information system development.

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HOSPITAL INTRANET PORTAL AS AN ADDITIONAL TOOL FOR INTERNAL KNOWLEDGE MANAGEMENT – A CASE STUDY

UDC: 614.2(497.113 ZRENJANIN): 004.738.4

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ABSTRACT

Intranet and intranet portal allow organizations to inform and support employees in all important segments of its business processes in an efficient manner. However, intranet portals have evolved from ordinary effective tools for finding and unidirectional data transfer to platforms for two-way collaboration and exchange of knowledge among employees. The current trend in intranet portal development is that it should be organized primarily as a knowledge exchange portal, thus providing the management of internal knowledge. The main objective of this paper is to highlight the importance of internal knowledge to the organization, as well as its management through the intranet portal as a useful tool for knowledge management. In this paper, we briefly presented a case of intranet portal development in our institution. We also performed literature review in this field in order to define key terms and to highlight the current trends. A review of the literature found that the internal knowledge is fundamental for well-functioning of an organization and particularly for its development and innovation. Implementation of intranet and intranet portal gives employees the ability to be well informed, to disseminate expertise, and finally to make better decisions.

Key words: Intranet portal, knowledge management, tacit knowledge, hospital settings

INTRODUCTION

The intranet portal was implemented in the General hospital "Djordje Joanovic". It is a secondary care health institution for inpatient treatment and provision of specialist medical consultation service, which performs specialized diagnostic, therapeutic and rehabilitation methods and procedures. General Hospital provides health services to the citizens of the Central Banat District, and employs 1,095 workers. Intranet at our institution has existed for several years. In the year 2013, management made the decision to move forward with the introduction of intranet portal as an expansion and betterment of the existing intranet. We set out to develop an intranet portal for many reasons and from various perspectives. In order to become knowledgeable about the theory, and to adequately define key terms, we performed a literature review. Our ultimate goal was to get a good orientation in the development and implementation of our intranet portal. In this paper, we briefly presented the case of intranet portal development in our institution. Findings from search of the literature could be considered helpful for all organizations that developing or implementing intranet portal in order to manage internal knowledge. However, findings of our case study are limited to the scope of our institution with its specific features, or very similar healthcare organization.

LITERATURE REVIEW

It is well-known fact that knowledge is a resource that needs to be strategically managed by organizations and can lead to competitive advantage when privately owned. Additionally, knowledge management (KM) is related to as an organizational activity implemented for creating an ambience in which data and information is transformed into knowledge and then to capital (Gabbay & May, 2004). The concept of KM in a broader sense could be described as the efficient use of knowledge to advance organizational capability and competitiveness (Hsia & Lin, 2006).

To be more specific, Girard & Girard, (2015) gave the following definition of KM in health care: "Knowledge management is a set of principles, tools and practices that enable people to create knowledge, and to share, translate and apply what they know to create value and improve effectiveness."

Outcomes of the study on KM implementation (Hassanian et al., 2015) demonstrated that KM can be applied to medical science. By implementation of systematic KM into medical science, every healthcare professional, can help promote the creation, capturing, sharing and applying of his knowledge to practice. It is presented that level of knowledge in medical groups is determined by the total amount of knowledge accessible and its level of transfer, pointing out that sharing knowledge would help better use of distributed knowledge, and accordingly facilitate better health care delivery.

Today, there are various options for KM implementation in healthcare organizations. One of the most commonly used is the intranet or intranet portal. Literature says that it could be an effective technical solution for KM in all industries including the health care.

But before we go deeper into the study of intranet portal, we must define the intranet. According to Gartner (Gartner IT Glossary, 2017) intranet is: "A network internal to an enterprise that uses the same methodology and techniques as the Internet. It is not necessarily connected to the Internet and is commonly secured from it using firewalls. Intranets often use an organization's local-area networks (LANs) or wide-area networks (WANs). Services include websites, collaboration, workflow and messaging services, and application development." Intranet portal can be seen as an intranet upgrade and can be described as a gate that combines access to all information and applications on the enterprise intranet. This is a tool that helps organizations to better manage their data, applications and information through personalized views. In hospital settings, intranet portals are becoming very useful tools for management of internal knowledge. Murtaza & Greer (2002) noted that the main purpose of portal is to aggregate information or knowledge from disparate sources and present it in a uniform interface, thus providing each user a personalized and integrated view of corporate information, business intelligence, and applications. Finally, authors concluded that enterprise portals allow an easier flow of knowledge inside the organization.

In the study of Rand (Rand, 2000), in order to support his standpoint that the intranet can be a valuable "support vehicle" in the knowledge management activities of an enterprise, author indicates the importance of working knowledge. Furthermore, he points to the importance of 'how-to' knowledge and its communicating from worker to worker. Capturing the knowledge that is locked up in the heads of a few subject matter experts and distributing it over the organization's intranet is one of the best ways to efficiently protect crucial knowledge. The larger the organization the more important an intranet becomes to distribute information in the organization. Quinn et al. (2014) reviewed the use of knowledge exchange portals (KEP) in public health. They noticed that portals have evolved and can have design features that enable integrated access to relevant content and resources in one location, sharing and distribution of tailored information and for bringing people together for knowledge exchange. Evidence suggests that KEPs in combination with other knowledge management strategies can influence evidence-informed decision making in public health. Guran (2008) introduced the concept of Knowledge applications (Kapps) that could bring the knowledge-enabled intranet (KEI), defining KEI as an intranet that helps the organization to develop and profit from its exclusive knowledge resources, and supports the needs of employees in their role as knowledge workers. He

also considered the knowledge content artifact that might create a valuable part of knowledge-enabled intranet. Analyzing large amounts of data from any business model, determining the personalized predilections of all users and enriching them with relevant information are the main business benefits from Kapps.

Considering the fact that knowledge generation is costly, there is an ever-present dilemma for organizations related to sourcing of their knowledge development. Whether to develop internally or via external sources? Many companies accentuate the value of acquiring knowledge from external sources and use it to facilitate the growth of their own knowledge or competence. In the study of Falkenberg et al. (2003), authors listed instances of external knowledge development, and pointed out that internal knowledge acquisition and creation or learning, takes place within the limits of the company when its members produce and distribute new knowledge through activities such as in-house R&D, stressing that there is no clear boundary between internal and external learning in the actual circumstances.

Assumption that the internal knowledge is crucial in realizing the full potential of the external knowledge proved Devinney et al. (2011). The results from their study showed that external knowledge in itself is rarely determining performance, indicating that it needs to be transformed and internalized which happens when combined with existing knowledge or new internally generated knowledge.

Another strong reason for implementing an intranet portal could be handling the tacit knowledge. Puusa and Eerikäinen (2010) pointed that there is no clear line between tacit and explicit knowledge and the use of the concepts is not settled. Tacit knowledge is often linked to a personal and subjective rather than to a group or an organization, but the findings of this study support the view that tacit knowledge is also context-dependent and organization-specific with a strong relation to organizational culture. Stressing that the asking questions is vital in trying to understand the tacit knowledge and make it visible, the authors also pointed out that all tacit knowledge is not possible, not either necessary to transfer.

Healthcare professionals, through externalization convert their tacit knowledge into explicit knowledge. Special importance in the work of clinicians has “mindlines” or “collectively reinforced, internalized tacit guidelines”. Clinicians usually rely on mindlines in practice because of the role of tacit knowledge, which is more essential than explicit knowledge. Therefore, they combine the knowledge with midlines in their communications converting knowledge into practice (Hassanian et al., 2015).

Regarding to innovation, a few authors (Lu & Tseng 2010; Uden & Naaranoja, 2011; Lin et al., 2010,) agreed that it is hard for an organization to improve its business performance without managing knowledge, underlining the view that innovation is a key factor for building sustainable competitive advantage. Behind the innovation lies knowledge and this knowledge often comes from internal sources and original ideas. The case study from Okatan (2012) revealed that intranet is a strongly supportive tool for capturing knowledge from minds of the members in an organization, also stressing out that it is just a tool which is useless when it is not used. Furthermore, intranet portal could give employees of an organization a powerful means for accessing critical knowledge and to share knowledge and generate innovative ideas.

Outputs from research of Rand (2000) confirm that employees do not instantly “flock” to an intranet just because it is there. Managers and IT professionals must cooperate to lead the organization to the intranet.

MATERIAL AND METHODS

The intranet portal was implemented in the General hospital “Djordje Joanovic”, Zrenjanin, Serbia. Hospital has already built an IT infrastructure, intranet and HIS. Within the intranet there is a determined, structure based set of folders, containing general and accurate documents of internal importance, thereby largely supporting workflow of employees. The first step in the process of developing the intranet portal was to study the requirements.

Department for quality improvement had analyzed the existing intranet solution and then submitted its requests. Also, the Department for education and scientific research delivered its requirements relating to the management of medical knowledge, but also the requirements for knowledge sharing and externalization of tacit knowledge. We have noticed that there are several target groups of users. It was clearly seen that in addition to the personalization of the portal, it must contain user groups, primarily due to CME. In the existing intranet, searching is time consuming. There are no possibilities for knowledge sharing and externalization of tacit knowledge. The main challenges were to develop in short time and with no additional costs. Everything had to fit into the existing hardware / software infrastructure.

After a thorough and detailed requirements analysis, we created a prototype. For the successful creation of any application, today it is crucial to make a quality UX / UI design. We developed wireframe mock-up by using Balsamiq 1.6.69. Fundamentally, we installed Wordpress 4.0. as a most popular CMS and blogging platform today. The next step was to choose appropriate theme and plug-ins. First of all, we had chosen an appropriate fully responsive theme, and then consecutively installed all the necessary plug-ins that expanded basic CMS functionality. Plug-ins had to meet functional requirements that we categorize in the following list:

1. Membership - controlling of all activities related to the membership (personalization, groups)
2. Calendar - scheduling specific activities within the time frame
3. Surveys and polls - surveying satisfaction of employees and their aspirations
4. Upload / download - monitoring of users' content
5. Quizzes / tests - implementation of CME activities such as electronic accredited test
6. Socialization – providing the expert forum with certain medical issues
7. Localization - enabling complete localization of front end and back end

It is important to note that the whole system is based on Web 2.0, and hence that, incorporates comments on most items. Thanks to that, we could collect hidden knowledge and affection from the staff.

At the end of this step, the intranet portal was enriched with appropriate graphics solutions. Finally, a browser-based intranet portal application was designed and developed, keeping in mind the complex workflows of all departments in the entire hospital.

The intranet portal application consisted of five components.

1. The first component was a browser-based application that is based on Wordpress 4.0.
2. The second component consisted of an open-source RDBMS (MySQL).
3. The third component was the web server. We selected Apache as an open-source solution.
4. The fourth component was the operating system (OS). We have chosen MS Windows Server 2003 because we had the existing infrastructure and support personnel to help troubleshoot issues.
5. The final component was the hardware, which consisted of server hardware and end-user interfaces, which in our case were thick clients and several workstations.

The final phase was implementation. System was tested and successfully implemented on the existing hardware / software infrastructure. We have to note, that it did not go quite smoothly. We noticed some problems in testing related to the compatibility of WordPress plug-ins and MS Windows Server. Some plug-ins we needed to particularly adjust and some to replace with others, similar but more suitable ones.

RESULTS

As a result, we realized a fully functional intranet portal within the budget that fulfilled all the requirements that were set. Additionally, it was implemented in the existing infrastructure.

FINDINGS

A review of the literature found that the internal knowledge is fundamental for well functioning of an organization and particularly for its development and innovation. From our case study, it could be seen that intranet portal based on WordPress could be an affordable solution for healthcare organizations regarding timely informing of employees, sharing internal knowledge, as well as implementing of CME activities through quizzes and questionnaires. Socialization is another important prize from implementation of such intranet portal. Finally, as a major gain, it could enable to some extent, tacit knowledge externalization through web 2.0 technology.

DISCUSSION

The problem of how to manage the internal knowledge in hospital by utilizing intranet portal can be solved in many ways. The other options that were considered included Liferay 6.2 and MS SharePoint 2013. Liferay Portal is a free and open source enterprise portal software product. Liferay, which is based on Java and portlets could be somehow hard to customize, and generally has steep learning curve. SharePoint is a web-based application that integrates with MS Office. It is a tool that helps an organization manage its internal communications, applications and information more easily and provides the means to capture and share tacit knowledge. However, drawback is that it requires CALs which is about \$100 per user.

Restricted to budget, we decided to set up our intranet portal based on WordPress. It is an open source and free scalable solution, easy to deploy and use. There are huge number of free quality themes and plug-ins that provide quick customization and expansion of a CMS. WordPress has a large and friendly community for support and troubleshooting. We have to mention that our institution already has two solutions for managing internal knowledge, such as a simple KMS and an LMS based on the Moodle. Therefore, in our hospital setting, intranet portal is an additional but powerful tool for that purpose.

CONCLUSION

It could be concluded from this paper that intranet portal gives employees the ability to be well informed, to disseminate expertise, and finally to make better decisions. Internal knowledge is fundamental for well functioning of an organization and particularly for its development and innovation. Intranet portal that we presented is capable to manage internal knowledge and furthermore to successfully support all four knowledge dimensions - socialization, externalization, combination, and internalization.

Nowadays, the implementation of an intranet portal does not necessarily have to be a hassle as there are many affordable solutions. However, managing the internal knowledge within an organization in an effective way could be quite a challenge.

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Session F: OTHER

Abstracts (pp. 293-298):

Ali Reza Afshari, Milan Nikolić, Zahra Akbari PERSONNEL SELECTION USING GROUP FUZZY AHP AND SAW METHODS	...293
Ildiko Csapó, József Poór, Tímea Juhász, Andrea Visztenvelt FLEXIBLE EMPLOYMENT FORMS IN DIFFERENT COMPANIES LOCATED IN BUDAPEST	...294
Danilo A. Đurović THE IMPACT OF URBAN-RESTRAINING MARINE SPACE ON THE PSYCHOSOMATIC HEALTH OF SAILORS	...295

PERSONNEL SELECTION USING GROUP FUZZY AHP AND SAW METHODS

UDC: 005.953.2:510.644

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ABSTRACT

Personnel evaluation and selection is a very important activity for the enterprises. Different job needs different ability and the requirement of criteria which can measure ability is different. It needs a suitable and flexible method to evaluate the performance of each candidate according to different requirement of different job respect to each criterion. Analytic Hierarchy Process (AHP) is one of Multi Criteria decision making method that is a method to derive ratio scales from paired comparisons. Simple Additive Weighting (SAW) which is also a simple and most often used multi attribute decision technique. The method is based on the weighted average. The method proposed in this paper successfully models the ambiguity and imprecision associated with the pair wise comparison process and reduces the personal biasness. This study tries to analysis of Analytic Hierarchy Process in order to expect the recruitment process be more reasonable based on the fuzzy multiple criteria decision making model to achieve the goal of personnel selection. Finally, an example is implemented to demonstrate the practicability of the proposed method.

Keywords: Fuzzy AHP, SAW Method, Personnel selection, Fuzzy decision making.

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FLEXIBLE EMPLOYMENT FORMS IN DIFFERENT COMPANIES LOCATED IN BUDAPEST

UDC: 331.108.34(639.151)

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ABSTRACT

Today, atypical employment, such as flexible forms of employment, has gained more important substantiality within work science researches. As a result of the economic crisis, the flexible employment form has appeared as an alternative solution, as it has cost reducing effects. The authors examined how the different companies - operating in the Hungarian capital- react on the economic crisis. Do they prefer the flexible employment forms as a possible and effective way of employment? In 2013 and 2015, the researchers also carried out a survey that tests the results of the current study, some results of the quantitative survey of the organizations were presented in Budapest. Based on the analysis in 2015 the organizations were more optimistic, and this is one manifestation of the willingness to expand employment as showed. The authors' aim with this study is to supply relevant answers regarding the new prospective methods of flexible employment.

Keywords: atypical work, flexible employment form, economic crises, alternative solution.

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THE IMPACT OF URBAN-RESTRAINING MARINE SPACE ON THE PSYCHOSOMATIC HEALTH OF SAILORS

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613.68

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ABSTRACT

The total imposed by the urban naval system, or maritime profession, defines maritime professionalism as a specific profession. From this and many other reasons, it is necessary to take seriously into account the educational and practical application of health preventive modalities today. Speaking of the maritime profession, it is evident that the concept of educational validity should be much more pronounced than when it comes to the professions carried out on the mainland. This finding is in favor of potential risks and / or process cancellations that are inevitable or more present than in the case of performing work and life tasks on the mainland. The deterioration of the psychosomatic health of sailors on a "long sailing ship" is evident in the observations and diagnoses of psychosomatic suffering and sociophysiological alteration of current personalities.

Key words: Professional Seafarer, "Naval Ship", Psychosomatic Health, Urban System, Restraint Space, Psycho-Somatic Suffering.

INTRODUCTION

The ship as a urbo dynamic system can primarily be observed in two basic segments. First, the ship as a urbo dynamic space, and the ship as a urbo restrained space. In both observations, there is an unusual work-life engagement for many or at least for all the economic engagements. Working and non-working (engagement) of a seafarer on a "long-sailing ship" is subject to the same destructive factors relating to swinging, tugging and other disturbances that are present, and may be said to be constant due to sea-ocean cruise conditions.

"A boat of long sailing"¹ regardless of its modern technical-technological performance is subject to the influence of natural phenomena on water (sea and oceano). The common name of water occurrences are wavelengths that can be different in strength and height as shown in Bofors from 1st to 12th grade. It is not just the problem of sea waves, but there are not a few other factors that strongly, gradually or immediately (aggressively) affect the occurrence of psychosomatic disorders and socio-physical alterations of seaman's personality.

Multidisciplinary absence outside the family, temperature variables, noise, vibration, insomnia, the impact of the work specification on the "guards" system, the effects of the restriction on the space, nostalgia, nausea, alcoholism, smoking, seduction of sedatives and other medications and analgesics, multicast use of mobile telephony Such as telecommunication information devices, limited physical contact socios, sexsus abstinence and sexual aberration, which is often manifested by masturbation, drug smuggling, weapons and other prohibited goods because of the desire to make as much money for as little time as possible, ..., strongly affect the occurrence of circadian destruction.

¹ The term "Sailing Boat Sailing" by Prof. Dr sci. THAT. Đurović used the term "over-the-counter merchant ship".

The modern "long-sailing ship" is, on the one hand, so gloomy and technically obsolete (length of ship, increased tonnage, swinging speed, reduction in overtime in the harbor or anchorage), while on the other hand the number of engagements is reduced to On board, whether seafarers or professional sailors.

The short-term "isolation" of individuals in the domain of urban and industrial noise as well as the "flight" of work-life burdens has a positive, relaxing effect on human health until the moment the person personally experiences as relaxing. However, when monotony is "constantly" present or is an integral part of a work-life opus, then it affects the appearance of certain pathogenic manifestations that often end in bodily or psychophysical injuries.

LONG SEA SHIPPING AND PROFESSIONAL SEAFARERS

Speaking of seamanship as a multisystematic activity requires a very serious and professional approach. Maritimeism is not just a ship, or a seaman, but also a port, harbor systems with all operational procedures, professional boat management and other validity related to maritime affairs. Our task is to briefly point out the psychosomatic phenomena which are very often indicative of the engaged sailor on a "long sailing ship".

The term "long sea shipping" completely replaces the term "trans-shipment over-sailboat", or the name for a ship performing a freight-trade service over the oceans and the seas. The term seafarer is used when it comes to a subordinate engaged in a "long-haul ship" whose profession or work is not strictly related to the maritime profession or is not professionally educated for one of the naval functions such as "deck" or "Shipyard".

So, under the terms of the seafarer, every individual engaged on a "long-sailing" ship in the service of "white-auxiliary staff", such as waiters, chefs, young men and kitchens, auxiliaries, and so on. The term "professional seafarers" means any engaged person who is, for a certain period of time, entrusted with the task of carrying out tasks responsibly related to "deck" (ship management, security and many others) or engaged persons professionally trained for operational regular and Special assignments in the ship's machine shop (machine-to-machine complex). Educational program for professional seafarers, and adapting to the current time of market supply and demand, requires, among other things, knowledge of safe navigation ("long-life navigation"), power, technical-technological, informational and service trans-shipment systems.

REDUCTION OF WORK ENGAGEMENT

Many of the factors mentioned, whether direct or indirect, have their share in disturbing the circadian rhythm and the regime of life and work of seafarers and professional seafarers. And the factors that are accompanying or primary in these operational requirements will have a gradual but certainly negative impact on the health of the seafarer. As one of the many examples, it may be mentioned that at the time of the 1960s on a "long sailing" boat, which was long around approx. 150-160 meters, the number of employed labor force (nautical, shipwreckers, radiotelegraphs - which is today due to modern technology, and those engaged in "white-help staff") ranged from 43 to 47 people. Today, the modern ship as a dynamically dynamic service system with dimensions of approx. 200-230 meters requires 15 to 20 people to engage in any job.

Reduction of work engagement on a "long sailing" vessel is conditioned by modern electro-navigation and control-driven, as well as over-the-counter systems that, with great precision, shorten the time required for the overall demand (operation). Due to these findings, the increase of the urban-naval system on the one hand and the reduction of required engagements (seafarers and seafarers) is one problem that directly belongs to sociopsychological and / or psychosocial observation.

MARINE SPACE RESTRICTION AND PSYCHOSOMATIC DISTURBANCES

The conclusion of this event is that in an increasing urban ship space, an associative mile is born, which has a kind of "personal alienation", which can leave indicative consequences for increasing the circadian destruction of prisms of psychosomatic disturbances and sociophysiological alterations. When it comes to restriction of marine space, Maritime ergosophology, through the modern, scientific-educational concept, sees a "naval ship" on the one hand as urban, while on the other hand as a urbo-restraining system. What is interesting to note from these observations is that the ship as a urbo dynamic system is interpreted through the scientific technological values that characterize the movement and maneuver of the ship with its specialty, and knowledge of sea crash prevention studies, safe abandonment of the ship by drowning or by means of legally foreseeable binding legal regulations on the notification and seeking of assistance by other persons.

Marine space restriction is a limiting phenomenon for a long time, not only when moving a ship by oceans or seas, in transshipment operations, but also in harbor aquaterial anchoring. In the psychology of personality, the negative influence of space restraint on the behavior of the individual in the sociological milieu has long been known, as well as the influence of certain sociological isolation on the overall behavior and health of the current subject.

DESIRE TO TRAIN FOR A MARITIME CALL

In today's time there is not a small number of candidates who have the desire to train for a maritime call. These desires "appear" for three main reasons. The first reason is the desire to "escape from the family-to-social times so far". Another reason is the desire to meet the world, while the third, and at the same time, could be the first, the inability to work on the land! When it comes to the first reason then we have the following information. With these candidates, the time of study is prolonged due to their negligence or comparative study and job engagement due to additional earnings that "supports" the student budget. Parameters we have indexed say that out of the 100% of the candidate candidates, about 37.2% of them completed the studies within the foreseen time period (with the delay of two to three months) while the other index index of 62.8% sums up all those candidates who are not Within the foreseen time period they have completed their studies. This relationship best describes our statement as "the first reason".

The second reason is a special feature, which, before, could be said to arise from the lack of timely information relating to maritime-maritime engagement and maritime life. A large number of candidates for studying piracy exercises from this group might say that the ship is a "personal transportation vehicle" that will guide them through the world's ports and cities to get to know these destinations. In these candidates after joining the maritime work engagement on "long sailing" after a very short time (For a couple of thousands of passengers) is disappointing, very often for the following reasons: - the ship must be on demand for the presumptive and out of the "working hours", - the ship is carrying the cargo (especially tankers) away from the harbor and the port city for several tens of miles, At the so-called. "Terminal platform" for loading of liquid cargo. - when a ship agrees to lucitada there are rules on the number of crew members who can temporarily leave (a few hours) for a ship to depart to the port city. - due to modern transshipment systems, the harbor operator ship is kept very briefly in the port of transshipment, or up to the time of the transshipment operation is anchored in the harbor (anchorage) which again requires a different "exit" relationship in the port with the ship or port of the water vehicle limited With the permission of the captain of the ship, the port authorities, the police,) The current ship and the modern way of port operations, even in this century's favored candidate who wants to engage in a maritime call for "getting to know the world".

The third reason is more "inhuman" work engagement, especially when considering socioeconomic problems on the land (inability to work) and "catching straw" for a maritime call, which is not based on a professional motive, but as a motive for any employment (survival) Existential survival. The urge to find a job on a ship is a constant information that the waiting time for the boat engagement is much

shorter than for land-based employment that could have been said improperly. When considering all three of these reasons, shipping as a commercial branch of a cargo cargo has a good prospect, both in traffic and in manpower, because thanks to technical-treble and informative progress the urban space increases, then the speed and security of the ship is also increased, While the filtering of personnel for maritime calls is sufficiently reliable, which promises a sailing and a good prospect. It remains to observe the inevitability of which a ship as an urban dynamic and urban restraint system imposes on an engagement agent on a "long voyage" vessel with all the aquatic geophysical impacts (restless sea, orcs, tropics, meteoropathic influences, separation from the family ...) Adaptive biophysical and sociophysiological mechanisms in the current subject could function incapacitated.

CONCLUSION

Restrictions on urban marine space, navigation in special geo-aquatorial conditions, family segregation, biophysical and sociophyseal unpreparedness (insufficient, inadequate and inadequate adaptability), disappearance of individual faces from the ship during sailing in a mysterious manner, or sudden death of a member of a ship's collective whose cause Can be conditioned by a powerful spur. Said, as well as many other current events that disturb or disturb the functions of the circadian rhythm and the regime of life and work of the engaged person on a "ship of long sailing" represent a very dangerous destructive factor in the mile of psychosomatic disturbances and sociophysiological alterations, which opens space for urgent and serious discussion of certain Specialties in the field of prevention and health preservation.

Maritime has always been treated as a specific and at a special risk as economic transport service, thus not ending its danger by building larger, more modern ships. Maritime ergosophology as a young scientific area in this profession offers a completely new and necessary high educational dispersion as the starting point for observational diagnostics of trauma-pathological phenomenon.

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