Figure No 1. Copper production in RTB Bor Group from 1990 to 2012
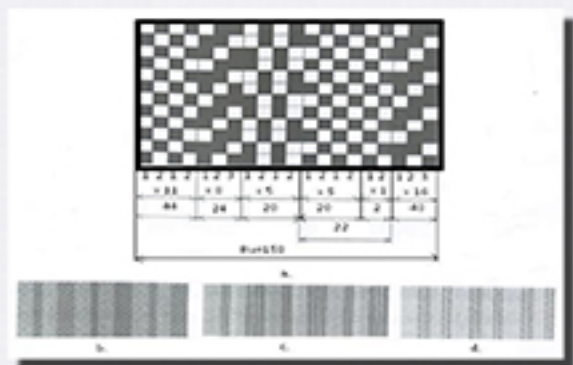

Figure 2. The binding with longitudinal ribs obtained
by grouping weave bindings, twill 2/1 and ribs 2/2:
a - the binding's repeat; b - black&white simulation;
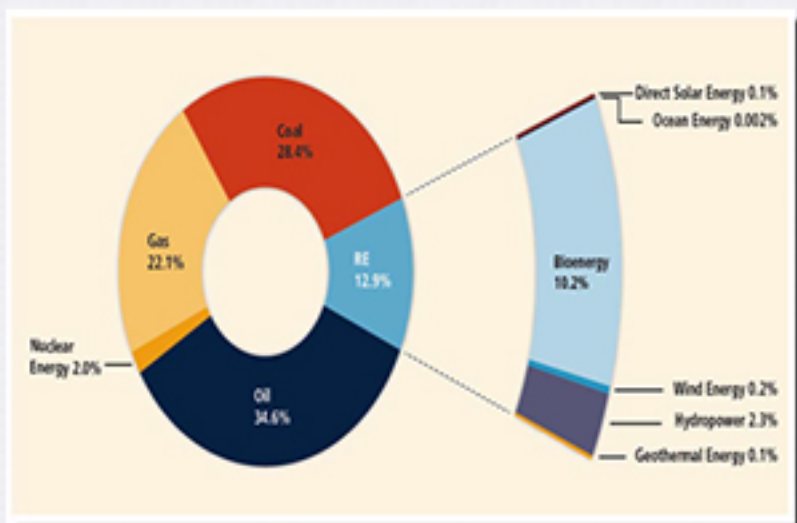c,d - colour simulation.

Figure No.1 Representation of energy sources in global dimensions

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E M I T

Content:

SERBIAN ENTREPRENEURSHIP – FUTURE CHALLENGES

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Abstract: Entrepreneurship is the driving force of a society, leading through innovative activity and improvements to increased competitiveness of the overall economy. Creating new products, services or advancement of the existing ones, constitute the basis of entrepreneurship, as well as the improvement of business operations. The paper represents the state of entrepreneurship at the global, regional and national level. We attempted to provide guidelines for further development of Serbian enterprises by comparing the secondary and by statistically analysing the primary data, on a random sample.

Keywords: entrepreneurship, innovation, development, change, economy

SUMMARY

The paper represents the current situation of entrepreneurship in Serbia and the region, as well as the research conducted in order to obtain a picture of the entrepreneurial activities that are carried out. The results showed that although Serbia is not lagging behind in entrepreneurial activities in the region, compared to the average of the countries to which it belongs, looking from the aspect of economic development, it actually legs far behind. The only stage of entrepreneurial activity in which it has a higher percentage compared to the average of those countries is the initiation of personal business. If looking solely at the national level, statistics show that the number of entrepreneurs, employees and the turnover is declining or stagnating. Empirical research conducted on a sample of entrepreneurs showed that generally no entrepreneurial activities are carried out or they are implemented in a very small percentage. Activities on innovation of products, services and operations are not part of the daily activities, and if they are actually applied it is mostly done without prior market research and business plan prepared in advance. Significant differences do not occur, regardless of the number of employees or business activity of the enterprise. This paper intended to point out to all that is negative and positive in Serbian entrepreneurship, as well as to emphasize those areas that need to be changed or improved.

1. INTRODUCTION

Climate for creativity and innovations should be promoted through generations in order to encourage the use of new products, services and method of operations. Such a climate within a company sustains the development, the assimilation and use of new and different approaches, practices and concepts. This is associated with a wide range of innovative outputs: new ideas, improving processes, new products and new ventures [1].

Society is constantly changing, the environment imposes new standards, so what's new today, tomorrow already becomes obsolete and requires looking for new, proactive

activities. The constant changes in the global market environment in modern conditions are leading to a steady increase in the number of market participants and increase in competition. On such markets, only those players who have initiative, who can adapt to changing environments and have the capability of operating under certain marketing rules and principles, can count on business success [10].

Developing countries, including Serbia, need to adapt to the environment, and create as much as possible visibility and diversity in relation to other economies. Entrepreneurs are the drivers of change, innovation; they change the present and create the future. For this reason, the paper focuses on entrepreneurship at the average level of economies at different development stages and Serbia particularly, pointing out aspects that should be affected, in order to change the entrepreneurial future and impact on the positive trends of economic development and competitiveness.

2. INNOVATION AND ENTREPRENEURSHIP – SOCIETY'S DRIVING POWER

There are a large number of definitions for entrepreneurs and what constitutes entrepreneurship. Curran and Stanworth [3] suggest that entrepreneurship refers to the creation of a new economic entity focused on creation of a new product or service, or, at least, of such products or services that would significantly differ from the other products or services offered on the market.

Entrepreneurship is defined as the ability to form a specific efficient economic activity on the basis of creative human activities and limited production factors. Entrepreneurship is a dynamic process of creating added value. The value is created by individuals who take the greatest risk in terms of capital, time, and / or career. Entrepreneurship is the process of creating something new by investing the necessary time and effort, assuming the existence of related financial, physical and social risks and accepting appropriate rewards in money, personal satisfaction and independence [5].

The entrepreneur is the driver of the ventures, changes and development, the carrier of innovations. He should not be innovator himself, but decide on how to take advantage of innovation, increase competitiveness, reduce risks, detect and more rationally use economic resources [14].
A large number of people consider when starting a business that a good idea is the basis for the initiation of the business. These "brilliant" ideas tend to remain just ideas that would provide modest profits, should they come true, without any knowledge or experience in the area in which this "brilliant" idea should be achieved. For successful entrepreneurs the following are important [11]:
1. Knowledge - type and size of the market, who are the customers, their needs, what are the technologies needed to realize the idea, some business activities, et al.
2. The entrepreneur himself/herself - experience, passion, perseverance, persistence, work, et al.
3. The idea - dream, goal, untapped market opportunities.

In the business world the importance of innovation is rarely underestimated. The general view is that in all highly industrialized countries, long term development of enterprises, and (thus) of the regions, derives from their ability to continually develop and produce innovative products [13]. The entrepreneur bases his/her business operations on innovation in business, which suggests that at the micro level, boosting of entrepreneurship should influence the development of the economy and the region.

Innovation in enterprises is generally entrusted to a particular team, consisting of experts in various fields. Despite their technically high level of education and knowledge,

these experts are often not in direct contact with the market and major customers, and thus what leads to true innovation in business is omitted, and that is an idea [12]. Just for this reason it is necessary for entrepreneurs to engage all employees (or at least most of them) in the innovation of a product. Innovation is the chain of activities that begins with market research, continues by creating ideas, selecting ideas, invention, and ultimately placement of innovation on the market.

3. ENTREPRENEURSHIP IN MODERN TERMS

Some regions precede others in the establishment of successful small businesses and creation of entrepreneurs, which is why their economic development is more successful. The question is whether it is due to the characteristics of the population, or other aspects of the environment and infrastructure that allow potential entrepreneurs to better utilize their skills and opportunities. According to official statistics, a large percentage of start-ups fail within the first three years of operation [4]. For this reason, in any economy it is important to realize what "inhibits" the development and survival of enterprises.

Today we talk about entrepreneurship in a broader context, due to the following facts [9]:

1. Approximately 10% of the workforce in most OECD countries is self-employed. It should be added that a large number of people have contact with some form of self-employment, either by once being self-employed, or someone in their family or a friend was or still is self-employed;

2. Between 80 and 90% of jobs are managed by self-employed individuals;

3. Many employees in the industrialized countries state they would prefer to be self-employed, indicating a great potential for future entrepreneurs.

Economies in the world economy, with regards to the economic development stage, can be divided into [15]:

- Factor-driven economies (basic requirements subindex: institutions, infrastructure, macroeconomic environment, health and primary education);
- Efficiency-driven economies (efficiency enhancers subindex :: higher education and training, goods market efficiency, labour market efficiency, financial market efficiency, financial market development, technological readiness, market size);
- Innovation-driven economies (innovation and sophistication factors subindex: business sophistication and innovation).

One part of the Global Entrepreneurship Monitor, measure Total Entrepreneurial Activity rate, which consists of the percentage of individuals aged 18-64 years in an economy who are in the process of starting or are already running new businesses. Total Entrepreneurial Activity includes both nascent and new entrepreneurs, measures established business activity and discontinuance.

If we start from phases of economic development and entrepreneurial activity, we can conclude that (Table 1) factor-driven economies (in average) for 2012 have greatest rate of nascent entrepreneurships, new business ownership, early-stage entrepreneurship activity and rate of established business ownership. From one side, there is lot of those who started new business, but on other side, factor-driven economies have greatest rate of discontinuation of business. Highest deviation between factor-driven economies on one side, and innovation and efficiency-driven economies on other side was present in 2012 and 2010.

Efficiency-driven economies have highest rate of nascent entrepreneurship, new business ownership, early-stage entrepreneurial activity, established business ownership rate, in comparison to innovation-driven economies. But still efficiency driven economies have a greater rate of discontinuation of businesses in comparison to innovation-driven economies.

Table 1. Entrepreneurial Activity in 2012, 2011, 2010, 2009, by Phase of Economic Development

PHASE OF ECONOMIC DEVELOPMENT	Nascent entrepreneurship rate	New business ownership rate	Early-stage entrepreneurial activity	Established business ownership rate	Discontinuation of businesses
2012					
FACTOR – DRIVEN	12	13	24	11	13
EFFICIENCY – DRIVEN	8	6	13	8	5
INNOVATION – DRIVEN	4	3	7	7	3
2011					
FACTOR – DRIVEN	9,2	4,8	13,4	5,6	5,7
EFFICIENCY – DRIVEN	8,4	5,9	14,1	7,2	4,3
INNOVATION – DRIVEN	4,0	3,0	6,9	7,2	2,7
2010					
FACTOR – DRIVEN	11,8	12,3	22,8	12,6	12,5
EFFICIENCY – DRIVEN	6,7	5,2	11,7	7,6	4,4
INNOVATION – DRIVEN	3,0	2,8	5,6	7,0	2,3
2009					
FACTOR – DRIVEN	9,9	8,3	17,7	8,9	6,9
EFFICIENCY – DRIVEN	6,1	5,3	11,2	7,9	4,9
INNOVATION – DRIVEN	3,4	3,1	6,3	6,8	2,5

Source: Global Entrepreneurship Monitor –
Global Report 2012, 2011, 2010, 2009 [2],[6],[7],[16]

From the above presented table it can be seen that factor-driven economies still lag behind the innovation driven economies that introduce innovations in their business and thereby provide an advantage over the competition. This means that the underdeveloped countries and developing countries should focus on increasing investment in those aspects that lead to the increase of the basis for the development of innovative activities.

4. ENTREPRENEURSHIP IN SERBIA

Clear distinction between private businessmen and entrepreneurs cannot be established. When in most of the European countries and the United States someone mentions the term entrepreneur that does not imply a private businessman. Entrepreneur is a person looking for new market opportunities and business solutions. Entrepreneurs initiate the changes and they are the drivers of social progress. Sometimes a large company can be entrepreneurially - driven, yet this is not an entrepreneurial company, it is organized as a different legal entity, and only business operations have entrepreneurial character.

In most of the EU countries and the States if somebody has their own business, they are "sole proprietor" or a "small business owner". That means he has his business, he is a lawyer, dentist, consultant etc. He is not "entrepreneur". In our country, this is not the

case. Namely in the Law on Registration of Business Entities a term entrepreneur is used for a natural person who carries out any activity for profit. The result is that everyone with their own private business can be an entrepreneur, without taking utmost care of innovative activity, a good knowledge of the market due to introduction of the innovations, providing resources for research and development of new products, services and ways of doing business, but mainly to possess their own business. This questions the development of entrepreneurship, which as previously stated, "carries" change and progress in society.

The data from the Global Entrepreneurship Monitor - Global Report for Serbia, relating to the state of the entrepreneurship, refer to the last information for 2009 [7]. Serbia according to its development is among efficiency-driven economies. If we analyze the data for 2009, for the countries in the region (Table 2.), as the last available data for Serbia, it can be seen that Serbia has lowest rate of nascent entrepreneurship, and highest established business ownership rate. In the region, Serbia has the lowest rate of disconnection of businesses, and it is after Hungary in rate of new business ownership. Serbia is after Hungary, Croatia and Romania in rate of early-stage entrepreneurial activity.

Table 2. Entrepreneurial Activity in Region for year 2009

EFFICIENCY – DRIVEN ECONOMIES	Nascent entrepreneurship rate	New business ownership rate	Early-stage entrepreneurial activity	Established business ownership rate	Discontinuation of businesses
	2009				
SERBIA	2,2	2,8	4,9	10,1	1,9
BOSNISA AND HERZEGOVINA	3,1	1,3	4,4	3,9	3,1
CROATIA	3,5	2,2	5,6	4,8	3,9
HUNGARY	5,4	3,7	9,1	6,7	3,2
ROMANIA	2,8	2,3	5,0	3,4	3,6

Source: Bosma, N., Levie, J. Global Entrepreneurship Monitor [7]

If we compared entrepreneurship trend in Serbia with average of efficiency–driven economy, we can conclude that Serbia in year 2009 significantly lags according to all phases of entrepreneurship activities. Established business ownership is only entrepreneurship activity in which Serbia has greater rate in regard to average rate of efficiency–driven economies. Here the question arises whether the ownership of the business is the entrepreneurship in the true sense of the word, which carries with it a novelty, innovation, pro-active approach to business, or whether entrepreneurs are persons who are as such registered under the Law on Companies.

Data of the Republic Statistical Office for the period 2007-2011 indicate that the number of entrepreneurs increases on yearly basis, except in 2011 when a slight decline was noticed. On the other hand, the number of employees has increased by 3.51% only in 2009, while in other years a decline was recorded. Turnover of entrepreneurs decreased each year. While it shows a small increase in 2011 compared to 2010 (0.44%), when turnover in 2007 is compared to the one in 2011, one can see that in 2011 it decreased by as much as 18.53% (Table 3.). The results show that entrepreneurship in Serbia has decreased. Entrepreneurship as the driving force of a society should be improved and directed in the right direction towards innovation and change, leading to the achievement of competitive advantage of the society.

Table 3. Chain index of the entrepreneurship status in Serbia

	YEAR OF OPERATION				
	2007	2008	2009	2010	2011
Number of entrepreneurs	212.575	214.819	226.242	228.680	228.540
Chain index	-	101,05%	105,32%	101,08%	99,94%
Number of Employees	285.728	250.591	259.383	232.176	203.520
Chain index	-	87,70%	103,51%	89,51%	99,29%
Realized turnover value (in billions of RSD)	992.648	956.031	924.451	805.140	808.709
Chain index	-	96,31%	96,69%	87,09%	100,44%

Source - Calculation by source: Republic Statistical Office, "Entrepreneurs in the Republic of Serbia in 2007; 2008; 2009; 2010; 2011, Working paper ISSN 1820-0141, No. 2008/62; 2009/67; 2010/72; 2011/78; 2012/81, Belgrade.

Number of employees significantly impacts the differences in entrepreneurial activities
Alternative Hypothesis H1: Number of employees significantly impacts the differences in entrepreneurial activities
Alternative Hypothesis H2: Business activity of the company significantly impacts the differences in entrepreneurial activities

The conducted survey is the transversal study, of empiric character. During the data collection non-standardized research technique - interview was used. As an instrument of this technique, for study purposes, a specially designed questionnaire was used. Collection and interpretation of the results was performed pursuant to the Oslo Manual [8] guidelines for the collection and interpretation of research results.

The sample included 400 entrepreneurs, to whom the questionnaire was sent electronically. There were 339 valid returned questionnaires. The sample comprises 16.5% of entrepreneurs who operate up to 3 years, 27.1% of those who operate from 4 to 6 years, 25.4% operate between 7 and 10 years, and 31% of the entrepreneurs who operate 11 or more years. The business activity of the entrepreneurs in the sample is marked as production (35.4%) and service industry (64.6%).

On the basis of theoretical research it was seen that for an entrepreneur the most important is the idea and innovation of products, services or method of business operation. The variables that were taken into consideration were the following:
Q1 - Innovation of products, services and method of business operations is an integral part of the activities of your company
Q2 - Funds allocated for innovative activity and improved operations are in accordance with the business needs of your company
Q3 - Before the introduction of innovations in business, your company first prepares a business plan and marketing strategy
Q4 - Market research in order to improve products, services or business operations is a regular activity in your company
Q5 - In your company all the employees are engaged in the innovation and improvement of products and business operations

For this reason, we have started from the innovation as the basis for determining the entrepreneurial nature of the business. The results showed that out of the total number of companies taken into consideration, 40.4% introduce certain innovations, while the major part (58.6%) do not innovate at all, introduce innovation from time to time or have even responded that they do not know whether the innovation is applied in the company. In the

sample, only 20.4% of all enterprises allocate sufficient funds for innovative activity. The results showed that in only 27.1% of the companies there is a business plan and marketing strategy for innovation in business, indicating that even if some kind of innovation in business is implemented, they are often implemented without previous thoroughly designed details of their introduction. Market research in order to improve the product, service or business activity is a regular activity in 31.6% of the companies, while 68.4% of companies do not engage the market research for the purpose of innovation, they do that from time to time, or the company does not even know about it. In the majority of companies (38.3%) in the sample the employees were not engaged in innovation and improvement of products and operations, while in 23.3% they were actually engaged, and in 38.4% of the companies they were engaged from time to time, or the responses of those interviewed were that they are not aware of the involvement of the employees (Table 4.).

Table 4. Entrepreneurial activities in the companies included in the sample

VARIABLES TAKEN INTO CONSIDERATION		YES	NO	FROM TIME TO TIME	I DO NOT KNOW
Q1	Absolute frequency	137	65	120	17
	Relative frequency	40,4	19,2	35,4	5,0
Q2	Absolute frequency	69	100	85	85
	Relative frequency	20,4	29,5	25,1	25,1
Q3	Absolute frequency	92	77	60	110
	Relative frequency	27,1	22,7	17,7	32,4
Q4	Absolute frequency	107	78	97	57
	Relative frequency	31,6	23,0	28,6	16,8
Q5	Absolute frequency	79	130	82	48
	Relative frequency	23,3	38,3	24,2	14,2

The study further sought to determine whether the number of employees, or activity affects the differences in entrepreneurial activities of the company. For this purpose the $\chi 2$ (Chi-square test, with certain level of degree of freedom (df) was used. The value 0.05 is taken for significance of differences (for value $p \leq 0.05$ there is statistically significant difference between the variables).

Results showed that (Table 5.):

- There is no significant difference between the companies which have different number of employees ($\chi 2=3,977$, df = 4, p (0.409)> 0.05) in the innovation of products, services, or method of business activities as a component of the enterprise. The difference in innovation as a regular activity was demonstrated in companies with different activities ($\chi 2 = 10.031$, df = 3, p (0.0018) <0,05).

- There is no significant difference between the companies which have different number of employees ($\chi 2 = 4.264$, df = 9, p (0.893)> 0.05) and different activities ($\chi 2 = 6.443$, df = 3, p (0.092)> 0.05) in terms of adequate quantities of financial resources allocated to innovative activity.)

- There is no significant difference between the companies which have different number of employees ($\chi 2 = 8.247$, df = 9, p (0.090)> 0.05) and different activities ($\chi 2 = 2.193$, df = 3, p (0.533)> 0.05) in terms of the existence of a business plan and marketing strategy for introducing innovation.

- There is no significant difference between the companies which have different number of employees ($\chi2 = 7.934$, df = 9, p (0.541)> 0.05) and different activities ($\chi2 = 6.947$, df = 3, p (0.074)> 0.05) in terms of market research in order to improve the products, services or business operations;
- There is no significant difference between the companies which have different number of employees ($\chi2 = 2.761$, df = 9, p (0.963)> 0.05) and different activities ($\chi2 = 3.205$, df = 3, p (0.361)> 0.05) in terms of involvement of the employees in innovation and improvement of the products and business operations;

Table 5. Modality of the implementation of entrepreneurial activities in relation to the company's number of employees and activity

VARIABLES TAKEN INTO CONSIDERATION	NUMBER OF EMPLOYEES			COMPANY'S BUS. ACTIVITY		
	$\chi2$	df	P	$\chi2$	df	P
Q1	10,444	9	0,316	10,031	3	0,018
Q2	4,264	9	0,893	6,443	3	0,092
Q3	8,247	9	0,509	2,193	3	0,533
Q4	7,934	9	0,541	6,947	3	0,074
Q5	2,761	9	0,973	3,205	3	0,361

The research results showed that regardless of the number of employees, there is no difference in entrepreneurial activities that are applied in them. On the other hand, results showed that company's business activity (whereat the included entrepreneurs are engaged either in the production or service industry) also does not affect entrepreneurial activities, except for the innovation of products, services or methods of operation which should be part of the regular activities of entrepreneurs.

Since it has been shown that the activities of companies in the covered population in the highest percentage are non-entrepreneurial-oriented, the research confirmed that business activity does not differ among the entrepreneurs regardless of how many employees they have, or whether they are in the service or production industry. This relates to the statement at the beginning, that entrepreneurs are registered as entrepreneurs, even though they themselves are not entrepreneurial minded and do not necessarily have to innovate and improve their business operations.

The trend of entrepreneurs in Serbia shows that their number decreases slightly, or even drops, while the number of employees and turnover show a decline on yearly basis, or a growth that is extremely small. This trend suggests that entrepreneurs have to deal with innovation and improvement of their operations, in order to be different with regards to the competition and creation of added value for the consumer.

6. DISCUSSION

The results showed that the hypothesis H1 is dismissed on the grounds that regardless of the number of employees, entrepreneurial activities do not differ in this sample. The hypothesis Hs is also dismissed since the results showed that regardless of the business activity, services or production, there is no significant difference in the performance of entrepreneurial activity among entrepreneurs (the exception being the innovative activity as a regular activity of the company, but within all other activities the difference does not exist).

Dismissal of the alternative hypothesis leads to the acknowledgment of the null hypothesis, namely the activities of entrepreneurs do not differ regardless of the number of employees and business activity, and the results of descriptive statistics showed that they generally do not implement or implement in a very small percentage entrepreneurial activity and have entrepreneurial characteristics.

7. CONCLUSION

The available data shows that Serbia is not lagging behind compared to other countries in the region in terms of entrepreneurial activity, although the trend itself cannot be followed due to lack of data. Yet compared to the average of the group to which Serbia belongs, according to its economic development (efficiency-driven economies), it lags, except in established business ownership rate. The issue here is whether the number of start ups of the entrepreneurs in Serbia is evaluated on the basis of those who are really engaged in entrepreneurial activity (innovation, improvement of business) or they are just start ups registered as entrepreneurships.

Data on the movement of entrepreneurs in recent years in Serbia shows a declining trend or stagnation of entrepreneurs themselves, the number of employees and the turnover. This indicates the need to modify entrepreneurial activity and movement in the direction of change in order to change the decline and stagnation, which has an impact on the economy as a whole.

A survey on the other hand shows that entrepreneurs in Serbia are not generally characterized by the features of real entrepreneurs. Implementation of innovative activities is generally not conducted as part of the normal course of business, insufficient funds are allocated for research and development, workers are not involved in innovation activities, and the innovations are not predesigned activities monitored by market research and business plan preparation.

Regardless of the number of employees and company's business activity (production or service industry), there are no significant differences in entrepreneurial activities (except for companies with various activities, and in terms of innovation as an integral part of the activities of the company).

Entrepreneurship represents the driving force of the society, and movement towards new challenges and competitiveness. Data and results show that the position and understanding of Serbian entrepreneurship have to change. Entrepreneurship should not be regarded as starting your own business, but as a business start-up that leads to certain changes and business activity improvement. Only then will the allocation of funds for entrepreneurs be justified, because it will signify an investment in the competitiveness of the economy and not in the foundation of individual businesses which do not carry the innovation. Only in this way Serbian entrepreneurship can be put in the framework that can enable it to compete internationally and in which the entrepreneurs among themselves strive to raise the level of business that tends towards innovation and distinctiveness.

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LEADERSHIP MANIFESTATION IN TERMS OF TECHNOLOGICAL CHANGES

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Abstract: *Market changes that are in the tendency of intensification, both in depth and in scope impose their need for monitoring trends and movements of the environment needs in order to satisfy them. Simply, from the need different ideas and views on the efforts and ways to spring towards the future also arise, which is appropriate to basic economic fundamentals. This paper is an attempt to consider some important spheres of organizational units' functioning, with one of the possible views, and in this way to contribute to the more certain future. Modern economic conditions, characterized by turbulent changes, impose the need for leadership as a means of survival and organization development, and in this context, a retrospective of leadership development in different operating conditions, different social circumstances and different understanding and manifestation of this phenomenon, and pointing out possible directions for its implementation in modern organizations of the future may contribute to the proper understanding and implementation of this phenomenon.*

1. INTRODUCTION

Leadership as a phenomenon of our time, the concept of which it is being increasingly thought, spoken and written about, rightly occupies a leading position in analyzing the performance of organizations in various fields of activity. Contemporary economic conditions, characterized by turbulent changes, impose the need for leadership as a means of survival and development of the organization. Today we often speak of leaders from various aspects, political, cultural, commercial... and each one of them views the specificity of the specific areas to be discussed, so the measures of success are different and in accordance to the possibilities and ways of their presentation. The foregoing facts about the diversity of success presentation stems from heterogeneity of a leader category, which is practically being implemented from the first man's thinking directed toward tomorrow. Thus, leadership as a process can be observed since the beginning of human society, normally, adapted to the environment in which it develops and, to this day, also as the process of the future.

Precisely the goal of this paper is a retrospective of leadership development in different conditions, different social circumstances and different understanding and manifestation of this phenomenon and pointing out possible directions for its implementation in modern organizations of the future. Also, the paper will discuss some specific characteristics of leaders as well that have evolved in parallel with the development of leadership awareness and the social environment.

2. WHAT IS LEADERSHIP AND WHO ARE THE EXPONENTS

Leadership as a concept is derived from the Anglo-Saxon language from the word (Engl. Leading), which means managing that is (Engl. Leadership), which means leadership. Leadership is a process based on the recognition of the impacts by those that are being influenced on and above all in the segment of working with people, motivation, work enthusiasm, identification with the goals of the group ... on a voluntary basis.

The phenomenon of leadership can be interpreted in several ways, all depending on social circumstances in which the interpretation occurred and on the aspect of observation. And thus, in one interpretation leadership is viewed as a process of directing the activities of members or groups to achieve goals, and according to the second, the leadership is presented as the ability to turn vision into reality. Thus, the method of implementation of leadership as a process has been harmonized with the environment, but in the essential leadership and management is always considered a key element in achieving the organization's objectives.

In the study of leadership different concepts have been accepted and abandoned. Thus, in the initial phase of the study of this phenomenon a view is accepted that it is important to discover the characteristics or traits of leaders by which they differ from others. This concept was based on the assumption that leadership is "God's gift", a privilege of few that can "bear" leadership. These attitudes have inevitably had to be discarded because they have been denied by the practice and also science. The leader is a person who plays a central role and a dominant position in the team, i.e. leader is the person who is doing the right things, but doing these things in the right way as well, so he/she is effective and efficient. However, leadership is not an innate gift, but the result of a permanent, hard work on solving real and complex situations by which the leadership role I acquired that does not have to assume a good position in an organization, but this role certainly feels good in every situation and environment, as it is said "better to be first in a village than second in the city."

Social circumstances create the type of leader appropriate to the conditions and environment of business, but as P. Drucker (Peter Drucker) believes all successful leaders know four simple things:

1. One definition of a leader is the one saying that it is someone who has followers. Some people are thinkers, some are prophets. But without followers there cannot be leaders.
2. An effective leader is someone who is willing and who is admired. He/she is someone whose followers do the right things. Popularity is not leadership. Results are.
3. Leaders are highly visible, they give examples.
4. Leadership is not a position, titles, privileges or money. It is a responsibility.

A successful leader must have a vision to bring together and motivate others to work on a job, but to be able to respect and awake to reality: to identify barriers and work to eliminate them. In addition he/she should have the power to influence others to follow him/her and by his/her work and behaviour enable the achievement of set objectives. The power, therefore, is the ability to influence others to do what you want. It is not the function of personal satisfaction or interest, but rather a function of the company, its employees.

Professional literature and practice knows a wide variety of sources of leading power, which manifests itself in the conduct of organizational systems. All forms of power, regardless of how they manifest themselves, come down to the personal ability of leaders to influence the behaviour of team members. The most commonly the power of a leader is

expressed through: the reference, professional, compelling, informative and rewarding power. Each of these forms of power is manifested in a special way. And so the reference power of a leader is based on the recognition of associates to appreciate his/her personality, because when the associates appreciate the leader they are trying to identify with him/her, trying to be similar to him/her, so as to at least be close to the circle of his/her friends. Such a relationship of a leader and the associates leads to aspiration of the associates to be pleased to fulfil all tasks set before them by the leader, by which they manifest loyalty or commitment to the leader. *Professional* power stems from the expertise of leaders in the field of business of specific organizational system as well as knowledge of general social conditions, because present in the human mind is the need to have knowledge of non-exposed information. This form of power is based on the conceptual knowledge, technical qualifications, as well as empirical knowledge, which is correlated with the correct relationships with members of the organization, undoubtedly contributing to personal authority of the leader. *Legitimate* power is based on the acquired authority in the managerial structure of the organization. It is most commonly expressed as the closeness to the management structure, in terms of transfer of instructions, commands, suggestions, coming from the "top". *Coercion power* of the leader stems from its powers in terms of sanctions and other measures, for which he/she is authorized to take in the event of failure of the work plan, or non-compliance with basic economic principles, and it as a verbal measure, such as a suggestion, reprimand… but also a repressive measure when it is related to suspension, demotion of a workplace... The *rewarding* power is primarily related to the manager-leader, and it is manifested through financial and other incentives or sanctions. And thus, for example, a leader in the role of a manager may prescribe awards in financial form, can to include an individual in the development of specific projects, give him a better job, and so on.

The aforementioned potential types of leadership power present opportunities or directions that a leader can act on the immediate environment in order to achieve the goal. However, the direction or manner of expression of specific leadership power depends on a number of factors that determine it. One of the main factors is certainly the goal, the leader wants to achieve, then resources that are available to achieve the objectives set and intellectual set of the leader as an essential component of his/her understanding of the environment, the problems he/she wants to solve and the way or path that he/she is going to move in achieving his/her desires or commitments.

The most productive leaders always rely on several different sources of power, in order to most effectively influence the behaviour and performance of the followers that is the team as a whole.

3. LEADERSHIP TRAITS

A leader as a person having the power to influence the associates is characterized by the professional and personal qualities, which together provide a profile of the leader. Certainly, one can not speak of the universal traits of all leaders, both due to the personal specificities and due to the specificity of the concrete task in which they are engaged. However, certain universal principles can be set up that would amplify the leading trait, and in that sense mentioned are: communication, teamwork motivation, credibility, power of influencing others, closeness, as the basic qualities of a good leader.

There are different approaches of theorist when it comes to the most important trait of a leader, and on that basis theoretical propositions can be seen as a concrete proposal for desirable traits, and theories that are based on the identifying characteristics based on the external impression that the leaders are leaving in them. However, the fact is that the right

quality of a leader is best recognized on the basis of the success in work. Certainly, it is clear that from the work of successful leaders some legitimacy can be drawn, but that certainly does not mean that a simple application of these principles in the work is a guaranteed success for those leaders who implement these laws in their activities. General guidelines which definitely help in achieving the goal of a leader primarily relate to:

- The appealing objectives and realistic programs,
- Order and organization,
- The ability of persuasion.

It is quite a normal fact that leaders differ both in the achieved results as well as in the chosen way to achieve it, as Drucker writes: They all differ from one another. Some of them did not go into the offices, while others often went out of them. Some were extremely affable (though not many), while others were rigid and inaccessible. Some were quick and impulsive, while others needed eternity and much thought until making a decision. Some immediately talked about their family; others did not mention anything else but a particular job. Some were great listeners, but there were those who followed only their own instincts. However, they all had one thing in common and that is that they had little or no "charisma." They were not "born" leaders, but have become leaders thanks to a successful and thoughtful work.

However, recent analyzes related to the work of leaders in the modern environment, which is burdened with a number of negative trends, speak about that their leadership authority is in permanent decline, and those are precisely the reasons of pointing out in particular to the need for additional efforts towards strengthening the leadership position by strengthening trust of employees, and with it the implementation of specific suggestions concerning the relationship to team members, such as:

- Practice responsibility,
- Be honest,
- Talk about your feelings,
- Speak the truth,
- Show consistency,
- Fill out your promises,
- Maintain the trust,
- Show competence.

4. LEADER BEHAVIOR STYLES

Style of behaviour can generally be defined as a method or way to achieve the desired effect. Style, is not a decisive variable, but it is certainly one of the most important. It cannot be said that the style is a part of a leader's "charisma" that can be fully acquired or replaced by experience and learning, because every man carries many inherent traits that are simply biological interpretation of the personality. Precisely for this reason, certain styles of behaviour make some leaders more successful than others. Thus, style is the two-pole "mechanism" in whose one segment there is a possibility of upgrade that can quite correctly be acted on. Precisely that is why it is necessary to scientifically identify successful behaviours of leaders, which have a universal character, so that they could be build on the leadership position in the team or organization. In this context, scientific research has led to the identification of four basic styles of leadership as a manifestation of

managerial skills, as follows: autocratic, diplomatic, bureaucratic, democratic and liberal style.

The *autocratic* style of leadership behaviour is manifested in making unilateral decisions, the leader of the style uses coercion as a means of influencing the behaviour of the members of a team or organization, his/her source of power is the authority stationed, is inflexible, difficultly accepts changes. This style of leader behaviour is characteristic of the early stage of industrialization, and the period of beginning of the recognition of management as a managerial process.

The *bureaucratic* style is expressed through initiating, coordinating and controlling the operation of the organizational system by the leader and within the legal norms, irrespective of the functionality and suitability of these norms to the current economic moment.

The *diplomatic* leadership style is manifested as the skill of holders of leadership "charisma" to listen to and take into consideration the ideas and suggestions made by subordinates, but to make decisions based on their own beliefs.

The *democratic* leadership style involves the participation-involvement of subordinates in decision-making. It is based on trust in the competence of the associates, the ability and willingness of employees to take responsibility for decisions made. Necessary conditions for the fostering of this style of leader are good human relations, respect for the assistants' personality.

The *liberal* style is based on the full freedom of employees in terms of initiative, decision making and teamwork. Also, subordinates are not required to provide feedback information to the competent managers.

The aforementioned theoretical capabilities provide a wide range of leader's positioning modes from autocratic approach oriented to the boss to the ultimately liberal oriented workers. The issue of selection of individual styles and the implementation depends on a number of factors that directly or indirectly may affect the efficiency and effectiveness of performance of the leader and the entire group or organization. Thus, from a theoretical point of view, a reference cannot be pointed to some of the styles, because when leaders decide which of the styles fit specific leadership position, previously they have to acquire the knowledge on their own strengths, the willingness of subordinates to accept the obligations and responsibilities and that the application of a certain management style will enable the achievement of planned objectives. Previous theoretical analyzes, which are based on practical cases, point to the need to combine different styles of leadership behaviour, using advantages of each of them in real situations. The aforementioned opinion also emphasizes the need for leaders to "practice" adapting their behavioural style with real situation and the particular needs of the environment. However in the long run, a leader should apply the distinctive style of behaviour that is directed toward the employees, motivating them that way for the identification of group and personal interests with the interests of the organization, with the aim of achieving the goal of business operation.

5. LEADERSHIP - PARADIGM OF THE FUTURE

A significant number of leadership theorists claim that 21st century will be the century of leadership. This view is also confirmed in the daily dizzying changes and increases in demands that are placed in front of a modern organization. Hence, awareness of the importance of leadership matures more, but with it the awareness of the lack of real leaders. Traditional organizations are typically structured so that errors are reduced to a minimum, which in terms of control turned out as very expensive, and in terms of the

direct perpetrators is very restrictive and uncreative. In modern organizations, individuals and teams are trusted, the leader's task in it relates to the provision of competent individuals in the team, who will understand the goals of the organization and identify with them. Thus, in modern operating conditions, leadership emphasizes the successful communication, promoting common values, commitment to employees, personal example... Such leadership milieu is aimed at creating conditions in which the employees in the conditions of full freedom and autonomy in their work, and thanks to voluntarily adopted values and high consciousness, primarily have in mind the common interests and goals.

Modern business conditions, characterized by daily implementation of scientific and technical achievements, condition that the percentage of knowledge workers is growing steadily, so that a need for a greater number of leaders is imposed in the organizations. In such social environment, innovation is the main occupation of employees, in order to solve problems in accordance with the speed of change in customer requirements. In this turbulent environment, each employee must be aware of the fact that he might just be the one taking on the leadership baton and lead to the goal on the basis of his/her competence and balanced attitude.

Nowadays, a leading position is rightfully emphasized as a basis for defining the vision of the organization and establishment of value system within the organization. However, the most important job of a leader relates primarily to the creation and shaping corporate culture and institutions of organization that will allow in terms of great freedom and autonomy, and in accordance with common and generally accepted values, each individual to give their best. Therefore, a new time, changing economic conditions, reduced product life, relativity of market distance, the everyday growing needs for use values of sophisticated purposes, imposes also the redefinition of leadership positions in the three types of expression such as:

-The local leaders, whose main task is that based on the newly acquired knowledge take purposeful activities aimed at improving business performance,
-The leaders occupying managerial positions and based on it generate conditions for improving and promoting a culture of knowledge and learning, and
-The leaders who through their ideas help organizational experiments and are in permanent search for individuals who have innovative predispositions.

Thus, modern environment requires a redefined profile of a leader, as someone who will be followed, but also as someone who is responsible for creating the conditions for continuous learning.

6.CONCLUSIONS

The role of leaders in modern organizational systems is gaining importance based on the ability to influence the associates in terms of their gathering around common interests and thus significantly contribute to the achievement of business objectives. The leader's role has been changing with the development of social and technical - technological economic conditions. The ascent ranged from marginal one to the most important role that leaders have today in organizations.

Precisely because of the role that leaders play in organizational systems, they are the subject of numerous studies and scientific analyses, which aim to determine the most

optimal characteristics of a leader in correlation with the current environmental conditions. Thus, the profile of an effective and efficient leader is the ultimate goal of all scientific debates. However, it is very difficult to come to the conclusions that will find the implementation, particularly because of turbulent social changes, especially in the sphere of demand, when trying to follow, and in the course from the complete process through specific organizational behaviour that is appropriate to the social moment. Leadership is definitely becoming one of the most important comparative advantages, and the profile of leaders who will bring the advantage has to be built on scientific basis, using existing experience and expectations of future movements of social changes and the needs of an environment.

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METHOD AND ALGORITHM FOR DESIGNING TEXTILES WITH MODIFIED MASS

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Abstract: *The goal of this paper is to study the method and algorithm for designing textiles with a required mass, which is achieved by proportional changes in thread density on the warp as well as the weft. This paper presents the method suggested for modifying mass in the case of a textile with longitudinal ribs with different warp-sets. We consider a textile to be formed of (partial weaves) which are characterized by density, count, shrinkage corresponding to the rib area (i) and the width l_f, called partial weave; the mass of each partial weave is calculated based on the reference textile parameters and characteristics. There will be as many partial weaves as there are ribs with densities and bindings (i) in the textile. The modified mass is calculated with an algorithm for calculating the mass of all the partial weaves. There are many cases when it is required to modify the mass of a textile by altering its internal structure, most times for economic reasons, but also to diversify appearance.*

The internal structure of rib textiles obtained by combining groups of threads with different bindings, densities and / or counts create a particular case, regarding altering the textile's mass. Each rib represents a weave whose characteristics differ significantly, in some cases, from the adjacent ribs. This is the reason for which modifying the mass of such a textile is not as simple as it is in the case of textiles with uniform structures (equal density and count for all the threads).

Keywords: *threads, design algorithm, textiles, methods.*

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1. INTRODUCTION

Textiles with longitudinal, transversal or rhombus-shaped ribs form a family of textiles which are found in all the sectors for raw materials.

They have become a necessity in textile production in order to diversify the appearance of textiles as well as the products manufactured from them.
Rib textiles represent different proportions in the field of raw materials as well as in the field of methods for producing them [1].

Studies of the structural characteristics of these textiles and the methods currently used for designing textiles with modified mass showed that there are other possibilities, beside the known ones, for solving this problem, which lead to the same results, but following a simpler path [3].

Thus, bellow is presented a new method and algorithm for calculating and designing textiles with longitudinal ribs obtained by combining different thread bindings, densities and / or counts.

2. THE EXPERIMENTAL PART

This paper only studies textiles whose ribs are obtained by grouping threads with different bindings, densities, counts, widths or colours. Presented below is an original method and algorithm for designing textiles with a required mass which is based on proportional changes in the thread density, on the warp as well as the weft.

The method suggested by the authors for modifying the mass in the case of textiles with longitudinal ribs consist of:

The textile is considered to be formed from „partial weaves" which have the density, count and shrinkage characteristics (dimensional alterations) corresponding to the rib area (i) and a width l'f , called partial weave.

The mass of each partial weave is calculated with the parameters and characteristics of the reference textile based on the (2.3) relation.

There will therefore be as many partial weaves as there are ribs and bindings (i) in the textile.

The modified mass is calculated for each weave in accordance with the design requirement (relation 2.4).

The density of warp and weft threads is calculated with the relations (2.8) and (2.5) respectively, to ensure the designed mass.

The method is applied for all the partial weaves based on the following algorithm:

The mass of the reference textile and the mass of the redesigned textile is only calculated for the background area related to the binding of width l'f=lf-lm with the following relation [2]:

$$Mf = \left[\sum_{i=1}^{m} \frac{Li \cdot Pu_i \cdot Tt_{ui}}{100(100 - a_{ui})} + \frac{Pb \cdot Tt_b \cdot l'_f}{100(100 - a_{bmed})} \right] \cdot \frac{100 \pm p_f}{100} \quad \text{g/m} \tag{2.1}$$

where:

Mf - is the mass of the weave corresponding to the width l'f related to the binding;

Li - the width of the ribs with binding and density (i), cm;

Pui - the density of the warp threads in the ribs with binding (i), threads/10cm;

Pb - the density of the weft threads, threads/10cm;

Ttui - the length density of the threads in the ribs with binding (i), tex;

Ttb - the length density of weft threads, tex;

l'f - the width of the background in relationship to the binding, cm;

aui - total shrinkage of warp threads in the weaving and finishing processes, %;

ab med - average shrinkage of weft threads in the weaving and finishing processes, %;

pf - mass loss or gain in the finishing process, %.

The average shrinkage of weft threads is calculated with the relation:

$$a_{b_{med}} = \frac{\sum Li \cdot a_{bi}}{\sum Li} \quad ,\% \tag{2.2}$$

The mass of the weave with binding (i) with the relation:

$$M'f = \frac{l'_f}{100} \left[\frac{Pu_i \cdot Tt_{ui}}{100 - a_{ui}} + \frac{Pb \cdot Tt_b}{100 - a_{bi}} \right] \cdot \frac{100 \pm p_f}{100} \quad \text{g/m} \tag{2.3}$$

Note: The calculation of the weave mass is only done for the background area of width l'f in the binding repeat.

Calculation of the modified mass with the relation:

$$M'_{fi} = M_{fi} \frac{100 \pm e}{100} \quad g/m \tag{2.4}$$

where:

(e) is the mass change coefficient, as a percentage [4].

Calculation of the density coefficient for the weft:

$$p_i = \frac{Pu_i}{Pb} \quad \text{resulting that } Pb = \frac{Pu_i}{P_i} \text{, threads/10cm} \tag{2.5}$$

Replacing 2.5 in 2.3 it results that:

$$M'f_i = \frac{l'_f}{100}\left[\frac{Pu_i \cdot Tt_{ui}}{100 - a_{ui}} + \frac{Pu_i \cdot Tt_b}{p_i(100 - a_{bi})} \right] \cdot \frac{100 \pm p_f}{100} \quad g/m \tag{2.6}$$

In the relation 2.6, Pui is a common denominator and therefore:

$$M'f_i = \frac{Pu_i \cdot l'_f}{100}\left[\frac{Tt_{ui}}{100 - a_{ui}} + \frac{Tt_b}{p_i(100 - a_{bi})} \right] \cdot \frac{100 \pm p_f}{100} \quad g/m \tag{2.7}$$

Pui is calculated with the relation:

$$Pu_i = \left[\frac{100 \cdot M'f_i}{l'_f \left(\frac{Tt_{ui}}{100 - a_{ui}} + \frac{Tt_b}{p_i(100 - a_{bi})} \right)} \right] \cdot \frac{100}{100 \pm p_f} \, threads/10cm \tag{2.8}$$

and is adopted so it complies to the conformity test of point (2) and is a multiple of 5 or 10.
The weft thread density is calculated with the relation 2.5, which must have the same value for all the redesigned partial weaves [5]. Otherwise, a recalculation must be done.
The results of the design calculations are correct if they fulfil the following conditions:
a) the density of the warp threads of count and binding (i), redesigned, must keep the same proportions with the reference textile, namely:

$$\frac{Pu_1}{P'u_1} = \frac{Pu_2}{P'u_2} = \ldots \frac{Pu_n}{P'u_n} = ct. \tag{2.9}$$

b) the density of the weft threads must be equal for all the weaves of density and binding (i), redesigned, namely:

Pb'1=Pb'2=...Pb'n=Pb' (2.10)

where (') refers to the redesigned textile.
The components of the new relationship (see Figure 1.) are calculated with the recalculated thread density, maintaining the width of the reference textile ribs lij and the number of threads passed through the reed ci.
Based on the recalculated density and with the width of the ribs from the reference textile, the number of threads on ribs is calculated, after which the real number of threads is adopted so that:

$$n_{ij} = x \cdot c_i \text{, x } N \tag{2.11}$$

Next, the other components of the new binding's repeat are calculated.
The mass of the redesigned textile is calculated with the new densities and characteristics of the binding's repeat with the 2.1 relation.
Note: The project is considered accepted if the deviation between the mass modified with the relation 2.4 and the mass of the redesigned textile (relation 2.1), $\Delta M'f = \pm 3$.

2.1. Table for designing textiles with modified mass

Input data	Symbol	Units of Measurement (UM)
Characteristics of the reference textile:		
Width: · ribs (i)	Li	Cm
· edge	lm	Cm
· finished	lf	Cm
Length thread density		
· warp in background	Ttui	Tex
· edges	Ttum	Tex
· weft	Ttb	Tex
Thread density: · rib (i)	Pui	
· warp	Pb	Threads/10cm
Total thread shrinkage		Threads/10cm
· warp	Aui	
· weft	Ab med	%
Mass loss or gain after finishing	$\pm\, pf$	%
		%

1. Calculating reference mass with the relation:

$$Mf = \left[\sum_{i=1}^{m} \frac{Li \cdot Pu_i \cdot Tt_{ui}}{100(100 - a_{ui})} + \frac{Pb \cdot Tt_b \cdot l'_f}{100(100 - a_{b_{med}})}\right] \frac{100 \pm p_f}{100}$$

Repeated (i) times

2. Calculation of partial weave mass with binding (i):

$$M'f = \frac{l'_f}{100}\left[\frac{Pu_i \cdot Tt_{ui}}{100 - a_{ui}} + \frac{Pb \cdot Tt_b}{100 - a_{bi}}\right] \cdot \frac{100 \pm p_f}{100}$$

3. Calculation of modified mass for partial weaves:

$$M'f_i = Mf_i \cdot \frac{100 \pm e}{100}$$

②

②

4. Calculation of density coefficients for the weft:

$$pi = \frac{Pu_i}{Pb} \quad \text{resulting that } Pb = \frac{Pu_i}{pi}$$

5. Calculation of warp thread density in partial weaves (i):

$$Pui = \left[\frac{100 \cdot M'f_i}{l'_f\left(\dfrac{Tt_{ui}}{100 - a_{ui}} + \dfrac{Tt_b}{p_i(100 - a_{bi})}\right)}\right] \cdot \frac{100}{100 \pm p_f}$$

6. If possible, a multiple of 5 or 10 is adopted.

7. Calculation of weft thread density:

$$Pb = \frac{Pu_i}{pi}$$

8. Conformity test for density Pu'i:

$$\frac{Pu_1}{P'u_1} = \frac{Pu_2}{P'u_2} = \ldots \frac{Pu_n}{P'u_n} = ct.$$

9. Conformity test for density Pb'i:

$$Pb'_1 = Pb'_2 = Pb'_3 = \ldots = Pb'$$

10. Conformity test for textile mass M'f:

$$Mf = \frac{100 \cdot M'f}{100 \pm e}$$

11. Binding repeat table						UM
	Ribs					
Incomplete repeat ri	r11	r21	r12	r31	…	
Binding i	1	2	1	3	…	
Width lij	111	121	112	131	…	Cm
Threads through reed ci	c1	c2	c1	c3	…	Threads/cell
Density pui	Pu1	Pu2	Pu1	Pu3	…	Threads/10cm
Number of threads nij	n11	n21	n12	n31	…	Threads
Repeat width 1 Ru	$\sum 1_{ij}$					Cm
Threads/repeat nR	$\sum n_{ij}$					Threads

12. Calculation of total width of ribs with binding (i) on width l'f:

$$Li = l_i \cdot N_R + r \quad \text{(cm)}$$

r*- width of incomplete repeat

2.2. Designing textiles with binding ribs (i) with a modified mass. Example calculations. The calculation algorithm and design method for rib textiles with modified mass are applied to a textile whose binding repeat characteristics are presented in Figure 1 with the base parameters in the 2.12 formula.

The length density of the thread systems and the other characteristics necessary for the calculation of the component elements of the binding repeat Figure 1 and textile mass are taken from the reference textile:

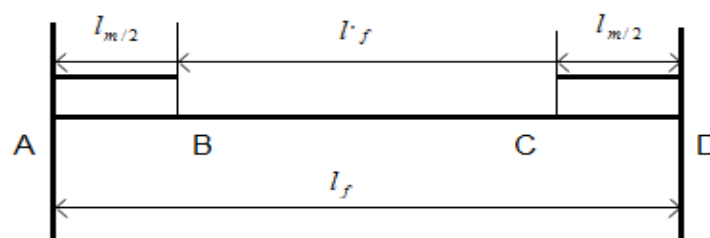Mt= Mu+Mb   g/m   2.12

Figure 1. The correlation table for the background areas and the edges of the weave.

It is suggested to modify the mass by increasing it with e=10%.
The calculation for the redesign of the textile with modified mass was done by applying the calculation algorithm and method described in table 2.1, obtaining the results presented below.
Characteristics of the reference textile
Width:·ribs (i) Li   L1=79.4cm
       L2=57.2cm
       L3=10.4cm
       l'f=∑Li=147.0cm
edge   lm=3.0cm
finished   lf=150cm
Length density of threads:
· warp: in background Ttui   Ttu1=20tex
       Ttu2=Ttu3=10·2 tex
 edges Ttum=Ttu1=20tex
· weft Ttb=16.67tex
Thread density:
· in ribs I   Pu1=200threads/10cm
       Pu2=300threads/10cm
       Pu3=400threads/10cm
· weft Pb=250threads/10cm
Total thread shrinkage
· warp on ribs i   au1=9.8%
      au2=6.9%
      au3=5.9%
· weft on ribs i   ab1=13.5%
      ab2=11.6%
      ab3=9.8%
· average   a b med=12.5%
Mass loss or gain   pf=4%
Calculation for the mass of the reference textile (2.1):

$$Mf = \left[\sum_{i=1}^{m} \frac{Li \cdot Pu_i \cdot Tt_{ui}}{100(100 - 1_{ui})} + \frac{Pb \cdot Tt_b \cdot l'_f}{100(100 - a_{b_{med}})} \right] \cdot \frac{100 \pm p_f}{100} =$$

$$\left[\frac{79,4 \cdot 200 \cdot 20}{100(100 - 9,8)} + \frac{57,2 \cdot 300 \cdot (10 \cdot 2)}{100(100 - 6,9)} + \frac{10,4 \cdot 400 \cdot (10 \cdot 2)}{100(100 - 5,9)} + \frac{250 \cdot 16,67 \cdot 147}{100(100 - 12,5)} \right] \cdot$$

$$\frac{100 - 4}{100} = 144,6$$

(2.13)

Calculation for the mass of the textile with binding (i),(2.3):
Textile binding
Mass calculation:

$$Mf_1 = \frac{l'_f}{100} \left[\frac{Pu_1 \cdot Tt_{u1}}{100 - a_{u1}} + \frac{Pb \cdot Tt_b}{100 - a_{b1}} \right] \cdot \frac{100 \pm p_f}{100} = \frac{147}{100} \left[\frac{200 \cdot 20}{100 - 9,8} + \frac{250 \cdot 16,67}{100 - 13,5} \right] \cdot \frac{100 - 4}{100} =$$

$$130,6 g / m$$

(2.14)

Calculation of modified mass (5.4):

$$M'f_1 = Mf_1 \cdot \frac{100+e}{100} = 130,6 \cdot \frac{100+10}{100}\ 143,7$$

g/m (2.14)

Calculation of density coefficient:

$$p_1 = \frac{Pu_1}{Pb} = \frac{200}{250} = 0,8$$

(2.15)

Calculation of warp thread density on rib with density 1:

$$P'u_1 = \left[\frac{100 \cdot M'f_1}{l'_f\left(\frac{Tt_{u1}}{100-a_{u1}} + \frac{Tt_b}{p_1(100-a_{b1})}\right)}\right] \cdot \frac{100}{100-p_f} = \left[\frac{100 \cdot 143,7}{147\left(\frac{20}{100-9,8} + \frac{16,67}{0,8(100-13,5)}\right)}\right] \cdot$$

$$\frac{100}{100-4} = 220$$

(2.16)

Calculation of weft thread density:

$$Pb_1 = \frac{Pu_1}{p_1} = \frac{220}{0,8} = 275$$

threads/10cm (2.17)

Diagonal binding $D\frac{2}{1}$:

Calculation of mass:

$$Mf_2 = \frac{l'_f}{100}\left[\frac{Pu_2 \cdot Tt_{u2}}{100-a_{u2}} + \frac{Pb \cdot Tt_b}{100-a_{b2}}\right] \cdot \frac{100 \pm p_f}{100} = \frac{147}{100}\left[\frac{300 \cdot (10 \cdot 2)}{100-6,9} + \frac{250 \cdot 16,67}{100-11,6}\right] \cdot$$

$$\frac{100-4}{100} = 157,5$$

(2.18)

Calculation of modified mass:

$$M'f_2 = Mf_2 \cdot \frac{100+e}{100} = 157,5 \cdot \frac{100+10}{100} = 173,2 g/m$$

(2.19)

Calculation of density coefficient:

$$P_2 = \frac{Pu_2}{Pb} = \frac{300}{250} = 1,2$$

(2.20)

Calculation of warp thread density on rib with density 2:

$$P'u_2 = \left[\frac{100 \cdot M'f_2}{l'_f\left(\frac{Tt_{u2}}{100-a_{u2}} + \frac{Tt_b}{p_2(100-a_{b2})}\right)}\right] \cdot \frac{100}{100-p_f} = \left[\frac{100 \cdot 173,2}{147\left(\frac{10 \cdot 2}{100-6,9} + \frac{16,67}{1,2(100-11,6)}\right)}\right] \cdot$$

$$\frac{100}{100-4} = 330 \ threads/10cm$$

(2.21)

Calculation of weft thread density:

$$Pb_2 = \frac{Pu_2}{p_2} = \frac{300}{1,2} = 275 threads/10cm$$

(2.22)

Rib binding R $\frac{2}{2}$;

Calculation of mass:

$$Mf_3 = \frac{l'_f}{100}\left[\frac{Pu_3 \cdot Tt_{u3}}{100-a_{u3}} + \frac{Pb \cdot Tt_b}{100-a_{b3}}\right] \cdot \frac{100 \pm p_f}{100} = \frac{147}{100}\left[\frac{400 \cdot (10 \cdot 2)}{100-5,9} + \frac{250 \cdot 16,67}{100-11,6}\right] \cdot$$

$$\frac{100-4}{100} = 186,5 g/m$$

(2.23)

Calculation of density coefficient:

$$p_3 = \frac{Pu_3}{Pb} = \frac{400}{250} = 1,6$$

(2.24)

Calculation of warp thread density on rib with density 3:

$$P'u_3 = \left[\frac{100 \cdot M'f_3}{l'_f\left(\frac{Tt_{u3}}{100-a_{u3}} + \frac{Tt_b}{p_3(100-a_{b3})}\right)}\right] \cdot \frac{100}{100-p_f} = \left[\frac{100 \cdot 205,15}{147\left(\frac{10 \cdot 2}{100-5,9} + \frac{16,67}{1,6(100-11,6)}\right)}\right] \cdot$$

$$\frac{100}{100-4} = 440 \ threads/10cm$$

(2.25)

Calculation of weft thread density:

$$Pb_3 = \frac{Pu_3}{p_3} = \frac{440}{1,6} = 275 \ threads/10cm$$

(2.26)

Conformity test for the warp system

$$\frac{Pu'_1}{Pu_1} = \frac{Pu'_2}{Pu_2} = \frac{Pu'_3}{Pu_3} = \frac{220}{200} + \frac{330}{300} + \frac{440}{400} = 1,1$$

(2.27)

Conformity test for the weft system P'bi

   P'b1=P'b2=P'3=275 threads/10cm

(2.28)

Conformity test for mass M'f

$$M'f = \left[\sum_{i=1}^{m}\frac{L_i \cdot Pu_i \cdot Tt_{ui}}{100(100-9,8)} + \frac{P_b \cdot Tt_b \cdot l'_f}{100(100-a_{bmed})}\right] \cdot \frac{100 \pm p_f}{100} =$$

$$\left[\frac{79,4 \cdot 200 \cdot 20}{100(100-9,8)} + \frac{57,2 \cdot 330 \cdot (10 \cdot 2)}{100(100-6,9)} + \frac{10,4 \cdot 440 \cdot (10 \cdot 2)}{100(100-5,9)} + \frac{275 \cdot 16,67 \cdot 147}{100(100-2,5)}\right]\frac{100-4}{100} =$$

159,4g/m

(2.29)

$$M'f = \frac{100 \cdot M'f}{100 \pm e} = \frac{100 \cdot 159,4}{100 + 10} = 144,9 \text{g} / m$$
(2.30)

All the conformity tests confirm the correctness of the calculations and therefore of the suggested design algorithm.

The table for binding repeat for the textile with modified mass

	Ribs					UM
Binding i	1	2	3	1	2	
Rib width lij	2.0	0.7	0.4	1.0	1.5	Cm
Threads through reed ci	2	3	4	2	3	threads/cell
Warp thread density Pui	220	330	440	220	330	threads/10 cm
Thread count on rib nij recalculated	44	24	20	22	48	Threads
Recalculated rib width $l_{ij} = \dfrac{10 \cdot n_{ij}}{Pu_i}$	2,0	0,(72)	0,(45)	1,0	1,(45)	Threads
Width of binding repeat lRu						Cm
Total threads in repeat nR						Threads

Calculation of number of binding repeats on width l'f:

$$Nr = \frac{l'_f}{L_{Ru}} = \frac{147}{5,6(36)} = 26 + 0,45 \, (cm)$$
(2.31)

Calculation of rib width with binding (i) within the binding repeat:

$$l_i = \sum_{i=1}^{n} l_{ij} \rightarrow l_1 = l_{11} + l_{12} = 2,0 + 1,0 = 3,0 \, cm$$
$$l_2 = l_{21} + l_{22} = 0,(72) + 1,(45) = 2,(18) \, cm$$
$$l_3 = l_{31} = 0,(45) \, cm = \underline{0,(45) \, cm}$$
(2.31)
$$l_{Ru} = 5,6(36)$$
(2.32)

10. Calculation of total width of ribs with binding (i)

$$Li = l_i \cdot N_R + r \rightarrow L_1 = l_1 \cdot N_R + r \rightarrow L_1 = l_1 \cdot N_R + R = 3,0 \cdot 26 + 0,45 = 78,45$$

on
(2.33)
$$L_2 = l_2 \cdot N_R + -2(18) \cdot 26 + -56,(72)$$
(2.34)
$$L_3 = l_3 \cdot N_R + -0,(45) \cdot \underline{26 + -11,(81)}$$
(2.35)
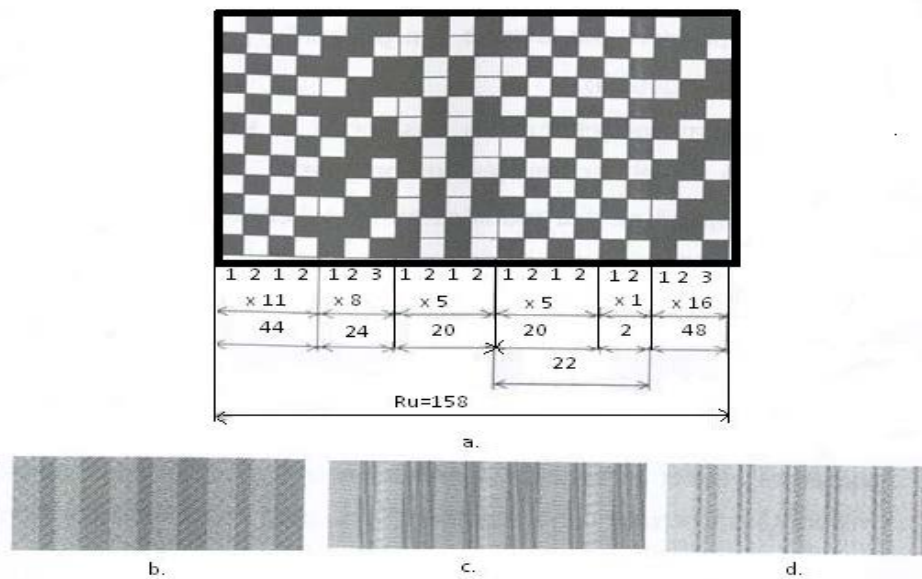$$\sum Li = l'_f = 147 \, cm$$
(2.36)

Figure 2. The binding with longitudinal ribs obtained by grouping weave bindings, twill 2/1 and ribs 2/2: a - the binding's repeat; b - black&white simulation; c,d - colour simulation.[6,7]

3. CONCLUSIONS

Rib textiles obtained by grouping warp threads of different widths, bindings, densities and / or counts represent a particular case as far as mass modification is concerned.

The analysis of rib textile structure shows that they are composed of several weaves with different binding, density and/or count characteristics, and based on their width they hold a certain weight of the textile's width l'f (l'f - the textile's width with a binding repeat).

The modification of the textile's mass in its entirety can be done by modifying the mass of each "partial weave".

The suggested method for modifying the mass consists in identifying and analyzing the structure characteristics for the component partial weaves and modifying their mass, in accordance to the design requirements.

The density method was chosen for modifying the mass, a method which involves the design of a textile with such a weft thread density that, by assembly based on the model of the reference texture, a new textile will be obtained, with a mass modified in accordance with the design requirements.

The redesigned textile will have a thread density proportional to the density of the threads in the reference textile.

For all the redesigned partial weaves the weft thread density is equal.
Redesigning a textile using the suggested method ensures the positional stability of the threads in the textile, and the other structure parameters are in a proportional relationship with the parameters of the reference textile. Therefore the quality characteristics of the reference textile are retained.

The method is simple and easy to apply, and the results obtained by using the suggested calculation algorithm lead, in every case, to assured results.

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Review Article

IMPORTANCE OF BUDGETING THE EUROPEAN CENTRAL BANK FOR STABILITY OF FINANCIAL MARKETS

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Abstract: *The subject of our research is processes and relationships that led to establishment of the European Union and European Monetary Union and functioning of one of the most important institutions of the Union, the European Central Bank. In the same way, we will present the policy, planning and control of finances of the bank responsible for the stability of the European monetary market which, as such, has a direct impact on financial flows of the member states and other European states, such as Serbia among others. The budget of the European Central Bank is of great importance for the society for being the institution that is most directly responsible for the stability of the monetary market and value of the European currency.*

1. INTRODUCTION

Incomes and expenses of the bank affect its work and are thus the indicator of the strength and stability of the bank. The analysis of the work of the European Central Bank will give us a clearer picture of the institution which, within the framework of the European Union, has a wide range of powers, such as management of foreign exchange reserves of the member states, improvement of payment operations, supervision over the operation of banks and other financial institutions. The scientific goal of this verified research is the scientific description of facts by which we primarily want to find the answers to the following questions: How was the Central Bank established? How does the Bank make money? How does the Bank spend money? How does the Bank manage its incomes and expenses? The social goal of this research is the clarification of the financial plan and strength of the institution whose functions are of crucial importance for the population of the Union and also the population of other European countries that have tied their currency to the euro.

2. EUROPEAN MONETARY UNION - EMU

History of monetary unions is long and diverse, and European Monetary Union is different for being the first monetary union seen from the perspective of history, where the sovereign states agreed on withdrawing national currencies from use and introducing a new and a single currency – Euro.

Each monetary union entails a few things – establishment of fixed exchange rate among currencies of the member states and integration of capital markets, the single currency, the single central bank and the single credit-monetary policy.

Monetary union does set as a mandatory condition the introduction of the single currency, because the exchange rates of member states are mutually fixed, and they have a floating exchange rate against other currencies. The existence of the single currency means the

reduction of transaction costs – the loss of costs of mutual exchange of currencies of member states and reduction of costs of maintenance of several currencies. However, the introduction of the single currency in the monetary union is a kind of guarantee that a state will remain in the Union. Specifically, the cost of leaving the Union is much higher in case of a single currency. The establishment of the EMU was the most complicated step in the European integrations as it entailed a series of decisions to be reached and implemented.

The first important step in the process of the European monetary integration was the introduction of the European Monetary System (EMS) on 13 March 1979, which was the outcome of compromises. Some member states expressed a fear that stability of their currencies in the light of other inflationary currencies would be more difficult as their currencies would be more expensive than inflationary currencies, which would raise the costs of export. These states are Austria, Belgium, Holland, Luxemburg and Germany. On the other hand, states with inflationary currencies did not have a problem with export but with import, which was getting expensive. These states are Italy, Portugal and Spain. [1]

The result of the establishment of the EMS was soon apparent: inflation fell from 12% to about 4% in the period from 1980 to 1992. When established exchange rates were in danger of being lost, central banks intervened by exchanging the quantity of money in circulation, changing the exchange rates and controlling the capital investments.

However, the EMS fell apart in 1992 because some currencies (lira, pound, peseta and escudos) exceeded the allowed fluctuations. At the time, the process of introduction of the single currency was underway. The process needed to be carried out in three phase:

The first was planned for July 1990, with an aim of liberalisation of capital flows,
The second was planned for January 1994, with an to prepare for the fulfilment of the envisaged conditions and establishment of institutional framework,
The third was planned for 1997 and 1999, with an aim to introduce the single currency.

After the dissolution of EMS in 1992, member states of the EU continued negotiations about the further monetary integration. New system provided for the system of central banks of countries able to fulfil the given conditions, and those that wanted to join the single currency. The system was headed by the European Monetary Institution, which was later inherited by the European Central Bank (ECB).

European Central Bank (ECB) has had this name since 1 June 1998, and emerged from EMI (European Monetary Institute) and ESCB (European System of Central Banks). It is managed by the committee of six members, including the President and Vice-President. All members are appointed for eight years and have no right to re-election. The members are elected by the European Council. The basic goal of the ECB is to preserve price stability and helping the economic policies of member states of the euro zone.

European Monetary Union is based on:

- harmonization of monetary policies of member states,
- single reserves,
- single central bank.

All the mechanisms of management of exchange rates, foreign currency reserves and monetary flows transfer from central banks of member states to the ECB seated in Frankfurt.

Central Bank and banks of member states are forbidden to cover deficits or approve loans to institutions, agencies or bodies of the Union, and to take debt instruments directly from them. [2]

To join the European Monetary Union, member states had to fulfil the necessary conditions called "convergence criteria" or conditions of the "stability pact". They include the following:

- PRICE STABILITY – inflation shall be no more than 1.5 % higher than the average inflation rates of three countries with the lowest inflation.
- ANNUAL BUDGET DEFICIT – shall be no more than 3% of gross domestic product of the country.
- TOTAL PUBLIC DEBT – shall be no more than 60% of gross domestic product of the country.
- LONG-TERM INTEREST RATE – shall be no more than 2% higher than the average of the interest rates in three member states with the lowest interest rates.

The following evaluation, which was supposed to be done, referred to how many countries would be able to meet the required criteria. It was though that there was no sense to introduce the common currency in less than seven countries. In order to ensure that number, the criteria needed to be somehow corrected (weakened). But basically, they had to be mechanical and arbitrary. [3]

Even though the convergence criteria were very precise, some states joined the EMU although they did not strictly meet them. In the period from 1996 to 1998, only one EU country met all four criteria all the time (Luxemburg), while a few countries were close to meet them (Austria, Belgium, France, Holland, Germany, Ireland). However, the fact that these countries were close to meet the convergence criteria does not mean that they managed to meet them. [4]

The Commission was generous in the establishment of the Monetary Union, because it did not pay attention to what might be called the quality of procedure, which some countries used for the reduction of public debt. It is known that some countries used single methods for the reduction of public debt in order not to affect the mechanism that creates public debt, which was not simple, given the political circumstances in those countries. For instances, those are: sale of state assets (in Germany – sale of Telekom, in France – operations with pension bonds of Telekom). In Italy, at one moment "euro tax" was introduced in order to cover public debt from collected funds. [5] Debt of Italian state railways was not included in public debt either. [6]

3. EUROPEAN CENTRAL BANK

European Central Bank (ECB) was established on 1 January 1999, when it started operating. Based on Maastricht Treaty, the European Central Bank and national central banks of the countries in the euro zone established the European System of Central Banks (ESCB). ESCB is the pillar of the monetary authorities and monetary policy of the European Union, which determines the frameworks of monetary aggregates, defines and conducts the monetary policy. Also, it uses the instruments of monetary policy, including interest rates policy.

The basic tasks of the European Central Bank are: managing the foreign currency reserves of the member states, improvement of payment operations, supervision over the operation of banks and other financial institutions.

ECB is a legal entity and has the widest legal powers in each member state, which are recognized by the national law to legal entities.

ECB capital paid by member states of the European System of Central Banks amounts to 5 billion Euros. The manner in which the participation in the founding capital was defined was based on the participation of member states in the Gross Domestic Product (GDP) and EU population. Each member state participates also in the formation of foreign currency reserves of the European Central Bank, up to total amount of 50 billion Euros. [7]

4. BUDGETING OF THE EUROPEAN CENTRAL BANK [8]

Activities and the budget of the European Central Bank (ECB) were described in detail in the relevant chapters of the annual report.

ECB decision-making bodies are Governing Council and the Executive Board and the Budget Committee for the budget issues. Budget Committee is a body responsible for the budget issues and it is formed by the Governing Council. It consists of the representatives of the European central banks. The Budget Committee discusses the issues of the budget of the European Central Bank and provides its opinion about the budget before it is adopted. It also controls the implementation of the budget policy of the bank and submits its report on it to the Governing Council.

Members of the Executive Board are appointed from among the persons of recognized standing and professional experience in monetary or banking matters by common accord of the governments of the Member States at the level of Heads of State or Government, on a recommendation from the Council of Europe, after it has consulted the European Parliament and the Governing Council.

Budget Committee (BUCOM) consists of experts from the ECB and central banks of the EU Member States and it crucially contributes to the process of the ECB finance management. BUCOM supports the Governing Council by providing a detailed evaluation of the ECB draft annual budgets and proposal and requests for additional budget funds provided by the Executive Board before submitting to the Governing Council for approval. Spending above the agreed budget is regularly monitored by the Executive Board, taking into account the internal controlling functions of the ECB, and the Governing Council by the assistance of BUCOM.

ECB annual accounts are compiled by the Executive Board, in accordance with the principles established by the Governing Council. The accounts are approved by the Governing Council.

Budget Committee is a body that deals with the budget issues and is formed by the Governing Council. Certain principles, primarily the following, are applied when forming the Budget Committee [9]:
- principle of budget unity which requires that all incomes and expenses shall be presented in a single budget.
- principle of full-disclosure or universality which means that all incomes and expenses are presented in the budget.
- principle of accuracy and realism.
- principle of balanced budget, which means that expenses in the budget are in balance with incomes presented in the budget.
- principle of specialisation that sets an imperative that incomes and expenses in the budget shall be presented based on a particular specification that shall provide that approved budget funds are spent:
  1) in defined amount
  2) for defined purpose
  3) within defined period.

- principle of duration or periodicity and annuality, which means that budget is adopted for the period of one year.
- principle of clarity, which means the unique grouping of all incomes based of their sources and all expenses based on their purpose.
- principle of transparency, which means that the budget shall be exposed to the public through a broad range of mass media.

When basic elements for the elaboration of the budget are prepared, the volume of incomes is estimated, which is the framework for the planning of expenses. In order to determine total volume of expenses, general balance expenses is prepared with the basic structure that is compared with the expense structure from the previous year.

Budget execution consists of collection of incomes on one hand, and financing of project expenses on the other. A special and very important part of the budget procedure is surely the budget control. Budget Committee controls the implementation of the budget policy of the bank and submits its report to the Governing Council. Budget control particularly refers to the budget execution phase. The control is diverse, and it is conducted in all phases of the budget procedure and includes all persons who manipulate the funds in the execution of the budget.

5. INCOMES OF EUROPEAN CENTRAL BANK

The basic tasks of European Central Bank can be presented as follows:

- maintenance of the price stability and the single currency – euro,
- creation and implementation of monetary-credit policy of the European Union,
- taking care of foreign reserves of member states,
- management of internal and external payment operations.

In order to perform the assigned and set tasks, the ECB has costs that must be covered from its own incomes. In addition, it can open accounts in credit institutions, public organizations and other agents in the market and it receives assets, including the booking state of securities booked as collaterals.

In order to increase the incomes and provide funds for the realization of proclaimed goals and tasks, the ECB can:

- intervene in financial markets by direct purchase and sale (urgently or on set date) or, in accordance with the agreement on subsequent repurchase, by approving or taking by loan the receivables and suing instruments, either in communitarian currency or the currency of non-state member, and precious metals;
- carry out credit operations with credit instructions and other participants in the market with appropriate collateral;

In operations with foreign countries, the ECB can:

- establish relationships with central banks and financial institutions of third countries and, in case of a need, with international organizations;
- purchase and sell, urgently and on set date, all categories of foreign exchange assets and precious metals. The term "foreign currency assets" implies securities and all other assets expressed in the currency of any country or in calculation units, regardless of the category;

- take care or manage the above stated assets;
- conduct all kinds of banking operations with third countries and international organizations, including the operations of approval and loan taking.

In addition to the basic tasks, the ECB may conclude transactions for their administrative needs or the needs of their staff.

The main incomes of banks are incomes received through interest rates, fees, commissions and other results of operation, such as dividend for instance. Any kind of income is published separately and per segments, if necessary.

The incomes of the European Central Bank can be divided into several categories:

- interest on current accounts
- incomes from deposits in the cash market
- agreement on reverse repurchase
- income from securities
- interest income from foreign currency termed and swap transactions
- interest income from foreign reserves funds.

Other incomes of the European Central Bank may include:

- penalties imposed by credit institutions for incompliance with the minimal requests for reserves
- incomes from fees and commission payable in current accounts
- incomes from stock share and participation interests
- other various incomes during the whole year mainly generated from the transfer of unused administrative reserves in the profit and loss account.

Transfer of the ECB net profit is performed in the following order:

- the amount determined by the Governing Council, which shall not exceed 20% of net profit, is transferred to the General Reserves Fund limited to 100% of capital;
- the remaining part of net profit is divided to owners of the ECB shares in proportion to subscribed shares.

If the ECB produces loss, it is covered by funds of the General Reserves Fund and, if necessary, based on the decision of the Governing Council, from the monetary income achieved in the same fiscal year in proportion and the amount approved to national central banks.

6. EXPENSES OF THE EUROPEAN CENTRAL BANK

The main expenses of the Bank are the expenses made through interests, fees, commission and losses from the sale of HOV and losses on placements and advance payments, losses on impairment of investments and general administrative expense. [10]

- expenses for employees
- administrative costs
- costs of manufacture of banknotes.

7. CLAIMS OF THE EUROPEAN CENTRAL BANK

Portfolio of the ECB foreign reserves consists of funds of foreign reserves transferred from banks of the member states in accordance with the conditions of the Article of Associations of the European System of Central Banks and European Central Bank, and income achieved from them. It serves to finance the activities in the foreign currency market.

Portfolio of the ECB funds reflects the investment of its paid capital, copy of commission from foreign currencies, risk of interest rate and price of gold, funds and incomes of general reserves collected on the portfolio in the past. Its purpose is to provide income to the ECB to contribute to coverage of its operative costs.

Claims and debts denominated in foreign currency are converted into euro at the exchange rate prevailing on the date of the final account. Income and costs are converted at the exchange rate prevailing on the booking date. Revalorization of foreign currency claims and debts, including balance and off-balance instruments, is conducted based on the relationship of the currency to currency.

Revalorization of the market price for claims and debts denominated in foreign currency is treated separately from the revalorization of the exchange rate. Gold is valued based on the market price prevailing at the end of the year. Differences of prices and revalorization of the currency for gold are not separated. Instead, one valuation of gold is calculated based on the price in Euros for fine ounce of gold. All securities eligible to trade and similar claims are valued at mid market prices prevailing on the date of the final calculation based on securities by securities.

Incomes and costs are approved for the period in which they are earned or made. Realized incomes and losses resulting from the sale of foreign currency, gold and securities are transferred to the profit and loss account. Such incomes and losses are calculated in relation to average price of the relevant assets.

Fixed assets, with exception of the land, are measured by depreciation costs. Land is valued by the price. Depreciation is calculated linearly, starting from the quarter after the acquisition and continuing during the expected economic life cycle of the fixed asset, in the following way:

Period of depreciation for capitalized buildings and renewed consumption that refers to the existing ECB premises has been reduced to ensure that these funds are fully written off before the ECB moves to its new premises.

Balances with banks and investments in securities, external loans and other external funds and claims of residents of euro zone denominated in foreign currency consist of balances with banks and loans denominated in foreign currency and investments in US dollars and Japanese yen. The fall of the value over the past two years in these positions has been primarily caused by bringing down the price of US dollar and, to a lesser extent, Japanese yen against euro.

8. CONCLUDING REMARKS

The research we have conducted in this paper shows how the budget is important in the work of one institution, especially the European Central Bank, which is directly responsible for the stability of the European currency and integration of the single market. Therefore, the subject of analysis in this study was the analysis of the balance sheet, profit and loss statement and balance of cash flows, analysis of functions and business reporting of the institution.

Budget of any institution is the basic document for planning of incomes and expenses and uninterrupted performance of planned activities. ECB Budget as such is applicable for financing of activities conducted by the bank in order to provide funds to cover all those costs envisaged within it, with an aim to:

- establish the single market, economic and monetary union;
- harmonious and balanced development of economic activity without inflation;
- high level of use of economic performances;
- increase of life standard;
- solidarity among member states.

Budget of the European Central Bank provides for obtaining funds for financing the work of the bank and its bodies and performance of tasks arising from the main goals. Budget of the bank is based on its sources of income. The largest part of budget expenses is directed at costs of salaries and administrative fees. ECB budget applies budget principles, respects the described budget procedure of elaboration, adoption, implementation and control of the budget.

Long-term advantages of functioning of monetary union will be best seen in case of existence of a stable single currency. Therefore, we should expect that member states will behave in accordance with this goal, that is – to refrain from behaviour that can undermine this stability.

European Central Bank showed the real value and significance only at the end of 2007, after the collapse of mortgage market in the USA, when it began rescuing the whole financial sector by its investments.

Specifically, on 9 August 2007, shares on New York Stock Exchange significantly fell which, according to the law of communicating vessels, resulted in the fall of shares on the most of world stock exchanges. The real cause of the fall of shares was the collapse of mortgage market, that is – the confession of the banks on not being able to collect mortgage loans from indebted USA citizens.

In the USA, the number of citizens who are not able to repay so-called highly risky loans which they took to buy real estate increases from month to month. Financial systems around the world feel the consequences because banks outside the USA which invested in the American market of housing loans are experiencing loss now when the part of those loans are not repaid.

Only two days after 9 August 2007, the European Central Bank put 156 billion Euros in the market in order to stabilize financial markets. It was the largest amount put in the market in the history of that bank, even more than 69 billion Euros paid after terrorist attacks at the USA on 11 September 2001. Afterwards, it continued with interventions in order to preserve the stability of the market.

In order to avoid the problems in the American banking system grow into a global financial crisis, the European Central Bank intervened and thus justified its existence after a little more than a decade since its establishment and showed the importance of the existence of such institution that will contribute to financial stability of not only member states but also the whole world financial system, by working on the achievement of its own goals.

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GEOTHERMAL RESOURCES OF SERBIA AS A COMPARATIVE ADVANTAGE

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Abstract: *The economic attractiveness of the geothermal energy as a major geothermal resource can be an important factor of economic growth, not only in tourism and balneology, but also in the agriculture, aquaculture, and industry. Besides in balneology and partly in tourism, expected results have not been achieved. What could have been done differently and what can be done for future prospects to be improved? Despite significant potentials, intensive development and positive results of using geothermal resources worldwide, and the present economic recession, only a small part of such natural treasure has been affected, with no attention paid to direct applications of geothermal energy that could directly contribute to the economic growth and recovery of our economy.*

1. INTRODUCTION

The economic attractiveness of geothermal energy as a major geothermal resource may represent a significant basis for economic growth, not only in tourism and balneology, but also in agro and aquaculture, as well as in industry. Besides balneology and a part of tourism, it has not achieved the expected extent. What might otherwise be done and what can be done to improve prospects for the future? China is now investing huge money in green technology and is slowly becoming a leader when it comes to the use of solar energy and wind. In Germany, which is also a leader when it comes to clean energy, have been opened over three hundred thousand jobs due to the trend of green economy and the use of sustainable energy sources, and our country, although rich in thermal mineral springs, is not using sufficiently this comparative advantage. Thermal mineral springs of Serbia provide economic benefits through comparative advantages of renewable energy sources and environmental benefits due to the reduction of global warming, since the Earth's climate is changing, and global warming is not happening by itself, but is a result of anthropogenic influences.

Thermal mineral spas have evolved around natural thermal mineral water sources. This and other forms of geothermal energy are an important national wealth, especially for replacing a part and even the whole of conventional energy (coal, oil, gas). Projects with direct use of these energy require higher initial investment, with lower operating costs later, however, the economic benefits depend of the location of the users and the resources, the efficiency of utilization of heat, the annual burden of exploitation of these resources, as well as financing costs, amortization period and inflation rate. This system has a long durability, which is beneficial to their economic viability and economics of geothermal mineral water utilization depends on timely application, the beginning of the exploitation of resources, so the total exploitation losses are minimized. Despite the significant potential, intensive development and the positive results of using geothermal resources in the world and the economic recession, it is used only a small part of this natural wealth,

with no attention paid to the direct application of geothermal energy that could directly contribute to economic growth and recovery of our economy.

2. GEOTHERMAL RESOURCES OF SERBIA AND A NEW APPROACH OF MANAGEMENT

New approach of management and marketing shows that the effect of business is primarily influenced by the resource profile of the organization, while the core of superior performances lies in possessing and using different and difficult imitative or patented resources. Observation of the economy and companies (organizations) based on resources or through a focus on core competencies - comparative advantages, with this new approach shows that the effect was primarily influenced by resource profile of the organization and the economy in general, while the core of superior performance lies in the possession and use of different and difficult imitative or protected resources, but also in the need to be selective in the choice of markets to serve, so that these should be markets in which the resources (assets and capabilities) give organization a chance to be leader. Marketing based on the resources essentially seeks to align the long-term market requirements and the organization's ability to meet them. This does not mean that the organization's resources are considered as a fixed and static, far from it. The market requirements develop over time, and the resource profile of the organization must be constantly improved to provide the company with permanent compete and eventually seizing new opportunities. It is essential to take advantage of opportunities when the organization has an existing or potential advantage through its resources, not only to be 'pushed' ad hoc.

Interest in the thermal mineral water has existed since the first of human encounters with them and can be said that this interest did not cease until the present day. Even at the first contact with them, the human understood the friendly role of thermal mineral water, since they usefully served the humankind from the beginning until nowadays. For these reasons, it is completely reasonable that not only doctors, but also geologists, chemists, tourist experts and economists have been interested for their use, and recently even more, because of the possibility of using thermal energy, these waters are subject of interest to many others like energy experts, technologists, agronomists etc., so this great wealth of Serbia could be used as much as possible wherever natural conditions, scientific and economic justification permit such a use.

Economic strength of any country always lies in the inserts of its citizens and in the natural wealth (resources) which poses, not all, but only the ones who has enough in an era that makes it valuable. The epoch which we are entering, makes the thermal mineral water salvific valuable because the previous one made all other resources worthless and with them could be settled many things that are lost pompously. The one who has a lot of mineral water in the incoming epoch will be respected and the one who knows how to use everything that could be used will have wealth. In Serbia, we have many of these waters, in the greater amount than we need, others have less than we do but they knew better, and we can be even better of them, if we have the will for it. On the territory of Serbia, in about 60 major regions there are about 250 locations with over 1,300 natural and artificial sources of mineral waters, conveniently located on over 60% of the national territory (temperature 16-80 °C, and some even more than 100 °C). It is estimated that the water flow out from all existing sources, visible and invisible, is between 5 and 10m3 per second of water, almost an entire Morava river.

The use of thermal mineral waters has begun spontaneously with the first humans. Thermal mineral water in our country is used in only three sectors: in balneology, for bottling and symbolically for heating. We are known as a country of spas, there are thirty

nominated, and only a few of them represented in the modern sense, others are just named so. It was supposed to be an axis of economic development and tourism in Serbia, but for decades, there is no significant movement. Agricultural production, especially in the environmentally protected area of the spa, heating and other purposes, require a large expenditure of energy. The high price of energy originating from fossil fuels considerably raise the costs of the production, and environmentally is multiple harmful, therefore geothermal water could have significant application in high intensive production of healthy (organic) food, also for heating greenhouses and livestock farms, and other needs (air conditioning - heating and cooling facilities, etc.).

Benefits that are obtained by using geothermal resources are multiple and numerous, and can be divided into three main groups: the socio-economic, environmental and technical and technological. Geothermal energy is a national, autonomous and independent energy. Its exploitation and utilization is independent of the international political, economic, war and other crises. Exploitation and utilization of geothermal energy does not depend on imports. Its use does not create the conditions for political and financial blackmail or conditioning by the historical enemies of the world, as it is the case with oil imports. The use of this power is not influenced by the weather conditions, or floods, earthquakes, drought and storms, and its accumulation cannot be destroyed.

Thermal mineral water can be used also, besides the use for air conditioning and growing all manner of plants, to make an impressive illusion of exotic beauty and virginal purity promised paradise from prosaic places, even the greatest stylists of beauty and environmental aesthetes cannot resist, and therefore, with all that pleasures, the tourists will have the largest selection of elixirs of extended youth and promising longevity. From some rarer and more interesting tame places, using of the thermal water and heat pumps could make a wonderful oasis of exciting experiences of photo safari without the risk of suspicious Africa, Asia, distant or dangerous Amazon. Some of its parts (Obetske ponds) can be transformed into a farm of crocodile, Amazon giant snakes and various monsters for viewing and photography, all of which except horror, lavish and expensive objects can be obtained. As far as is known, such a unique oasis in Europe would not be, even in such a nice, gentle and accessible place.

The possibility of using geothermal resources are numerous: agriculture, aquaculture, heating and district heating, heat for industrial purposes, drying grain and other plant fruits and industrial products, greenhouse, recreation and sports, spas, etc. With further expanding and increasing the utilization of geothermal energy Serbia will become less dependent on imports of other types of energy. A new state or national energy strategy (NES) is needed, made in the form of operating and dynamic document which is open to new insights and new ideas, as well as for global, continental, regional and local changes in the environment. Elaboration of new NES should be made in a such a way that represents a significant shift from the previous strategy, whose weaknesses and failures are reflected in the full light right now. New NES should not be just an energy plan, as well as all previous strategies were. It must be a comprehensive *linking of the both environmental policy and economic policy with the energy policy.*

The territory of Serbia is especially specific and suitable for the use of geothermal energy, and not just because of the amount of heat that can be drawn from ground, but also because the heat is usually located at shallow depths (which is technically and therefore economically available and convenient), and the fact that the conditions and possibilities of its use are evenly spaced on practically the entire surface of Serbia. Geothermal fluids can be transported in thermally insulated pipelines at great distances, even up to 60 km (distance between sites, or geothermal sources and places of use should be as less possible).

Technical and technological benefits of geothermal energy are reflected in its technological rationality and high reliability of exploitation and use, the equipment can be easily and quickly overwhelmed, easily incorporated into new and existing systems and it can easily be stored and accumulated till complete exploitation. Evaluation of reserves in the sites is faster, easier and cheaper than the evaluation and assessment of oil reserves and solid raw material, and its exploitation can begin even before the completion of evaluation of the entire site. The thermal mineral water, as an environmentally resource, can be valorized on the basis of cost evaluation, the relationship between profits and investment, and on the basis of environmental costs - economic effects, and their use must not be outside of the economic and environmental systems. The calculation shows that even those small and of lowest quality sources can bring economic benefits, because they can be exploited complexly at the regional and local level.

3. ECONOMIC ASPECTS OF USE OF GEOTHERMAL RESOURCES

Energy is fundamental for economic systems and life in general. Our equally critical need for energy is partly camouflaged with the modern economy. Measured in the values of the gross domestic product, energy resources represent only about 5 percent of economic output. However, the other 95 percent of the output is absolutely dependent on the input of energy. As the economies develop and become more complex, the need for energy is greatly increased. Historically, as the supplies of firewood and other biomass became insufficient to support the growing economy, people have turned to the use of hydro power, then coal, and finally oil and natural gas as the main sources of the power. In the past 50 years people have begun to use the nuclear energy. From the standpoint of economic analysis, the most important factor that is affecting the power consumption is its market price. Today there are two types of problems related to the use of energy. The first is the depletion of limited supplies of energy resources, and the other is inevitably creation of waste and pollution from energy use. Energy reserves have a special importance because energy is essential for the extraction of other resources too.
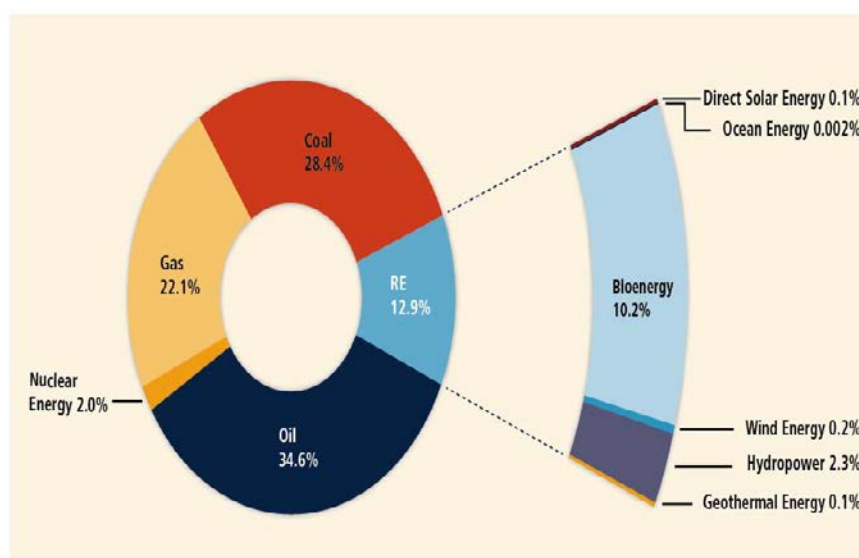

Figure No.1 Representation of energy sources in global dimensions [7, p. 4]

In the structure of energy consumption in Serbia, low temperature heat consumption represents about 30-35%, and is covered by coal, wood, electricity, oil and gas. Coal is environmentally harmful, wood and electricity is a pity to be wasted for heating, and we do not have own sources of oil and gas. Serbia could cover about 25-30%

of the total heat consumption from the geothermal sources. Thermal energy received from geothermal water at temperatures up to 40 °C is 20% cheaper than the thermal energy received from other sources, with a temperature of 60°C is cheaper by 55%, and with a temperature over 80 °C is cheaper to 90-95%, but used in the most primitive way, without heat pumps! Thermal mineral water with the use of the heat pumps could have a huge application in the industry too, particularly in the chemical, cosmetic, dental, brewing, confectionery etc. because they cheapen the production, substitute the substance which is dependent on import or provide a higher quality product (value gained by reducing costs and saving energy and other natural resources, especially through the environmental pollution component directly or by changing climatic factors indirectly), or because they solve all in the same time.

The efficiency of using thermal mineral water can be increased to a great extent with the use of heat pumps, sort of sophisticated technical devices used to redirect the heat energy from underground natural sources. Energy utilization by a heat pump system is several times higher than the mechanical working energy at the entrance. The working principle of the heat pump is similar to the working mode in the fridge - but in the opposite direction through the heat exchanger. Economic benefits and technical characteristics of the implementation of heat pumps in spas are detailed in the paper, through the case studies of two spas of Serbia (Mataruška spa near Kraljevo and Bukovacka Spa in Arandjelovac) [1, p. 1127]. This system has a long lifespan, which is useful for their economic profitability. The economy of utilization of geothermal mineral water depends on the timely implementation and the total losses should be minimized, which can be expressed as follows:

$$W = e\text{-rt } [W(id) - W(t)]dt, [2, p. 137]$$

where W is the ideal state for thermal mineral water sources with minimal integral loss, W (id) - the ideal level of meeting the needs for this resource in a state of stable social and economic development, W (t) - constant level of meeting the needs for this resource in all periods of time and r - discounted rate at time t.

Above the geothermal water, heat pump can use the heat from the land, at a depth of several meters and even deeper, where the temperature is constant between 11°C and 12°C during the whole year. By using these underground sources, heat pumps separate the energy from the soil and the groundwater with very high level of efficiency, while also achieving a significant reduction of CO_2 emissions in the air. In any way, the heat pump does not produce energy, but it is only transferred, "released" and redirected to the consumer. A heat pump can help to achieve significant fuel savings (costs) as compared to direct electric heating systems (e.g. storage of fuels), gas boilers, oil boilers, and some renewable energy systems, such as biomass because they require no storage space for fuel. Heat pumps are an environmentally friendly alternative to oil and gas. Thus, the heat pump provides more than 2/3 of the energy needs from the free (natural) energy stored in the earth and reduces the heating costs by more than 60%.
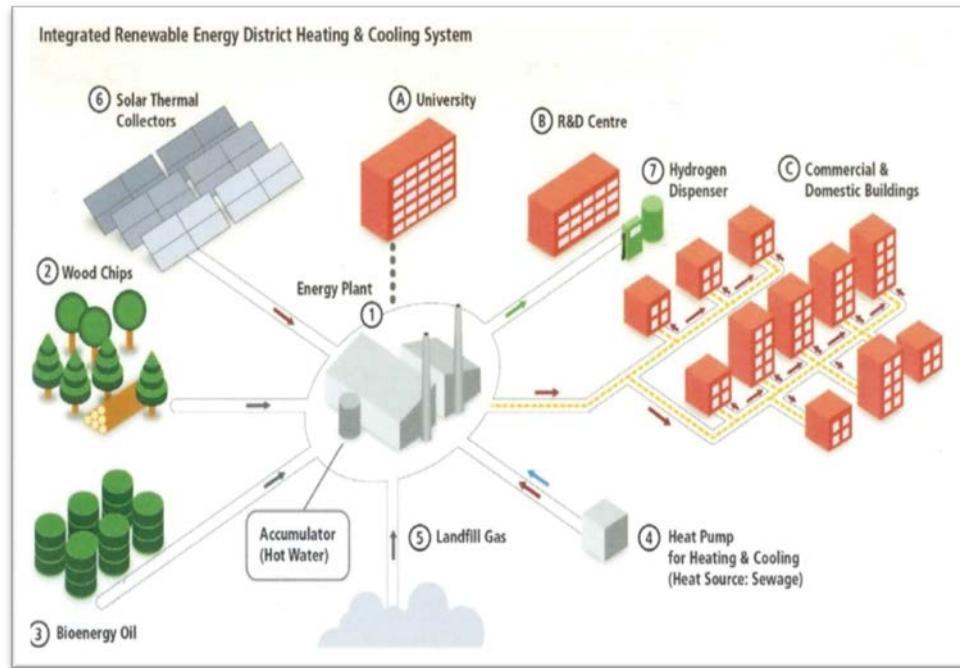
Figure No. 2 An integrated RE-based energy plant in Lillestrøm,
 Norway, supplying commercial and domestic buildings [7, p. 15]

Geothermal energy is a national resource that contributes to our energy security and reduces our trade deficit, replacing imported fuels. Using geothermal energy saves foreign funds, because it reduces the amount of expensive imported oil and gas. At the same time, this valuable energy fuels from domestic sites are released for use in the chemical industry, because they are an important raw material in this economy branch. Heat equivalent of geothermal energy from the land given by the thermal water of natural hot springs per year (which is spread out in the atmosphere - air) is about 100,000 tons of oil. Using of geothermal energy save dinar funds also, because the geothermal heating plants are cheaper than the heating plants in which the heat is obtained by burning oil, coal or gas, and because it is cheaper than using other sources of energy. In other words, the unit cost of heat and electricity derived from the geothermal energy is always lower than the unit cost of heat and electricity produced from other fossil fuels energy and they are very stable, practically immutable over time, because they do not depend on foreign and domestic unfavorable impacts, primarily because it is a highly autonomous energy.

Exploitation of geothermal energy costs are very low, and they are the lowest compared to the same in other energy fuels. This is because the operating costs are low, because the thermal equivalent per unit of energy is much lower than the amount of thermal energy exhausted or heat per unit of time. Geothermal sites have a long exploitation period and are much longer than the fossil energy fuels sites. Geothermal energy is renewable and has no tailings during the exploitation.

Geothermal energy is characterized by high efficiency in terms of the amount of initial investment, plant maintenance and operating costs, the lifespan of the site and strong profitability (high tech economy - no hidden costs). Hidden costs in the exploitation of fossil energy sources are not very well known, cannot be predicted, nor expressed, because they come mostly because of unfavorable impacts on the environment (nuclear power plant disaster, rehabilitation of surface mining, reclamation of tailings - ash pan, sludge filled accumulation, relocation of villages, cultural property, roads, deforestation, destruction of arable land, climate change, etc. The latest economic demand, as a condition of high

competence, the use of energy has become a matter of prestige in conditions of quality life at home and on the world market and it is becoming a key postulate of national economic systems [3, p. 74].

Environmental benefit lies in the fact that geothermal energy is practically harmless to human and animal health, its ecological value is in its easy to control labels and high equifinal coefficient, it is used directly (immediately), which is not the case with fossil fuel. It sets us free from pollutants, because the energy is clean and ready for use – there is no conversion (with the combustion as it is case with the coal, there are harmful wastes), creates no carbon dioxide, also does not cause climate change and the greenhouse effect, neither acid rain – resulting in a fall of the food production, damage to human health, dying forests, destruction of biodiversity, etc. Because of this, ecologically pure energy like geothermal is, must have a growing role in the replacement of fossil fuels, because it is in line with nature. It will be reasonable to say that the Serbian thermal mineral water are promising environmental resource, and therefore a strategic condition of development of more economy branches, which combines within the effect of economic and non-economic factors.

Starting with the real possibility of using these materials in Serbia (the further studies will confirm to what extent it is profitably), bearing in mind the general energy situation and especially the need of protection of human environment, it is necessary for the research and utilization of thermo-mineral, mineral and gas water, as well as geothermal power, to include in the appropriate flows of social planning and construction in the Republic, such as the green plan, energy development plan, utility plan, a plan for the protection of human environment, etc. Because of the low cost and environmental benefits, the use of geothermal resources is the most economically attractive for industrial drying processes, central heating systems, and also agro and aquaculture production.

Exploitation and utilization of geothermal energy should not be hindered by the companies engaged in the production of energy from fossil sources (coal, oil, gas), and according to this the state support to the development of geothermal energy is expected. Reliance on a strategy for Serbia's energy future, based on the combustion of domestic low energy coal and increasing imports of oil and gas without taking into account the possible environmental problems and constraints, could distract the attention from other development strategies that are based more on a market principles, human resources and ingenuity, and less on the economic attractiveness of domestic resources. Today the situation is different, much more is known about the technical aspects of geothermal resources in general, and also the ways to overcome all technical issues related to the exploitation of geothermal fluids and their geothermal energy are found. Therefore, today the technical risks are much smaller, and the conditions are prepared for the investors to deal with the basic question of marketing and commercial operations, since there has been a rapid progress in business management and marketing.

Geothermal resources in Serbia could play an important role in increasing the supply with the profitable energy that is acceptable from the standpoint of environmental conservation, as well as to help the utilities for their integrated resource planning by enabling them to provide an effective means to manage demand and to reduce the need, or geothermal direct use. Utilization of geothermal resources has a bright future in our country. The first assessment of potentiality of geothermal energy resources were made, which aim of making them was to point to the whole perspective and social interest in geothermal energy, that means, they are the basis for determining the long-term economic policies and strategies of the economy for the use of this energy, and they show that according to the intensive program of geothermal exploration and exploitation until the 2015., could be reached the replacement of at least 500,000 tones of imported liquid fuels

annually. If properly exploited geothermal energy can play an important role in energy balance. Low to medium temperature of geothermal resources can solve many local problems and to raise the standard.

4.CONCLUSION

Utilization of geothermal resources in Serbia must be an important basis for economic development. In the present socio-economic conditions, in our opinion, for evaluating the criteria of the success of the venture in a broad range of technical possibilities of using geothermal resources, the more important is the understanding of the mutual action of the elements of economic processes than correctly forecasting the economics of geothermal energy as a resource, or the understanding of the technology used in certain industrial processes. Social, technological and economic advantages or benefits of their use are still significant in comparison with other energy sources, and can do even much more to get on the value, if concern for the increase in CO2 in the atmosphere leads to economic measures that would discourage the use of fossil fuels. However, this will depend more on our business efficiency, than our competence in other areas, including good marketing, than of geothermal technology itself.

Geothermal energy in Serbia can play an important role both in increasing the supply of cost-effective energy, which is acceptable from the standpoint of environmental protection, as well as assisting the utilities in their integrated resource planning by providing them with an efficient means of consumption management and to reduce the need, which is geothermal direct use. To achieve this, the geothermal energy must be included in the primary energy resources, that means it must be given equal status with coal, oil, hydro power and other fossil energy sources, it must not continue to hamper. The exploitation and utilization of geothermal energy has to become imperative because it is the most valuable natural energy for the use of which does not require any conversion.

Geothermal energy does not increase the natural greenhouse effect and does not cause climate change, does not destroy the ozone layer and does not lead to the occurrence of acid rain. All these highly harmful effects to the environment of which will significantly depend the survival of the human species, are caused by waste originating from increasing combustion of fossil fuels (CO_2, SO_2, CH_4, NO_2). For this reason geothermal resources should be explored and used in ever greater extent, because it is proven that the direct use of geothermal heat can be an economical and commercial. This application will require strong cooperation between the government and the private sector in the implementation of certain projects.

Geothermal energy can be successfully used in spas to adjust the temperature of the balneotherapy and physiotherapy purposes and to heat nearby buildings using heat pumps. This is the proven energy efficient and economically viable solution and can be used instead of two-thirds or more of the conventional thermal energy. Before making decisions on the exploitation of geothermal resources and before making decisions on the type of their use must be taken into consideration the following facts: the total cost of geothermal heating plants are higher than similar to conventional fuels, but the cost of energy produced in geothermal power stations are smaller than the energy obtained from conventional fuels and the high investments in the construction are rapidly returned by energy cost savings.

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BUSINESS ECONOMY OF RTB BOR, TRENDS AND POSSIBILITIES

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Abstract:*For more than two decades RTB Bor is facing serious business problems. From once famous and respectable company, it had fallen down in a very short period of time. Reasons for that should be found in political and economic crisis in 90's, caused by breakup of former Yugoslavia, but also in internal technical and organizational weaknesses.*

In the meantime, there were several attempts to overcome the difficulties, but without results. Two attempts of finding strategic partner failed. Increase of smelting of imported ore, caused by low domestic ore production, didn't bring much of improvement in utilization of smelting capacities. Through the restructuring process, only basic part of copper production was left in the company, but it didn't have much influence to business results.

However, there are some serious changes in last five years. Copper production is almost doubled, business income increased nearly three times and, after a long period of time company achieves positive business result in 2012. Also, there is a significant amount of investments in renewal of mining and mineral processing equipment in Veliki Krivelj and Majdanpek open pits. Does it all mean that the company leaves economic and financial crisis behind, it will be shown in upcoming period.

Key words*: business economy, economic crisis, copper production*

INTRODUCTION

RTB Bor Group is a well known Serbian company which produces copper and precious metals. In former Yugoslavia, it has been considered as one of the leading companies. At the same time, it had major role in development of eastern Serbia and beyond [1].

Untill 90's, RTB Bor had a very solid dynamics of industrial growth. Especially rapid growth took place after WWII, when several mines and mineral processing plants were developed. All this, along with incorporation of many companies from the region, created an industrial giant, with more than 20,000 employees, recognizable by production of high – quality copper [2].

Breakdown of former Yugoslavia and political and economical issues that followed it, brought many serious problems to the company. Due to economic sanctions, export of copper was disabled, as well as import of material, spare parts and other inputs needed for production process. All of that, along with some internal and organizational weaknesses, pushed the company into deep crisis.

Downfall lasted very long, up to middle of previous decade. It was one of the toughest periods of company's entire existence. Its survival was very questionable.

Finally, after years of crisis, second part of previous decade brought some improvement and recovery of production process. Thanks to the support by Serbian Goernment, the company was able consolidate its production, business economy and financials. The effects were soon visible in each aspect of the company.

1. OUTPUT FLOW

RTB Bor Group achieved the highest recorded annual output in 1990, when production of catode copper reached 151,395 t. Some 33% of raw material came from import, and the rest was provided by domestic copper mines and mineral processing plants [3]. Since then, we have a trend of decrease, with small variations.
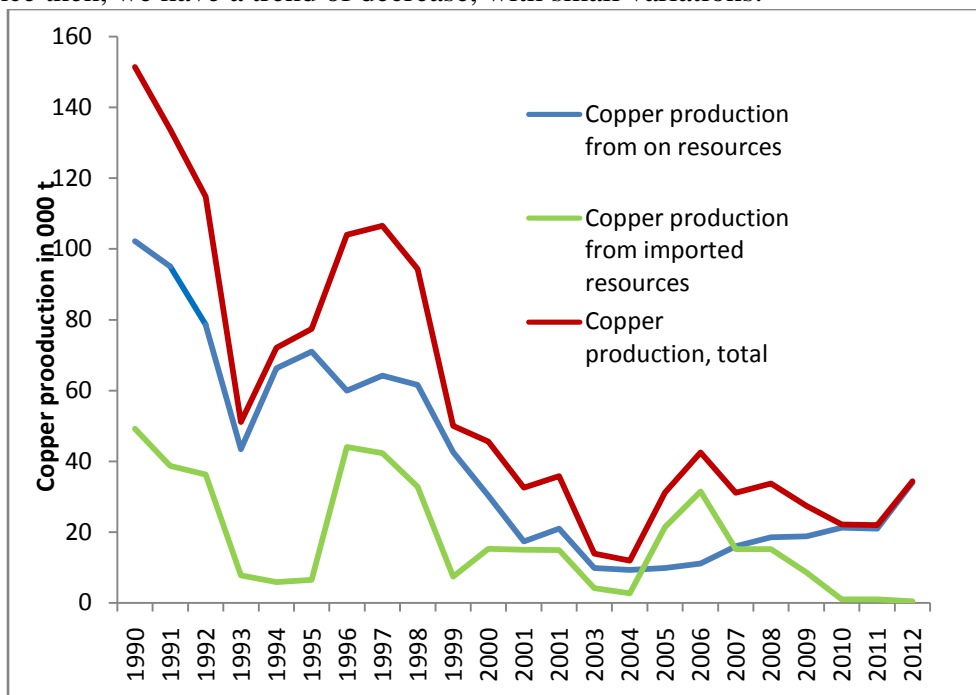

Figure No 1. Copper production in RTB Bor Group from 1990 to 2012

The lowes annual output happened in 2004, with 11,997 t of copper produced, 9,343 t from own resources and 2,654 t from imported ore concentrate. Since that moment production is constantly rising, up to 34,430 t in 2012. Production from own resources was up by 30% in last year. Beside, almost half of total production was sold in international markets [4].

At the same time, production of precious metals is also rising. RTB Bor produced 5,421 t of gold and 33,514 t of silver from 2005 to 2012.

2. BUSINESS RESULTS

Years of crisis have heavily influenced company's business results. Business losses were recorded year after year. The expensescould not be covered by incomes. After many years, RTB Br managed to achieve positive business result in 2010. However, it recorded a loss in 2011 again, regardles on almost 30% increase of income.

In 2012, along with increase of production, the company achieves solid financial result, too. Incomes rise by 29%, regardless on decrease of prices at the world market by 10%. Much lower increase of outcomes enabled profit of nearly 5 Billion RSD. However, due to high level of financial outcomes, related to negative exchange difference and high interests on credits, net profit is 1,884 Billion RSD.

Table No 1 - Consolidated success balance, in 000 RSD [4]

Position	2007	2008	2009	2010	2011	2012
Incomes	8,766,420	8,938,164	8,809,555	18,389,847	23,654	30,523
Outcomes	10,864,803	11,620,925	12,042,666	15,620,359	20,597	25,589
Profit-loss	-2,098,383	-2,682,761	-3,233,111	2,769,488	3,057	4,934
Financial incomes	1,387,617	892,107	165,130	1,210,901	1,893	1,842
Financial outcomes	1,225,935	4,528,311	2,521,466	6,081,677	5,633	5,699
Non-business and extra incomes	217,100	86,406	81,832	2,972,185	1,455	1,961
Non-business and extra outcomes	376,455	399,908	326,856	794,283	1,662	1,154
Profit-loss from regular activity	-2,096,056	-6,632,467	-5,834,471	76,614	-801	1,884
Aborted business loss	-54,046	-	-	-48,883	-	-
Net profit-loss	-2,150,102	-6,632,467	-5,834,471	27,731	-801	1,884

3. STATE OF EMPLOYMENT AND WAGES

Increase of business activities was also reflected to company's state of employment. There were 229 new employees in 2012, mainly in company section RBB. Currently, the company has 5,029 employees.

Table No. 2. State of employment and wages [4]

Unit	State of employment at 31.12.					Net wages (annual average in RSD)				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
RBB Bor	1,986	1,872	2,088	2,048	2,267	34,676	37,027	40,619	59,354	69,702
RBM Majdanpek	988	952	962	946	953	34,026	35,811	40,056	59,184	69,349
TIR Bor	1,830	1,731	1,706	1,681	1,680	34,633	37,165	40,574	59,225	67,745
Company management	84	93	114	125	129	42,055	45,138	50,722	68,904	72,388
Total	4,888	4,648	4,870	4,800	5,029	34,651	36,983	40,701	59,515	69,036

Wages have a trend of constant increase. Wages as mainly balanced between company sectors. Related to average net wage in Serbia, wages in RTB Bor are higher by 66.8%, which is normal considering the character of company's business activities.

4. INVESTMENTS

For more than three years investment activities are constantly realized upon entire copper production line. All of the copper mines have improved their technology by high – capacity equipment, as well as mineral processing plants Veliki Krivelj and Majdanpek. Also, as a major project of great importance for the company, reconstruction of smelter and

construction of new sulfur acid factory are in progress. Surface mine Cerovo is reactivated and new ore deposit Coka Marin is in preparation for beginning of excavations.

Along with all of these activities, special attention is paid for environmental protection, considering very high level of pollution in Bor and region. Total investments in 2012 reached 13 Billion RSD.

5. SOME LIMITING FACTORS OF ECONOMIC GROWTH

Regardless on very obvious and strong revival of business activities, RTB Bor still faces many limitations in its economy and development, such as:

- Low ore grades. Mean content of copper in excavated ore in last five years varies from 0.247 to 0.289%. Situation in near future should slightly better, with projected 0.33%. If we know that mean copper content in the world reaches 0.5 to 0.6%, it is obvious that quality of Serbian copper ore resources is twice worse.
- High cost price of copper. Due to high costs of inputs, cost price in RTB Bor varies between 6,453 and 7,563 US$/t. For majority of copper producers in the world cost price is lower than 4,000 US$/t, while highest recorded cost price reaches 5,950 US$/t. Furthermore, companies where copper is a byproduct have costs around 1,450 US$/t.
- Low productivity. Annual copper production per employee in RTB Bor is 6.4 t, while in the world it varies from 40 to 400 t.
- Poor competitiveness. Due to problems mentioned above, where most important are high costs, products of RTB Bor are not competitive enough at the world market. However, due to high demand and favorable price of copper and precious metals at the world market, production is not affected.
- High indebtedness. Many years with recorded business loss caused lack of working capital and turning over to loans. The biggest problems are previous credits that haven't been serviced, because today they represent the ballast and mortgage of the past. By Government's program of restructuring, state owned creditors are obligated to convert their assets into shares of company's capital, while regulation of debts will be negotiated with commercial creditors.

Finally, status of company ownership needs to be determined permanently, since currently it is state owned. Along with ownership, a model of company's internal organization should also be defined. Results of the analysis can be approximated using polynomial regression equation [10, 11].

CONCLUSION

After years of agony and crisis, RTB Bor started to achieve encouraging results in recent years, especially in 2012. Improvement is visible in almost every segment of economy.

Improved production level enabled significant investments, which are the base for rapid growth in next period. Special attention has to be paid on decrease of costs in this process, as well as increase of productivity and solving some internal weaknesses. All of that should enable better competitiveness of the company on both domestic ant world markets.

Permanent stability of economy and sustainable growth are the goals that company should be aiming to. This is an interest of employees, but also a public interest, considering the importance of company in development of Serbia.

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