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Milivoje Radenković
Andrej Novović

Address
Belgrade, Jove Ilića 154
Tel./fax. 381 11 3950 868
E-mail: manage@fon.rs
http://management.fon.rs/

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Knowledge Based Economy – the Base of Economic Growth and Development

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Sandra Jednak[1], Dragana Kragulj[1]
[1]Faculty of Organizational Sciences, Belgrade

Economic development is a complex social process. Determination of factors that affect the economic growth and development, the way they work, the reasons some economiesare more developed than others, and why economies have different rates of economic growth are the issues of a number of studies. Analysing these topics, and according to the economic growth theories, the traditional determinants are found tobe the labour, capital and technology. However, knowledge is nowadays considered to be one of the factors of economic growth and development as well. The aim of the European Union is to build a knowledge-based economy, and hence the increased role of knowledge and new technologies. This paper analyzes the importance of knowledge as a factor of economic growth and development, and analyzes the results of building a knowledge-based economy in the European countries.

1. Introduction

Economic development is a complex social process in which every country tends to ensure a passage from the lower to the higher phases of economic developement. Economic developement is viewed as an indicator of the relationships between macroeconomic aggregates such as social product, national income, employment, accumulation, investments, consumption, etc. Although no economic developement is possible without economic growth (there is no need for an inverse relation, i.e., the "economic growth is possible to achieve without an economic development"), it can be confined only to the growth in GDP and the per capita national income. In addition to the above mentioned elements, the economic development can be expressed by a set of structural and functional changes withing a particular economy, as well as by a succession of other economic and non-economic factors. It is in this sense that economic growth is defined as a multidimensional process. The change in the overall social structure is one of the basic components of economic growth and together with economic growth it ensures the growth of both the GDP and the national income. Similarly, economic development is necessarily oriented towards achieving certain goals that have to be brought into harmony beforehand, and can be sublimed into two most important ones: the developemnt of the economic potentials of the country and the improvement of the living standard of its population. [9, p.306]

The modern economic science insists on sustainable development. The sustainable development is defined as a development that ensures the satisfaction of the today's generations' needs, however, without endangering the satisfacton of the needs of the future generations. Sustainable growth means an optimum balance among the economic, the social, and the environmental factors within an institutional framework. It is defined as a long-term, comprehensive, and synergetic process permeating all aspects (economic, social, cultural, ecological, and institutional) as well as all levels of life (local, regional, global). [15] The three basic pillars of sustainable development are: a sustainable economic and technological development, a sustainable development of the society and the environmental protection.

2. Knowledge as factor of economic growth and development

There are numerous factors of economic growth and development of a country or a region. They may be classed on the basis of various criteria and their impact can be analysed in detail. The most important factors are as follows: *natural conditions* (size of a country, geographical position of a country, natural resources – ores, soil, forests, etc., pollution of the nature, climate, etc.); *human resources and science* (human resources quality, human resources potential, factor – knowledge, quantity and quality of personnel training institutions, development level and efficiency of resarch operations, the development level of the information sector of economy, the extent to which information technologies are used, the quality of scientific personnel, information as key development resource, etc.): *production, technics and technological change and innovation* (production structure of economy, the overall production potential of the country, the level of manufacturing technics, the technical and technological progress, the type of technical progress, the rate of obsolescence – physical and economic depreciation of technics, technological change and innovation, accumulation and reproductive potential of economy, organization and methods of managing economy, the level of infrastructure sophistication, etc.); *agricultural production* (prevailing agrarian relationships and their impact upon agricultural production, the

processes of change in agriculture, etc.); *socio-political factors* (cultural heritage, historical heritage, tradition in economy, methods and institutions of social management, political system, the position of an individual in the society, social security, degree of democracy, ability to stand against different forms of pressures from the part of economically developed and politically influential countries, etc.); *international environment* (international economic environment, international labour division, the level and trends of international regional integrations, international economic organizations, international political environment, international and political alliances, itd.). The process of economic development in a given country and in a given period is affected not by individual factors, but by a set of factors, therefore the effects depend on their interaction. One individual factor, for example, may not have a significant impact upon the economic development of a country, however, within a set of other factors, its importance may be crucial. Using the economic analysis it is possible to select individual factors and highlight their impact, however, their importance can be evaluated only in a concrete situation (country, time, conditions), and together with the impact of the other factors.

Certain factors of economic development can be grouped according to different criteria, depending of the objective of the analysis. The most frequent classifications in the modern economic literature, important from the point of view of the development strategy selection, observe the following criteria: territorial origins (endogenous and exogenous factors), type of operations (economic and non-economic factors), matter (material factors), immediacy of effects (primary and multiple: secondary, tertiary factors, etc.), the rate of volatility (strongly volatile, medium volatile, slightly volatile factors), measurability level (measurable and non-measurable), utility (positive and negative factors), relevance (relavant and irrelevant), priority (higher or lower level priority factors), up-to-dateness (historical and modern), etc. Such a variety of economic development factors with different impacts as regards the orientation, intensity and the length of time produce different impacts in different cases. The development level and the size of a country will affect not only the priority of factors but their impact as well. Their interaction makes the understanding the impact of each individual factor difficult; besides, many of them produce insufficiently measurable effects. The priority of factors cannot be given *a priori.* A higher level of priority is given to those economic development factors that produce a wider scope of effects, they work on a long-term basis, they are not subject to frequent changes and produce a strong positive impact upon the economy trends and development. [9, p.311]

Modern economic theory and practice views knowledge as one of the key factors of economic growth and development. Knowledge, in fact, can be said to have always been the driver of economic progress. New ideas, skills and competences resulting from knowledge have always been incorporated into new products, processes and organizational structure of companies. *Schumpeter* was the first to recognize knowledge as a structural component from an economic point of view, as well as its importance for the economy. He claimed that a new combination of knowledge is a key factor of innovation and entrepreneurship. [2] The basic sectors responsible for knowledge generation are: education, research and development, art, media, information sector and information technologies. Depending on the sector, knowledge is analysed as production (research and development of new knowledge), dissemination (education, training and human resources development) and transfer (diffusion of knowledge and innovation). A development factor that is becoming increasingly important is the integration of science, education and information technologies. [10] Some researchers maintain that knowledge can be viewed as an essential resource, product and system. The view of the knowledge as an input is related to investment into research and development, education and information technologies. As a product, knowledge is important in developing business services based on knowledge, as well as in the development of the new technology sector. It is implemented in improving the existing products and creating new ones. [7]

Science demands a system of knowledge. Different kinds of knowledge are required to achieve progress in a certain area. New technologies, i.e., information-communication technologies, are the instrument to generate and transfer knowledge. Owing to browsers, electronic databases and various softwares, the scientists and researchers enjoy a faster access to information, development and storage of results, or knowledge, and this all results into new innovation and an increase in growth and development. The comparison between capital, labour and knowledge, however, clearly shows that knowledge displays certain features of a traditional factor. Similarly to capital, knowledge can be accumulated. Knowledge, same as capital, has an impact upon labour. It affects the labour force through education and training. [16]

In certain economic studies and analyses, and due to an increasingly important role of knowledge in achieving economic growth and development, a classification of capital was made into natural, physical and human. There is a connection among these three types of capi-

tal. All three have a direct or indirect impacts and improve the productivity in expanding the production of goods and services in an economy, and also ensure the development and growth of the social wealth. The impact of all the three types of capital upon the economic process and social wealth is illustrated in Figure 1.

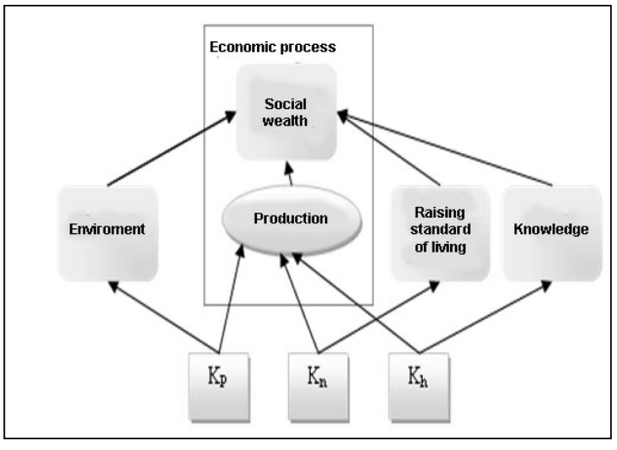


Figure 1. The impact of physical, natural and human capital upon economic process and social wealth

Source: *Barbier B. Edward, The Role of Natural Resources in Economic Development,* University of Wyoming, *2003*, p. 255.

Physical capital (K_p) includes machinery, equipment, premises, tools and other investment goods. It is used in the production process and affects both production and the environment. It has a crucial impact upon the growth of social wealth. Human capital (K_h) includes knowledge, skills, competences, and abilities of labour force necessary in the production process. It ensures research and development that leads to technical and technological innovation and larger social wealth. Natural capital (K_n) or natural resources are materials and energy consumptive inputs used in production. Appropriately oriented, natural capital supports the population to employ ecology to contribute to the health of people and their safe life, thus increasing social wealth. [1] It is necessary that an appropriate social policy should be pursued and that a socio-political consensus should be established in order that all three types of capital be used to the extent to which they increase the production and the social wealth, and that simultaneously the capital be available to the future generations in the time to come. Forecasting, evaluation and the selection of a possible course in achieving this goal is neither an easy nor a simple process. Without adequate economic policies, a development strategy, and an active role of the state, chances are small to answer to an increasing economic and technological complexity of increasing social wealth. Tt is necessary that economic policies be improved and business activities and profitable processes be maintained. It is also necessary that employment should be increased, but also the level of knowledge, to stimulate the development of new products and processes and hence improve productivity, production and the amount of social wealth. [13]

The developed economies based their growth and development on knowledge that generates innovation. Innovation is achieved by a more effective protection of intellectual rights, by the development of the financial sector, by a higher quality and a higher level of education and by a macroeconomic stability. [18, p.52] The European Union, the OECD, the EBRD and other international institutions define standards to achieve sustainable economic growth, increase employment, improve the standard of living, maintain financial stability and provide aid for the developing countries. Improving and creation of new knowledge and its transfer and dissemination to new generations through education is closely connected with the development of higher education, as well as with the research and development that increasingly become a dominant factor in the economic development and in creating a knowledge-based economy. This economy is based on high quality intellectual resources and their profitability. In addition to generating innovation, knowledge can direct and define the orientation and flow of economic development. Similarly, knowledge and technological progress are linked to the reduction of budgetary deficits and the deregulation of policies, especially in the financial sector, in airline transportation and the electrical power supply sectors. Not all economies, however, have equal amount of resorces available. It is because of the differences in education, i.e., knowledge, competencies and skills of the country population that it is assumed that there is a development gap among countries. Hence the implementation of knowledge, conditioned by technological change and innovation becomes an important development factor in each economy, which is the goal of many countries worldwide.

International institutions such as OECD, the World Bank, the United Nations and the European Union have developed their own methodologies and indicators to mark the extent to which economies have developed. They are oriented towards humane and social development indicators, towards measuring the development based on systemic, strategic and planned processes, on information-communication technologies and certain knowledge indices that have their roots in the indices of education, innovation, and the ICT and economic-institutional regime. [14, p.6] There also are other indicators that show the development of the knowledge-based economy. These are: investments into research and development, investments into the higher education system, i.e., capital (researchers and doctorands), capacities and quality of the education system (costs of education and life-long learning), e-government (purchasing new

equipment and modernization of public services), work productivity, implementation of information-communication technologies, etc. [2] Investments into education can contribute to achieving a sustainable and long-term economic growth and development, due to the development of human capital employed in creating, implementation and adjustment of technologies. It is in this way that knowledge can "catch up" with the new technologies developed and consequently with developed economies. The support to knowledge is ensured by information-communication technologies.

3. European information society and knowledge-based economy

The information communication technologies play an important role in building the knowledge-based economy and the information society. The information society is a synonym to information-communication technologies (ICT). A result of a fast development, implementation and impact upon all the spheres of society and economy in the course of 1990s, the idea for creating an information society emerged. This period is caracterised by an electronic exchange of information, convergence towards digital technologies, an exponential growth of the Internet and opening of the telecommunication market. For an information society and a knowledge-based economy to be created it required a further ICT development and implementation. In order that the production and implementation of new, knowledge-based technologies should be increased, it is important that structural changes be conducted, and this is accomplished through the following structural factors. [5]

1) Flexibility of goods market is necessary, including the market regulation, low costs of market entrance and exit, a competitive environment that will ensure the necessary incentives to companies to invest into and implement innovative technologies and increase innovation.

2) Relevant is the implementation of efficient innovation systems meant to reduce the gap between the EU and the USA. The American innovation system is efficient in linking various participants, is of good quality and invests into knowledge sectors. This system offers direct resources to the sectors of new and high technologies. On the microeconomic level, the main component of an efficient innovation system is the entrepreneur culture. In order that a company be innovative, it has to recognize the opportunities and chances on the market, respond in an innovative manner and possess a large knowledge base. A flexible financial market generates venture capital to finance the innovation of the company.

3) Labour market flexibility is important because of the presence of technological change. An inadequate employment policy can have a negative impact upon the company reorganization, upon new technologies implementation, as well as upon the skilled labour force migrations. The possibility of migration between different jobs and a flexible labour market include life-long learning and ensure permanent improvement and education.

4) The ICT skills are essential for the ICT sector as well as all other sectors that implement new technologies. The ICT sector and all the companies that implement ICT have a highly trained labour force (scientists and engineers). There is an increasing percentage of labour force [11] that command an equally increasing knowledge and skills required that the ICT should be implemented correctly. Education and various forms of training are essential for the ICT implementation.

In addition to these factors, the successful implementation of ICT depends on the factors related to both the ICT sector and public policies. These are:

1) *The ICT sector* that has an impact upon the productivity growth via technological change. The sector generates innovation and invests into knowledge, research and development. Investments into research and developement are larger here than in any other sector. In the EU they amount to 25% of the total research and development of the entire economy;

2) *Common market* allows for the economy of scope and a larger market for ICT diffusion to develop. The legal framework and the regulations of the electronic exchange of information, i.e., communication, is important for the creation of the European unified ICT market. The lack of appropriate regimes, however, may end in the market fragmentation, especially in the fields of intellectual rights protection, of standardization and of security;

3) *The Small and Medium-sized Enterprise sector* makes a majority of the European economy. These firms are a major source of new jobs, entrepreneurship and innovation, however, they lag in the ICT implementation. An integrated e-Business policy should stimulate firms to implement ICT to a larger extent;

4) *ICT implementation by the government* and the availability of modern *on-line* services can increase the ICT implementation and productivity.

In the 2000s, the EU encountered a problem of economic growth and unemployment. The solution was to create conditions for a dynamic growth, one that was to increase employment, offer an opportunity for the progress of all members of the society and increase the standard of living, and these should be achieved by the adoption of the Lisbon Strategy, meant to build the EU into an information society and a knowledge-based society.

4. Lisbon strategy

Modern strategies are becoming the basis of the so-called new economy. The idea of this economy is that developed economies should achieve high economic growth rates, reducing inflation and unemployment along the way. A fast development of the Internet made people neglect the ICT for a while. New technologies, however, continue to contribute to the economy development. The ICT are considered to be the general purpose technologies. They are present in economic processes and affect economic efficiency in various ways and in different sectors. A gradual adoption and implementation of structural changes helps achieve certain economic performance. In order that it should improve its economic performance and reduce a gap between the European and the American economies, the european Union creates a so-called electronic Europe and implements the Lisbon Strategy.

The implementation of economic reforms improves the competitiveness of European economies. The increase in employment is the best way for the European Union to increase productivity, achieve economic growth, increase the human potential and create more jobs. Economic reforms include the implementation of various measures, from the market liberalization, to the promotion and development of the small and medium-sized enterprise sector, entrepreneurship and innovation, to the reduction in legal regulations that enhance the flow of economic activities. In order to implement economic reforms and become the world's most competitive economy as well as a knowledge-based economy by 2010, the European Union adopts the so-called *Lisbon Strategy* (also known in literature as the Lisbon Agenda or the Lisbon Proposition) in 2000. Since 2000, the EU achieved a considerable progress in implementing economic reforms. In the five-year period markets have been opened for telecommunications, network industries and financial services, over a million new jobs were created and various opportunities for households all over Europe emerged. [4]

There was a need, however, that this process be accellerated in order that the goals set should be achieved by 2010. Hence the Lisbon Strategy was amended and improved in March 2005. The report on the goals accomplished and the results of the Lisbon Strategy implementation was prepared under the leadership of *Wim Koka*, in 2005, therefore it was named Koka's report. The report showed that the set goals were not achieved to the extent they were expected and planned to be achieved. The critics stressed that goals were defined too broadly, that programmes were too voluminous, that coordination was insufficient and that the priorities of the development of some EU countries were inadequate, especially from the point of view of the public debt and the GDP. Besides, the allocation of responsibility among national economies and European institutions was not clearly defined. Different levels of reform implementation were achieved simultaneously among the EU countries. Nevertheless, the authors of the Report pleaded for the pursuing of the same set goals.

The reforms meant to be accomplished remained the same: *a relatively flexible labour market*, i.e., improvement and recruitment of highly skilled staff in order that a higher employment rate should be achieved; in this way a stronger competition and a regulation reform will be achieved; *creating favourable conditions of business climate* and firms' profitability in business operations as well as innovation implementation; *creating a relatively dynamic and competitive unified market*, characterised by a liberalization of services and a new strategic approach that means the implementation of the ruling regulations, a proactive approach to competitive policy, the introduction of competition in public tenders and the reforms in state aid; *the liberalization of foreign trade* and ensuring economic conditions for sustainable development, as well as environmental protection, more precisely, the promotion of eco-efficient innovation and an economic and social progress in environmental protection.

The strategy has a complex structure, since it includes varied and numerous goals and activities, as well as an ambiguous allocation of responsibilities and tasks, especially between the EU and its member-states. The goal is to understand and overcome the weaknesses in the reform implementation, as well as to reduce the gap between the American and the European, but also an increasingly strong Asian economies by achieving the set goals. The major goal of a revised Lisbon Strategy is sustainable development, economic growth and an increase in the employment rate. This is possible to achieve only on condition the EU become an attractive area for investments and thus a higher level of labour productivity be ensured, on condition knowledge and innovation be ensured for the growth and a larger number of jobs requiring highly skilled staff be created, from the point of view of new technologies implementation. [8]

Basic to the Lisbon Strategy is the global economy whose goal is a radical transformation. This includes the change in technology, in production and in trade. A faster flow of information and a reduction of transportation costs have broken traditional geographical barriers to performing economic activities. The boundaries indicating which goods could be traded and which could not have gradually disappeared and the global market includes an ever increasing number of different and new

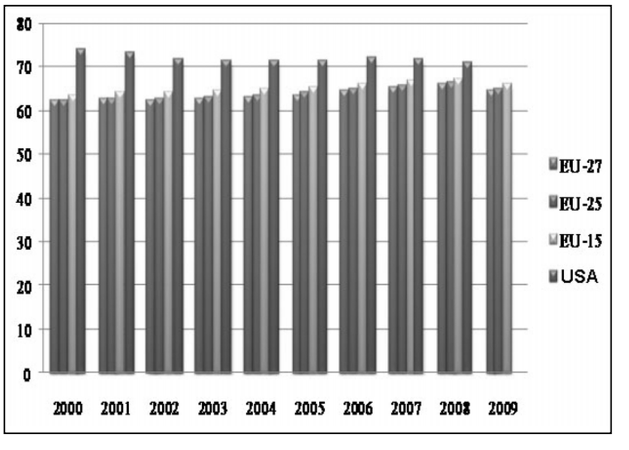
goods and services. An increasing number of countries open their economies, and market liberalization allows for the development of global trade and investment. It is in this way that a larger number of opportunities for a faster integration of national economies into the global economy are created. The increase in the global output has become a dominant strategy of the modern world. An important share in this output belongs to Asian countries. China and India are expected to achieve about 25% of the world output by 2015. Creating a favourable business climate and low costs of production orient foreign direct investments towards Asian countries. With the development of the ICT the production becomes specialized and decentralized by countries, by continents, as it tries to find the most convenient site and profitability for business operations.

The global competition and the speed of technological change intensify the need for increased innovation. Countries that implement high technologies to produce added value make attractive fields for foreign investments. The need for higher education and for the skilled labour force is increasingly present throughout the world. The promotion of energy efficiency helps reduce costs and protect environment. These are only some problems the European economy will have to cope with and maintain the traditional leading position, that is, to have a major share on the global market and in the global economy. These are simultaneously the basic reasons for adopting the Lisbon Strategy. The EU economy should achieve a higher flexibility of the goods, labour and capital markets in order that business activities should be adjusted to economic changes, and that new opportunities should be taken and thus the advantage be achieved in comparison with other economies, and especially in comparison with the USA and the global environment. The structural changes promoting flexibility make the basis of success in the modern economy.

Since 2000 until the present day, the EU has been changing. Innitially an organization of 15 member countries, the EU has become a Union of 27 member countries. The Euro has become one of the leading currencies in the world. The number of member countries in the Eurozone has increased from 12 (in 1999) to 16 (in 2010). Nevertheless, the economic crisis affected the implementation of the Lisbom Strategy. The GDP in the EU fell by 4% in 2009, while the unemployment rate amounted to approximately 10%. The fiscal budget deficit amounted to about 7% of GDP, and in two last years the debt level rose by 20%.

In the last decade the European economy was characterised by a cyclical movement, its success and its falls. After the fall in the economic activities in the 2000-2003 period, the European economy in the following five years has been caracterised by the price stability, a steady economic growth and creation of new jobs. Since 2005 until the economic crisis these performances increased. The average GDP growth amounted to 3% (2006-2007), to fall to -4%, due to the 2009 economic crisis. The situation with unemployment rate was not much different. In 2007, the unemployment rate was 7%; in 2010 it amounted to 10%. The crisis had a negative impact upon fiscal policy, that is, upon public finances. The average fiscal deficit amounted to about 7% of GDP, while the debt level approximated 80% of GDP.

Regardless of these unfavourable changes, the Lisbon Strategy has had a positive impact upon the EU development. The basic goals, the employment rate of 70% and a 3% GDP expenditure on research and development have not been fully achieved. In 2000, the employment rate was 62%, in 2008, it rose to 66%, while in 2009 it fell below 65%, due to the economic crisis. The employment growth is important because it increases the economic growth, ensures a long-term fiscal stability and safekeeps the wealth of the citizens. Graph 1 presents the employment rate in the EU and the USA in the 2000-2009 period. The employment rate is still higher in the USA than in the EU. In 2008, the employment rate in the EU-15 amounted to 67.3%, in EU-25 it amounted to 66.3%, in EU-27 it was 65.9%, while in the U.S.A. it amounted to 70.9%. [3]

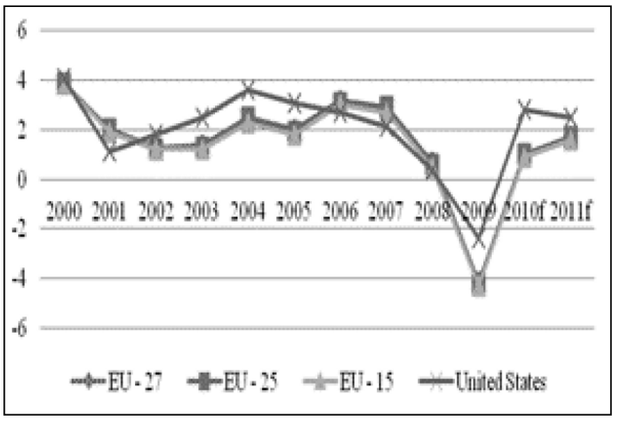


Graph 1. Employment rate in EU and USA, 2008-2009 period

Source: *Eurostat*

Through a historical genesis, the economic analysis shows that in the first three decades after the Second World War the living standard in Europe increased, however the gap between the living standard in the USA and that in Europe always existed. The living standard in the USA was higher. In the 1980s this gap decreased, to increase again in 1990s. In 2005 the gap in the living standards between the USA and the EU-15 amounted to 30%, whereas it was 35% for the EU-25. The USA has always had a higher economic

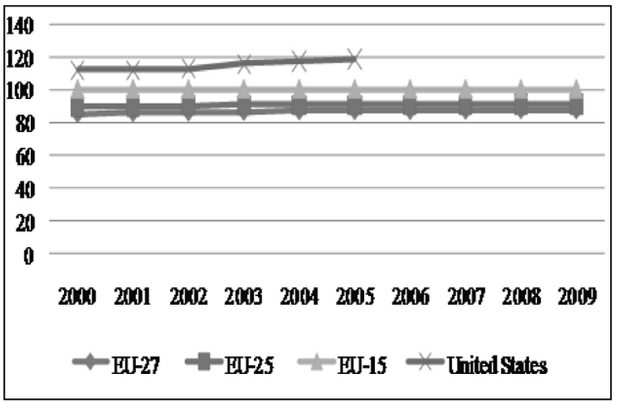
growth rate, except in late 1990s and at the beginning of 2007, when the economic crisis in the American economy started. The trends in economic growth rates of the European and the USA economies are presented in Graph 2.



Graph 2. Growth rate of real GDPs of EU and USA, year per year percentage change, 2000-2011 period

Source: *Eurostat*

In order that the strategic goal of the EU, the rise in the economic growth and employment, be achieved, it is necessary that labour productivity be higher. The productivity differs from country to country, and on the EU level it is smaller than in the USA. It is only Luxembourgh that has a higher labour productivity than the USA. The trends in labour productivity in the EU and the USA are presented in Graph 3.



Graph 3. Labour productivity per working hour in EU and USA, GDP (PPP) EU-15=100, 2000-2009 period.

Source: *Eurostat*

The attempts to achieve the goals set in the strategy were hindered by the economic crisis, but also by an insufficient political will to implement the strategy fully. The consequences of the economic crisis are a relatively high unemployment rate, the decline in economic growth and an increase in the public debt. Nevertheless, the EU succeeded in stabilizing its financial system and adopting a recovery plan by increasing aggregate demand and bringing back the trust in this system. These were accomplished by fiscal and monetary stimulative policies, that is, by public investments into infrastructure, innovation, new skills and knowledge of the labour force and energy efficiency. The economic conditions for work are gradually improving, however this recovery is rather slow. Fast and frequent changes are evident in the world economy, therefore the European economy should primarily deal with globalization, scarce resources and climate changes. The EU will be able to adjust to change and progress further if all the member countries act in unision, in a coordinated manner, together.

It is for this reason that the European Commission adopted a *new strategy – the Europe 2020 Strategy* in March 2010, its goal being that the European economy should exit the economic crisis and prepare the EU for the decades to come. Besides, this is a continuation of the Lisbon Strategy implementation. According to this strategy, the EU should exit the crisis stronger and achieve a *smart*, *sustainable* and *inclusive* growth and an economy that will increase the employment level, the productivity and the social cohesion. To achieve these goals requires a powerful and successful state management. The Europe 2020 Strategy set three priorities: 1) *smart growth*, that is, the knowledge- and innovation-based development of economy; within the smart growth there are three initiatives: *Innovation Union* (creating conditions for financing research and development), *youth on the move* (improving the performance of the education system and raising the international reputation of the European higher education), *a digital agenda for Europe* (a very fast Internet and the benefits of digital unified market for households and companies); 2) *sustainable growth*, i.e., promoting a higher resource efficiency, a "greener" and a more competitive economy; this growth is based on two initiatives: *efficient resources in Europe* (refers to climate, energy and mobility, to promoting renewable resources and energy efficiency) and the *industrial policy for the globalization era* (competitiveness and improvement of business climate, especially in case of medium-sized and small enterprises); 3) *inclusive growth*, full employment in economy that has an impact upon the social and the territorial cohesion. There are two initiatives to achieve this type of growth: *Agenda for new skills and jobs* (modernization of labour market due to the mobility of labour and skill development) and the *European platform against poverty* (social and territorial cohesion). [17]

The *New Europe 2020 Strategy* promoted the introduction of the so-called scheme of state monitoring and linking the fiscal stabilization programme with larger investments into science and education. The basic EU 2020 goals are ambitious, but achievable. It is the

proposition of the European Union that there should be five goals that would also be the basic national goals: employment, research and innovation, climate changes and energy, education and fighting poverty. The EU has set concrete goals and responsibilities, such as: raising the employment rate of the population aged 20-64 from the present 69% to 75% and an increase in investments into research and development from GDP 1.9% to GDP 3%. One goal is also to reduce energy consumption by 20%. The emission of carbon-dioxide and other harmful gases is planned to be reduced by 20% as compared to 1990, and the share of renewable resource-produced energy should amount to plus 20% in the total consumption. Much attention in the new strategy is paid to education and to applied science; plans are that the number of university graduate citizens should increase from today's 30% to 40%. One goal is also to reduce poverty, from 80 million to 60 million people. Due to the goals defined by the new strategy, its creators named it the plan for a "smart, green and inclusive growth". In order that this target should be achieved, the Europe 2020 Report and assessments and the Stability and Growth Pact will be conducted simultaneously, in order that resources and goals be coordinated. [6]

5. Conclusion

The knowledge-based economy and the informantion society are terms used today to describe the present-day economic society. The knowledge-based economy is increasingly viewed as a continual process of economic transformation towards knowledge-based activities and sectors, rather than towards radical and drastic changes. The developed countries have already based their economies on knowledge; they already allocate largest funds to science and research. One way to increase their income is the building of a knowledge-based economy. This opportunity can be taken by those countries in which productivity and growth do not largely depend on natural resources; the countries that possess a certain quality human capital, invest and create new knowledge and ideas to improve the factors of production. Knowledge and technological progress have become the leading driver of economic growth and development. [12, p.202] New growth theories are associated to labour productivity achieved by innovation, which are in turn the result of knowledge.

Various economic statistics, research and analyses have analysed and proven the impact of the knowledge-based economy upon the economic performance and the long-term change in the economy structure. Similarly, the knowledge-based economy ensures an impressive economic growth, an increase in productivity, profitability and investment rate, while at the same time reducing inflation and unemployment rate. It is most strongly associated with the impact of technological innovation that contributed to the price reduction and an increase in the ICT product efficiency. The globalization effects and a fiercer international competiotion and competitiveness on the labour market resulted in cost reductions and an increase in efficiency. The European Union is making efforts to build a knowledge-based economy. The idea is that this concept of development be implemented in all the EU countries as well as in the countries that wish to join the Union. The building of such an economy is meant to increase economic growth and the development of European economy and thus reduce the gap between the development levels of the EU and the USA. By the implementation of the Lisbon Strategy directives, by building a knowledge-based economy and an information society, the European economy has increased employment and economic growth. The economic crisis, however, hindered the achievement of higher economic performance in the world economy. The EU, however, has adopted a new plan to overcome the economic crisis and to further build a knowledge-based economy that will help achieve a higher level of economic development of the European economy.

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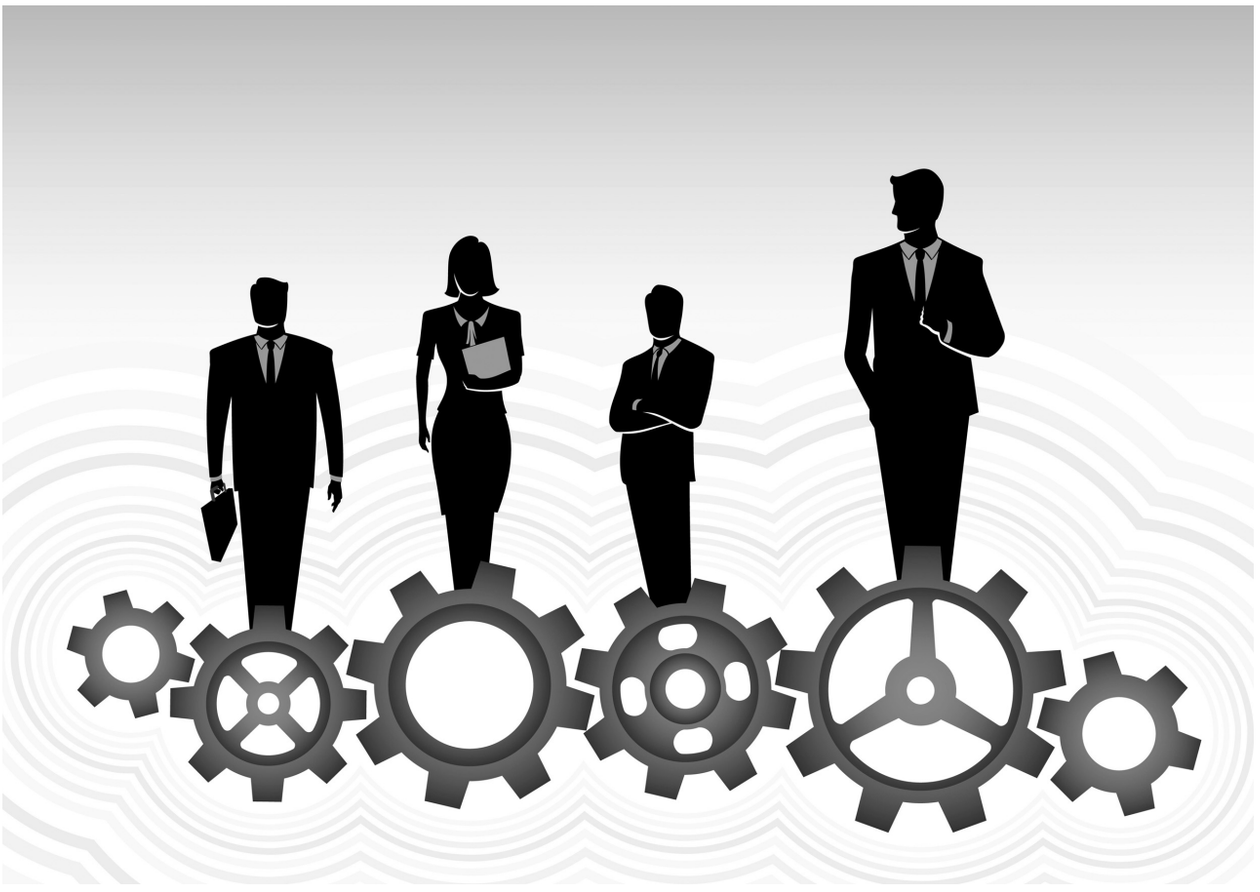

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Project Management and the Creation of Economic Policy Guidelines at the Sub-national Level

UDC: 005.8 ; 338.24

Walter Scherrer
University of Salzburg, Department of Economics and Social Science walter.scherrer@sbg.ac.at

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Economic policy at the sub-national or "regional" level has increasingly become relevant and challenging with intensified economic globalization and requires the development of economic policy concepts. This paper discusses how methods of project management can be applied to the process of creating guidelines for regional economic policy authorities. It starts with a discussion of specific features and challenges of project management in the public sector. It is concluded that projects in the public sector frequently are more difficult than those in the private sector.
Then typical features of a project which is aimed at creating regional economic policy guidelines (CEPG-projects) are highlighted. Major characteristics of the most important project deliverable – a coherent medium term concept for regional economic policy makers – are discussed. The analysis of the typology of such projects suggests that CEPG-projects tend to start as pioneer projects and then turn into acceptance projects. From this analysis of project types and a brief analysis of three distinct levels of project management (functional, methodological, and social level) skill requirements of project managers and the public administration's potential for drawing on external expertise are derived. Finally the relation between focusing the project's scope on the one hand and achieving legitimation and acceptance by the stakeholders and the wider public on the other hand is discussed. A trade-off between these two project goals arises as both are functions of the number of stakeholders.

1. Introduction

Project management has become a standard tool for planning, coordinating and controlling diverse and complex activities in the private business sector. Meanwhile its use is commonplace in many areas in the public sector, too. Many endeavours of the public sector are organized as "projects", and thus the interest for specific features of project management in the public sector has increased (see e.g. Wirick [8]). This paper deals with a specific type of public sector projects which is at the interface between the public and the private sector: the creation of a strategic framework ("guidelines") for regional economic policy authorities.

The need for such a coherent framework for focusing regional economic policy in a medium term perspective has increased as the context for economic policy making at the sub-national level (i.e. regional level) has become more complex. The intensity of interaction and competition among regions has increased both at the international and interregional levels, and the scope of economic policies at the sub-national level has been enlarged as international economic and political integration has shifted competences and power between levels of government. The scope of regional economic policies has also been widened as participation in many European Union programmes needs most of the project development and policy planning to be done at the sub-national levels.

Politics has been challenged by the necessity to design coherent and sophisticated strategies for regional economic development. The design process of guidelines for economic policy at the regional level is considered a "project" because it meets the criteria both according to the Project Management Institute's Guide to the Project Management Body of Knowledge (PMBOK; PMI [5]) and to the German industrial norm DIN 69901. The design process is a temporary endeavour as it has a start and an end, it needs resources and some amount of preparation and planning, and the process's goal is to create a unique "deliverable" – i.e. the economic policy guidelines. Thus methods of project management can be applied to the process of creating such guidelines.

The paper analyses the endeavour "Creating Economic Policy Guidelines at the sub-national level" (CEPG-project) from a project management perspective. Section 2 discusses challenges and problems of project management which are specific in public sector project in general. Section 3 highlights major features of a CEPG-project being a specific public sector project. Topics of analysis include project deliverables, possible project types, specific issues concerning the functional, methodological, and social levels of project management, and problems of dealing with big numbers of stakeholders and aggregating results. Matters concerning project organisation, timing of the project, and the roles of public employees and other experts in such a project have been discussed elsewhere (Scherrer [7]).

The paper draws on experience with CEPG-projects which have taken place in Austrian regions since the late 1990s.

2. Specific features of project management in the public sector

2.1. Defining the "Public Interest" and Measuring Project Success

A marked difference to private business sector projects is **the difficulty to define the "public interest"**. While in business projects a company's interest usually can be defined easily in public sector projects major problems of revealing preferences and preference aggregation arise. So it is not quite clear which groups of a region's society or economy ought to be targeted by economic policy in order to serve the "public interest" best. A specific feature of public sector projects is that – like a CEPG-project – they may reach far into the future and therefore needs of stakeholders ought to be served who are not yet "at the table" and whose interests might be difficult to identify (Wirick [8]).

This issue has been reflected by the change of goals of regional economic policy in the CEPG-projects in the province of Salzburg during the past fifteen years. In the first edition of this project in 1997 the guidelines aimed at two goals of economic policy: gdp growth and jobs. In the next round in 2003 economic growth and jobs were still top-level goals, but the reduction of regional disparities was added as another goal of medium term economic policy. This change occurred although no major change in regional economic disparities had been observed in the meantime. In the project cycle which started in 2009/10 these three goals will very likely be complemented by ecological sustainability. While this topic was considered exogenous in former project cycles ecology-economy links will get more attention and thus will turn from being part of the framework conditions to a core object of economic policy.

But even if we assume that – like in the case of the CEPG-project – it is possible to define the public interest properly it is often difficult to **measure the achievement of this public sector project properly**. While in a private business environment a single and simple indicator of performance, like return on investment, can be used to measure performance, public-sector agencies often lack such simple measures. In the case of the CEPG-project at the top level of goals aggregate indicators like the gross domestic product per capita, the growth rate of real gdp, employment growth or unemployment rates have been used. Measurement of these indicators is simple, but targets expressed in average values hide differences across sectors, firm size, gender, age groups and other structural characteristics which might be important. Targets and measures ought to be diversified carefully because there is a risk of overloading medium term guidelines with a vast amount of goals, strategies and instruments. Guidelines thus would become less meaningful.

A further problem with the CEPG-project is the difficulty **to attribute actual economic performance to the strategies suggested by the project**. A region's economic performance depends on a variety of influencing factors which are not under the control of the region's authorities. Interregional and international interdependencies of the business cycle, constitutional and other legal constraints, and the activities of regulatory authorities at the national and supra-national levels restrict a region's potential to design and implement independent policies.Therefore it is suggested to measure performance and to define targets in a CEPG-project not primarily in absolute numbers but in relation to other regions within the same or a similar relevant legal and political framework

2.2. Five Challenges for Project Management in the Public Sector according to PMI

The Project Management Institute, a leading non-profit organisation which has been propagating project management and setting standards in project management identified five challenges and trends which affect how project management works in the public sector (PMI [6]). These challenges are: managing multiple stakeholders, adapting to a changing political landscape, understanding local politics, dealing with public scrutiny, and dealing with personnel constraints

In public sector projects usually **several stakeholders from other agencies and outside the public sector** with varied interests are involved. The impact of these projects on this multitude of programs and providers has to be considered as the project's success requires their cooperation and performance. This, in turn, increases the number of stakeholders in this type of projects. The project managers thus operate in an environment of conflicting goals and outcomes, and because they may lack governance in their projects, they need to use a lot of negotiation, conflict resolution, communication, and leadership skills. The inclusion and management of a multitude of stakeholders has turned out to be a major challenge in CEPG-projects (see Scherrer [7]) and will therefore be dealt with in more detail in section 3.

The need to **adapt to a changing political landscape** may best be exemplified by the fact that project continuity may not we warranted due to political cycles and

elections which entail the change of political leaders and perhaps even the first tier of administrative leadership. With new people at the top level new ideas for new projects enter the administration while old projects are prone to be stopped or started over again. A CEPG-project should be initiated soon enough so that it can be finished well before the next election day in order to save project results from the rhetoric of election campaigns. Therefore proper timing has turned out to be another crucial issue in CEPG-projects (more details see in Scherrer [7]).

Understanding local politics is important because directives, policies, procedures and statutes may affect projects. In the public sector projects are performed in an environment that includes political adversaries; often they have to placate political interests. This applies to CEPG-projects because they affect a variety of policies which are designed and implemented by other departments of the regional administration, by other government agencies, or at other levels of government (e.g. the central state).

Public sector projects are usually confronted with a much more **intensive public scrutiny** than private sector projects because they affect many persons, firms, and organisations outside the public sector. Failures get a lot of attention because they could be considered to cause an improper use of public funds and because they could harm many persons. In public sector projects it is much less possible to conceal information than in private sector projects; they are performed under constraints imposed by administrative rules, policies, and processes that can delay projects and consume project resources. The project manager in the public sector may operate under a variety of – sometimes overlapping – oversight structures, like the oversight of an elected executive, oversight agencies, legislative bodies and their own oversight agencies, and elected oversight officials, such as state auditors and treasurers. "As a result of this overlapping oversight, public-sector projects may be required to dedicate substantial resources to ensuring that constraints are not violated and that oversight agencies are placated" (Wirick [8], p.3). And, last but not least, projects in the public sector frequently operate under close media scrutiny.

Finally, "dealing with a pay cut" (PMI [6]) or other **personnel constraints** are specific features of public sector projects. If highly skilled jobs in the public sector are paid lower than in the private sector this might lead to higher turnover rates of skilled project managers. Budget constraints, procurement regulations, civil-service protections and specific hiring systems may cause that public sector projects have to be performed with existing staff resources more often than private-sector projects. Further, the culture in public administrations is likely to be different from firms in the private sector which are usually better used to directed action and project success (Wirick [8]).

2.3. Summing up: Public-sector projects can be more difficult than private-sector projects

The public sector is different compared to the private sector, and thus public sector projects are characterized by specific features and problems which can make them more difficult than many projects in the private sector. In the public sector projects are often operated in organizations and project environments in which it is difficult to measure project outcome. In many public sector projects the outcome is difficult to determine in advance (a CEPG-project is a good example!) which makes this type of projects more difficult than those for which the outcome can be defined at the beginning of the project because more interaction among stakeholders is required during the process.

3. Features of a cepg-project

3.1. Project deliverables

The project's purpose is to develop a coherent concept for focusing regional economic policy strategies in a medium term perspective. The concept – which will be the core deliverable of the project – ought to contain an analytical basis from which regional economic policy guidelines are to be derived. This analytical basis is likely to contain an analysis of economic structure and performance of the region, an analysis of the economic, social and institutional environment which forms the region's framework conditions for economic policy, and an analysis of socio-economic trends which are likely to affect the region's future economic development. Forecasts and scenarios might also be part of the analytical base.

A first policy-oriented part of the concept is the definition of medium term goals of economic policy and of operational indicators to measure the achievements of policy. This is not a straightforward task because of problems to develop operational indicators which should measure the achievements of the policies and because of the difficulty of attributing economic outcomes to economic policy actions (see section 2.1.). The politicians' and other stakeholders' attitudes toward goals of economic policy might change over time, too. E.g, in the economic policy guidelines of the Province of Salzburg in the first project cycle which started in 1997 economic growth and job creation were the only two top-priority goals while in 2003 the reduction of regional disparities was added as a third goal (although regional disparities had not increased

in the meantime). In the recent third round of the project cycle (2010) sustainability – ecological sustainability in particular – will very likely be added as a fourth goal.

The second policy-oriented part of the concept is the identification of fields of economic policy guidelines for developing medium term strategies. Medium term means more that guidelines should be developed for more than one election period and that the strategy period reaches beyond the usual short-term political planning horizon. While divergent interests of project stakeholders may emerge already at the stage of defining top-priority goals they become most virulent when the areas of policy intervention are defined and concrete strategies are developed.

As a CEPG-project is an instrument of political marketing another group of project deliverables could be the presentation of the concept to regional government, regional parliament, various stakeholder groups of economic policy, and to the wider public.

3.2. Project type

Project characteristics and challenges for project management differ with regard to project content and type. Project types can be distinguished according to various dimensions, e.g. according to:

- the project initiation and project operation: internal vs. external projects;
- the size of the project in terms of resources and time required for the project;
- the project's degree of "uniqueness": pioneer projects vs. routine projects;
- the nature of the endeavour: the project task may be well defined in advance with a limited amount of possible modes of delivery ("closed" task) vs. projects which are characterised by a variety of possible modes of delivery ("open task"); and
- the degree of social complexity of the project: low complexity projects due to a small number of stakeholders involved with only moderate differences of interests and approaches to problem solving, simple modes of causation and thus relatively low risk to accomplish project goals vs. highly complex projects requiring interdisciplinary cooperation, being politically controversial, and involving many stakeholders with diverging interests.

A CEPG-project usually is initiated internally by the politician(s) in charge of regional economic policy, and the administrative department plays a key role in the project. Thus CEPG-projects tend to be basically internal projects although external expertise (both organisational and functional) may be purchased from outside. The project size usually will be a medium one: in none of the CEPG-projects in Austrian regions in which the author has been involved the average number of staff devoted to the project in terms of full-time-equivalents during the whole process exceeded five persons. The project duration was between nine and eighteen months.

Combining the project dimensions *nature of the endeavour* and *degree of social complexity* in a matrix (see diagram 1) yields interesting insights particularly for CEPG-projects. Projects in the lower left quadrant ("**standard projects**") can be operated easily due to simple project characteristics; because of its repetitive nature organisations are already experienced with handling this kind of projects. The deliverable of such projects is unique but the mode of delivering is standardised. Serious CEPG-projects will not be found in this quadrant. "**Potential projects**" are characterised by little social complexity. But because the mode of delivery and the contents of the outcome are largely undetermined in these projects an the scope (i.e. the potential) of possible solutions is broad.

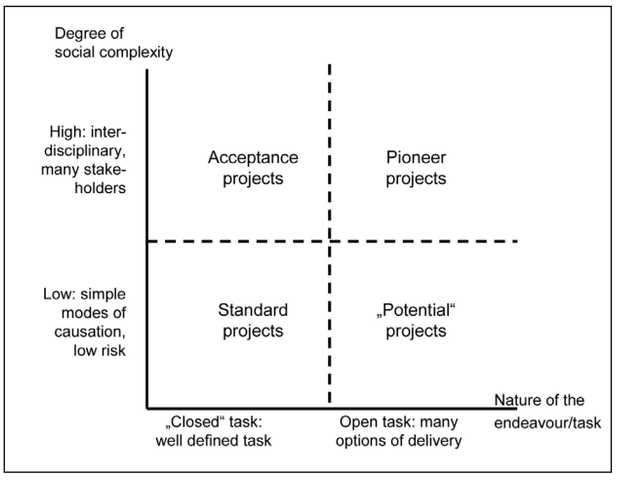

Diagram 1: *Project types; Source Kuster [2], translated and adjusted by W.S.*

"**Pioneer projects**" entail fundamental consequences for the organisation undertaking the project. They involve many stakeholders and are characterised by a high degree of uniqueness and risk. Finally, "**acceptance projects**" are endeavours with a well defined task. They are complex projects due to a big number of stakeholders with diverging interests, but they are not unique (any more). As the organisation already has some experience in handling this type of project methods of project management can be standardised. The major task of such projects is to gain or maintain stakeholders' acceptance of the project outcome.

What project type will a CEPG-project be? When a regional administration does such a project for the first time then it will be characterized by a high degree of openness concerning the mode of delivery and the nature of the project outcome. The project's degree of social complexity depends on the number of stakeholders involved. The project may start as an internal project within the administration in order to analyse the feasibility and different modes of creating economic policy guidelines at the regional level. As it will turn out sooner or later that guidelines are likely to have an actual impact on economic policy and the regional economy only if the region's key economic policy relevant stakeholders get involved into the process the first CEPG-project undertaken by a regional government will tend to be a pioneer project. If the project is repeated it will become easier to define the project task and the expected outcome, and the project management can rely on methods which have proved to be already successful before. So a CEPG-project might start in a pre-project phase as a potential project but will then quickly change to a pioneer project. Finally it is likely to change to an acceptance project as it runs through several project cycles.

This typology of projects is helpful for the choice of project organisation, for the decision on how to deal with the project environment, and for defining the requirements concerning networking and the skills of the project manager. In the lower two quadrants (particularly in standard projects) no big project organisation is required and the organisational culture does not differ very much from the "line-world" of an organisation. In acceptance and pioneer projects the cultural difference to and the potential for interferences with the line organisation are more significant. In such projects – which are typical forms of CEPG-projects – social competences and networking abilities are key skill requirements for project management to be successful.

3.3. Levels of project management

Project management deals with the organized planning and implementation of complex activities in a project. It has to cope with the challenges of defining the proper scope of the project, dealing with time constraints, and dealing with cost constraints – the triangle of objectives and trade-offs between cost, performance and time (Lock [3]). A major task of project management is to strike a balance between these interrelated constraints. Tackling these challenges needs three levels of project management (comp. Kuster [2]) from which again skill requirements of the project manager of a CEPG-project and the potential to outsource specific tasks to external firms (consultants, experts) can be derived.

First, there is a **functional level** of project management which aims at planning of goals and structuring the project. Here the major challenge for the project manager of a CEPG-project is having a sound knowledge of the region's economy and a basic knowledge of economic theory and policy. The project manager has a strong influence at the functional level because he is in charge of formulating intermediate reports and drafting the final report – the deliverable of the whole project. Therefore administrations are well advised to build up competences in economic policy as these are at the core of the knowledge base required for developing and implementing economic policy guidelines and strategies. At the same time public administrations ought to draw on external expertise, too, in order confront regional economic policy stakeholders with an unbiased view of the region's economic situation and development.

Second, there is a **methodological level** of project management which is concerned with planning resource use, capacities, cost, time, and liquidity. For these purposes the standard tools of project management like structuring techniques, bar plans, netplan techniques like the critical path method, and other decision and planning techniques are used. As long as a CEPG-project is a "potential project" or a pioneer project methodological expertise may be purchased in the market. When a project is set to take place repeatedly and it thus gets the character of an acceptance project (or even a standard project) the time has come to develop this type of expertise within the administration in order to reduce the dependency from external knowledge.

Third, there is a **relational or social level** of project management. The "informal aspects of project planning and management, which focus on problem solving and conflict management", are important determinants of the success of projects in the public sector (Joyce [1], p. 85). It is relevant how the persons involved in the project communicate and deal with each other in a team, how they can develop creativity, how they present their ideas and results, how opposition and contradictions are dealt with in the project. Motivation and co-ordination of agents which are involved in a CEPG-project are the key challenges at the relational level of project management. Public administrations are well advised to build up and develop skills in this area internally and not to completely rely on external support. For public administrations which are in charge of economic policy contacts with stakeholders or potential "clients" like interest organisations of entrepreneurs, top managers and owners of key firms in the regional economy are essential for the success of economic policies both operationally and

strategically. Project managers therefore should have a sound knowledge concerning the relational or social level of project management. It is supportive if people from the administrative department which is in charge of economic policy affairs are well integrated both in formal and informal networks of relevant agents of economic policy in the region.

3. 4. Focusing the project's scope and large numbers of stakeholders

Designing guidelines for regional economic policy is a genuinely political process and therefore it is – according to Niskanen ([4], p.321) – a "process of achieving consent on governmental actions. … Consent should be considered superior to any of the other criteria by which social actions are also evaluated". In CEPG-projects defining the project's scope – what is included in the project and what is not – is a particularly delicate issue because of the broad range of stakeholders with diverging expectations of the project's scope. Stakeholders need to be integrated in the process of defining project scope which makes achieving a consensus – which is crucial for the project's success! – difficult. External stakeholders from outside the public administration and often even internal stakeholders from other departments of the same administration which are affected by the CEPG-project cannot be controlled by the project manager. Like in other public sector projects, even though the project manager may be ultimately accountable, governance of a CEPG-project and credit for successes must be shared (Wirick [8]).

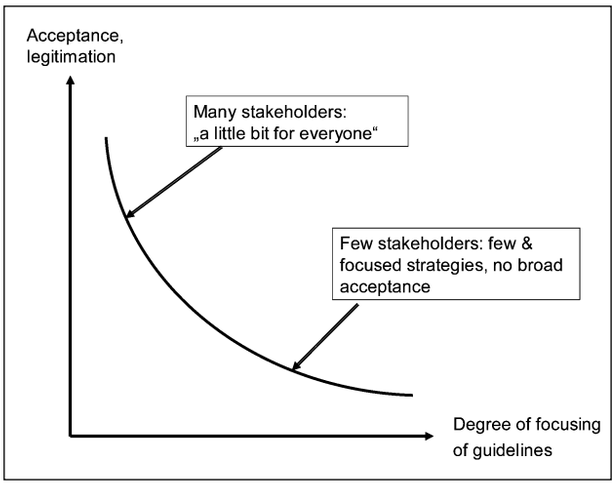

Diagram 2: *Acceptance vs. focusing of guidelines.*

In a CEPG-project the number of people included in the process of creating guidelines will be large because this is beneficial for the guidelines' legitimation and acceptance in the public. Economic policy actions and decisions of regional policy makers can be legitimated by medium term guidelines. The acceptance of economic policy actions will increase if actions can be explained easier to the public by referring to a coherent set of guidelines thus demonstrating that policy actions are not the result of ad-hoc decisions but are based on a strategic plan. But stakeholders in the project might want to pursue individual interests in the project even under the assumption that there exists a basic consensus on a common regional interest. The participation of a large number of stakeholders in the project makes the search for compromise as a precondition for consensus difficult because the variety of issues to be dealt with in the economic policy guidelines is high and thus the expected degree of focusing of guidelines is low.

But attaching priority to well defined topics and strategies is necessary for budget reasons because it will be both difficult and most likely ineffective to finance a "something-for-everyone" bundle of strategies and measures to be derived from the guidelines. It is also questionable whether such guidelines are helpful for economic policy or even if the guidelines can be taken serious at all because (nearly) any policy action and even contradictory policy actions can be justified with reference to such guidelines. As both the acceptance of guidelines and the degree of guidelines' focusing are a function of the number and diversity of stakeholders involved in the project a trade-off between these two goals emerges (see diagram 2).

The trade-off between acceptance and focusing of guidelines therefore has to be addressed when those policy fields are defined which ought to be covered by the guidelines. It is an important task of project management at the methodological level to apply methods which allow increasing both acceptance and the degree of focusing of guidelines. In the diagram this would mean a shift of the trade-off curve outward from the origin. A simple method to achieve this based on a careful structuring of stakeholder participation in work groups and agenda setting for the workgroups by the project management has been presented in Scherrer [7].

3.5. Summing up: Project management is a useful tool for handling a CEPG-project

The analysis showed that project management is a useful tool to for handling the process of creating economic policy guidelines at the sub-national level. The process of creating such guidelines has all the characteristics which constitute a "project". The project's purpose and major deliverable is to develop a coherent concept for focusing regional economic policy strategies in a medium term perspective. CEPG-projects might start in a pre-project phase as a potential project but they soon will change to a pioneer project and finally to an acceptance project as it runs through several project cy-

cles. A major task of project management is to strike a balance between project scope, time and cost constraints by applying project management at the functional, methodological, and social levels.

Key skill requirements of the project manager of a CEPG-project are both at the functional level and most of all at the social level, while at the methodological level it is less problematic for a public administration to outsource specific tasks to external agents. The acceptance of guidelines by stakeholders and by the wider public and a high degree of guidelines' focusing are important project goals. As both goals are a function of the number and diversity of stakeholders involved in the project a trade-off between these two goals emerges. Dealing with this trade-off is one of the major tasks of project management in a CEPG-project.

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Importance of Strategic Management Accounting for Bank Management

UDC: 005.51:336.71 ; 007:336.71Ć:004

Snežana Knežević[1], Miloš Milosavljević[1], Veljko Dmitrović[1],
[1]Faculty of Organizational Sciences, Belgrade

As part of significant dynamic changes in the banking sector, the aim of this paper is to identify the information portfolio for strategic management in Serbian banks. Foreign banks entering the domestic market of banking products have caused the competition in the banking sector to increase, which fostered the information to become a resource of primary importance for the formulation of the bank's strategy in various business segments.

1. Introduction

Strategic decisions refer to the conduct strategy and actually define the level to which a bank is developed, the profits distribution, the capitalization level, the decisions on reorganization, the development of the existing and the introduction of new bank products, etc. The complexity of the strategic management accounting techniques themselves in the banks goes far beyond those quoted and described in the academic studies so far [1].

As each decision can be good to the extent to which its information basis is reliable, information can be said to have become a strategic resource of management. Certain authors maintain that the information is as important as the strategic technique implemented [2].

Regardless of the fact that the earliest reports on strategic management accounting appeared only a couple of years ago, the research conducted in this work has shown that a large number of banks in the developed market world introduced some of its segments years ago. For example, a large number of banks facing a rather fierce competition characteristic of financial market conducted a host of analyses in which they compared themselves to the competition, especially in the domain of cost management, using a considerable information potential of the management accounting.

2. Strategic management accounting as support function to strategic management

The strategic management accounting is a modern academic response to the impulses created by a dynamic business environment. An increasing need of the bank management for the methods and models relevant in decision making in the conditions when the incremental changes in the environment are replaced by radical and content changes, demanded that the academics and practitioners should focus upon external, rather than internal elements in the analysis of the banking operations. The strategic decisions characterised by a mobilization of all the bank resources become crucial in business operations, therefore the introduction of new management accounting techniques has become a logical answer to new requirements. Our aim in this work is to present essential potentials and a real reach of modern strategic management accounting techniques, as well as their approprieteness for business decision making in the banks.

The top managers in the bank concentrate on long-term strategic decisions. Hence they need information that can help them make decisions on integration and acquisition, as well as on planning new bank products. The empiric studies so far have expressly stated that the role of the strategic managemnt accounting in creating an adequate information portfolio is significant, however, the conclusions are somewhat ambiguous as regards the strategy itself on the basis of the information generated by the strategic management accounting [3] [4].

The middle level bank managers tend to focus upon the medium-term decisions, such as the events that may affect the banking institution's operations in the following year. Hence they need information necessary for the budget analysis, for a short-term forecasting, and for the analysis of deviations from the planned performances.

Strategic management accounting can be defined as a form of management accounting that uses a set of information concerned with external business and non-financial factors alonside the traditional, internally generated accounting information, as the information input. The basic importance of such an analysis is reflected in a better communication of the business decision making and strategy. The logic of such a categorization and the scope of this definition have, however, resulted into a divergent interpretation of the strategic management accounting elements.

Different definitions of the components of strategic management accounting can be seen from the survey of the literature so far published in this field. Thus, for ex-

ample, one of the pioneering works in this field developed a conceptual framework that supports the importance of competitive information on the market share, the scope of production, costs, prices, money flows and other elements required to conduct a corporate strategy developmet analysis [5].

Other authors have additionally contributed to the development of strategic management accounting based on this so-called "competitive" strategic analysis [6]. They highlight the importance of the strategy analysis of costs and a consequent requirement that costs should become an integral part of strategy. On the other hand, an analysis is developed focused upon market indicators, primarily related to meeting the consumers' needs with continuously taking attributive costs into account. It is important to stress the accountants' willingness in management accounting to valuate the brand, contrary to the rigid standards of financial reporting [7].

The third aspect of strategic management accounting refers to the analysis of value creation in the relations with suppliers and customers. All the activities classed as primary activities and logistic acitivities are included in designing the product or the service for the customer, and hence in the resulting value creation for the customer [8].

Specific aspects of the analysis refer to the theoretical approach that explicitly links the supply chain re-configuration with the change in profits resulting from the strategic decisions implemented [9]. Numerous specific techniques developed within the mentioned global categories, the derivates of theoretical study, do not, however, show a high level of correlation with the level of practical usability of these same techniques.

In the conditions when the real sector is consolidated, on one hand, and when the business banks are active in their credit support to the economy, on the other, the importance of the implementation of strategically oriented management accounting by the bank management will be greater. In case of long-term credit sources in general, and especially in case of the financial support to the economy, it is necessary that the bank should have long-term and high-quality capital sources. The implementation of the strategic management accounting model in banking enable the banks to profit from their comparative advantages, especially in the further process of developing financial market, and on the basis of the information obtained on the environment.

The strategically oriented management accounting is expected to provide a strong information support that will allow for the execution of preventive measures for the purpose of eliminating ineffective business results of the bank. It is dynamically dimensioned as it ensures business information in a changing environment. Strategic decisions require that the management provide information for the future action. Certain studies point to the fact that the majority of strategic management accounting features has long become inherent to banks and other business organizations [10].

Strategically oriented management accounting is a source of information oriented towards management, concerned with the future rather than with the past, especially oriented towards strategic business units and to the most important resources of banking business operations – their own capital as a guarantee, the human resources and the investments. The awareness of the competitive conditions itself makes the key difference between the strategic and the traditional management accounting [11].

The information potentials of the strategically dimensioned management accounting for the needs of the bank management evolve along with the changes in the information technology. The studies in the field of information support of management accounting to business organizations conducted so far have predominantly focused upon the identification of dimensions and upon performance measures [12] [13], however, there is a lack of studies focused upon a specific impact of the strategic management accounting information on the bank performance. There is no universal concept nor model of information of strategic character that can be applied in efficient bank management in a longer term and for the purpose of finding adequate solutions to all management problems.

The domestic banks prefer to use the information products of financial and accounting type within a global accounting system, rather that management accounting type [14]. A reliable accounting information system should ensure the following:

1. information gathering, classifying and processing at lowest costs;
2. prompt provision of various surveys, financial reports and tax returns;
3. generating of valid accounting information of sufficient scope;
4. prevention of thefts and any other financial misuse, i.e. reducing these to the least possible amount;
5. comparison of current and previous financial reports or those accomplished with targeted values.

In this sense it is necessary that the management accounting be first incorporated into the bank's accounting system, and then assigned a strategic role. This will be inevitable in the conditions of an increasing compe-

tition among banks, as well as in relation to non-banking financial institutions (especially in unfavourable current events on the banking market, where it is necessary that strategic information potentials and efforts be focused), how to "grab a client or a bank customer before the others?". Besides, the introduction of a long-term crediting of a company as a bank client will contribute to the importance of strategically oriented management accounting for the bank management team decision making as to the method and conditions of the long-term placement of the bank's assets.

In the prospective balance analysis segment where a dynamic aspect or forecast information is relevant in making good business and financial decisions, strategically oriented management accounting can be highly beneficial. The very strategic orientation of management accounting must not have any implications upon the practical usability of the techniques and the analysis procedures themselves, and this has been the issue of a lively debate in the past decade [15] [16]. Both the traditional and the strategic management accounting must have a pragmatic dimension [17] [18].

3. Actualization of importance of information for banks

With the market globalization and an increasingly fierce competition in both the national and international fields the importance of an adequate bank's risk management is especially actualized. In such circumstances the bank's strategic management needs the reports on the risk profiles as well as on the bank's need for capital for the purpose of capital budgeting and an adequate management of risks immanent to banking operations, all in order that a long-term financial stability of the banking institution be established.

The bank capital can be observed from various points of view, namely: (1) organizational capital as a method of bank's business doing; (2) intellectual capital which primarily includes human resources; and (3) capital in the form of clients and customers of the bank.

As a logistic support to strategic management the banking controlling fosters the development of a long-term oriented management accounting, in the implementation of an optimum strategy to achieve the set goals of the bank, especially the optimum cost strategies [19], as well as an adequate management of the bank productivity. Reducing the price of the bank products to a lower level ensures the bank a more favourable position in comparison with its competitors.

A strategically oriented management accountant can be called the information-for-the- future manager and is expected to supply the bank's top management with valid information to be used in defining the alternate directions of strategic activities, primarily for a strategic positioning of the bank. A strategically dimensioned management accounting is also highly important in the strategic control process, i.e., in the comparison of achievements with the budgeted values in order to identify discrepancies and define appropriate corrective steps to be taken.

In the current – turbulent conditions of operations on the financial market, the critical competency of the bank's strategic management achievement becomes a competence to generate the value for both the bank owners and the consumers of the bank product. The bank top management is particularly interested in the market and competitive environment changes, hence the management accountants are expected to provide not only internal information (flows within the bank) but rather external one – information about financial market as well as about competition, namely, the information on the environment.

The strategic performance of the bank is oriented towards the segments of profitability, efficiency, effectiveness, competitiveness and flexibility. Of paramount importance in this sense is a high quality the management-accounting information for an qdequate management of bank information, as well as for measuring the performance of the bank management. In assessing the business efficiency, banks prioritize the methods of cost control, as well as the productivity of the bank personnel in managing its assets.

For the banking operations to be efficient the bank requires an adequate portfolio of financial resources. The bank's financial health depends primarily on the bank management. An adequate management of financial resources requires valid and timely information. Particularly important are the reports on the client and customer receivables management as regards their negotiability, maturity and a policy to correct them.

The current changes in international banking have made the bank management process more complex. The primary responsibility of the management is to ensure that the bank has efficient risk control and risk management systems. Risk management should be a daily activity of the managers of respective business fields of the bank. The bank management should also introduce an adequate internal control which will include internal auditing too.

Significant innovation on the financial market that emerged in the last few years and the internationalization of financial flows have radically changed the

nature of banking. On the global level, banks are becoming increasingly engaged in the development of new instruments, products, services, and techniques. Not so strict legal regulations and technological process in this field allowed for a fiercer competition to take place between banks and non-banking institutions. In such circumstances, the resource of crucial importance for change management is (sufficient in scope and satisfactory in quality) business information. In order to survive on the dynamic market today, the bank has to change faster than its competition.

A strategically focused management accounting is an efficient instrument developed for the purpose of strategic management of the bank. It disposes of information required for tracking, analysis and cost control and the bank product price calculation, as well as for the assessment of market potentials and the client and customer profitability, capital management and financial performance, the dynamics of business assets for the information needs of trading on the financial market, etc. The role of an adequately designed strategic management accounting is crucial in a long-term management of the human resource and moneraty activities of the bank. The implementation of the strategically oriented management accounting always means the implementation of new techniques in the analysis, such as the activity based cost calculation, the balanced scorecard and various techniques of strategic capital budgeting such as strategic cost management in the value chain, the technological path tracing, the application of fuzzy sets in quantitative analysis, the real option valuation etc.

The information potential of a strategically oriented management accounting has to be continually reshaped to be able to accomplish the tasks of the information recipient –strategic management primarily, but also other management levels, which means that the quantitative selection of information is continually under way so as to avoid the situation of excess information. Besides, the information potential of the bank strategic management accounting is expected to produce highly actualized information, full, timely and as accurate as possible.

Given the dynamic changes on the financial market, this type of accounting should be in a process of continuous evolution. Besides a more intensive competition between different types of banks, the threat that non-financial institutions will expand into the banking product sector is an additional incentive to banks to implement the strategic management accounting concept [20] which is market-oriented.

The strategic management accounting concept requires to be further developed in order that it should prove its full role and advantages in defining concrete situations. It is necessary that the usability of the strategic management accounting be researched into, especially in the field of the competition analysis in the conditions when the competition operates in a different economic, political and cultural environment.

In order that domestic banks should estimate the losses in accordance with the relevant standards, it is necessary that they anticipate events related to credits, and this is where the macroeconomic statistics information is of special importance, though it is not transparent and satisfactory in scope yet. Such information would help make use of information advantages of strategic management accounting in the process of making high-quality decisions for the needs of an efficient placement of the bank's assets.

The rise in the bank capital means a better chance for the bank to acquire big and significant clients. There is an intention that banks that already achieved a stable financial position redirect a portion of their placements from retail business to economy, that is, to grant more loans to economy which would in turn increase the importance of the strategic management accounting. In addition, due to a substantial growth of capital of the banks in this country, i.e., due to intensive recapitalization, the role of an adequate long-term bank capital management becomes increasingly important. For example, many banks did not earn adequate return rates on the capital invested.

It is necessary that domestic banks implement the instruments of the strategically oriented management accounting to a larger extent in order that they should maximize the value.

Management accounting is a relevant information instrument in the strategic management process. The collaboration of accounting and strategy is thoroughly analysed in numerous academic and empirical studies [21] [22] [2].

Finally, it is important to point out that there is no universal accounting model developed for the needs of strategic management; it is necessary that every bank should create a model that will be compatible with possible changes on the financial market (to the extent to which it is possible to predict) as well as with adjusted characteristics of a particular bank.

The strategic management of the bank performance can be described as an activity of management a bank financial standing for the purpose of defining the opti-

mum relationships on two levels: returns maximization and satisfying the requirements of regulatory institutions [23].

The strategy consists of a series of concrete activities that the banking institution undertakes in order to accomplish its mission. Each concrete activity is autonomous. The activity has to support the bank's mission, however, it also has to observe the principles of successful business doing. Hence it is necessary that the bank has a developed management accounting to implement project strategies in the segments of budgeting, tracking and reporting on costs, profitability, and other important bank performance.

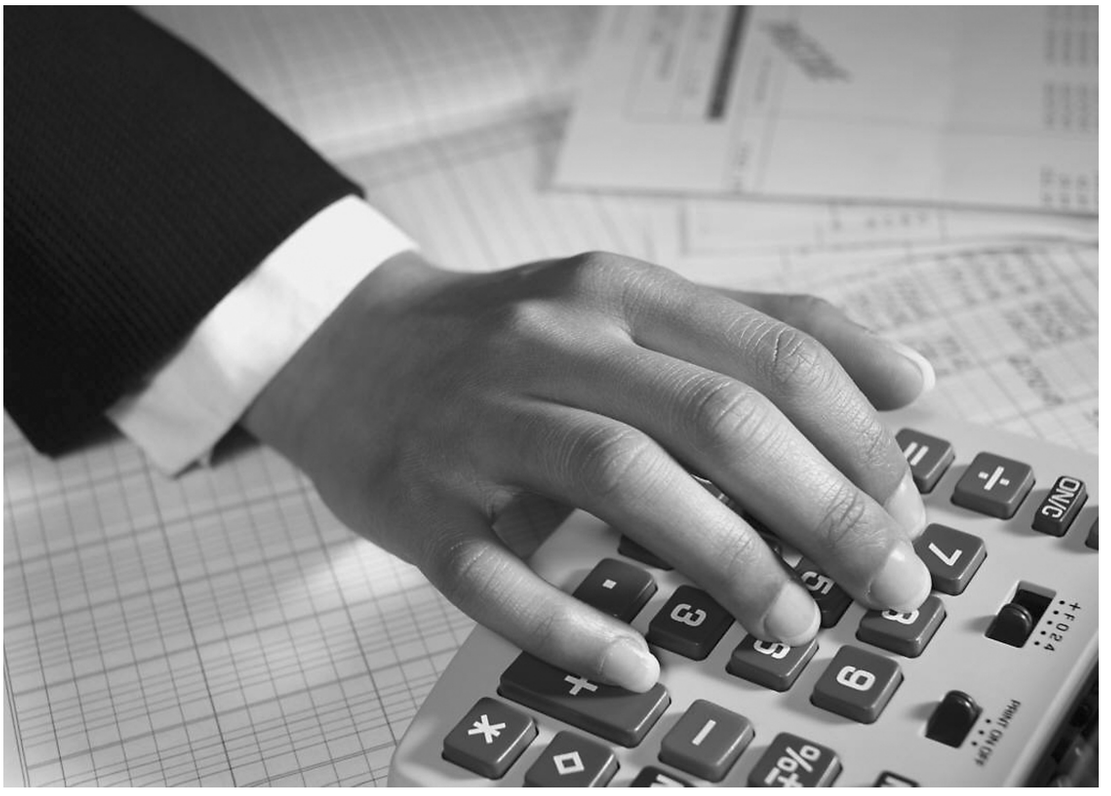
4. Factors that impact the sma implementation into the bank information system

The strategic management accounting is based upon the research into information in accordance with the needs to make certain business decisions, rather than with the current trend or information availability. The strategic orientation of management accounting requires that the necassary information meant to be the basic input in the analysis be externally oriented. Consequently, the need for defining the bank environment and the basic ways of communication between the bank and the relevant environment arises.

The environment itself can be viewed via a value chain and the relationship of the bank with the clients, with the investors, and with the creditors. A far greater adequacy and importance, however, should be assigned to the competitive environment of the bank. The bank competitive position itself is viewed from the point of view of the current, as well as an anticipated competitive environment.

The competitive position is monitored by the implementation of the competition cost assessment technique, by defining costs per unit of service, by the analysis of competition technology, by defining the economy of scope, by the calculation of market share per different market niches of the banking sector, as well as by defining the scope of services delivered and the returns on services. The analysis itself is strategically conceived and planned to be of a long-term character. Hence it is not the current values that should be analysed, but rather the future ones. The orientation towards long-term elements in the analysis means the implementation of a target oriented cost allocation and the cost analysis throughout the life cycle of particular financial services, but also of the life cycle of the bank as an entity of analysis.

To be specific, a bank in a domestic economic environment has to conduct a comparative analysis of its market position and the earning capacities of all exist-



ing banks, as well as of other financial instiurions that to a larger or to a smaller extent form a competition to a current or planned mix of the given bank's services. In addition, the aspirations of foreign banking institutions to penetrate the domestic banking market also have to be taken into account. Consequently, a relevant competitive environment does not mean only the present, but also the anticipated competitors, as the analysis is of a long-term character.

The environment defined, it is necassary that an analysis be conducted of the information that the bank has to generate for the purpose of an appropriate strategic management-accounting analysis. The strategic management accounting and the techniques based on it use the existing set of information, however, reveal entirely new information requirements. For example, an increasing leaning on the marketing concepts preconditions the change in cost allocations in accordance to the customers' tastes, as well as measuring the quality costs and valuating the brand of the service itself and of the bank as an entity.

The bank that insists on the strategy of differentiation of its products will not focus upon the unit price of the service, but rather upon the development of new services and upon marketing costs. The interdependance and interrelation of required information and the bank development strategy is by far more complex than the previous illustration, however, this elaboration is beyond the domain of this work. Here the attention is focused upon the creation of the model that will support the required information portfolio of strategically oriented management accounting for banks.

The empirical research corroborates the relative arrangement, formality, and structure of the relationship between the strategy and the other functions in the business organizations [24].

The information system that will support the strategic orientation of management accounting includes elementary subsystems for:

- planning and analysis of bank costs;
- planning and analysis of bank income, expenditure and profits;
- planning and analysis of bank capital;
- identifying risk profile and the bank's need for capital;
- monitoring the competition among banks, in relation to non-banking institutions;
- provision of specific profitability analyses;
- planning and analysis of cash flows;
- monitoring and conducting executive actions;
- coordination with the accounting and marketing information systems for the purpose of the analysis of the current clients and customers, as well as an insight into prospective bank's clients;
- ecological and other issues of socially responsible business.

The classification itself is not ultimate in character; in accordance with the needs of a particular bank it is possible to define others, leave out some of the above quoted or redesign the existing sub-systems of the strategic management accounting.

5. Conclusion

The objective of financial management, as well as of the bank capital management is to maximize the bank's value within the profitability and the risk exposure levels. Since risk is immanent to banks, the task of the financial management is to manage various types of risks in such a manner that will allow for the achievement of the desired profitability, reasonable risks included. This requires that three types of activities should be performed:

- risk identification;
- quantitative statement of risks (if this risk is immanent to the particular type of risk);
- risk exposure controlling.

In order that the abovementioned tasks should be efficiently accomplished, it is necessary that the bank develop adequate business, and especially financial policies, as well as implement information logistics. Besides, the bank management should be informed on the risk profiles and the bank capital needs, in order that they should timely undertake appropriate steps on the strategic plan, which is the domain of the strategically oriented management accounting.

The latest trends on the financial market, conditioned by the competition growth and the increase in the direct capital transfer highlight the necessity of implementation the strategically oriented management accounting for the banking purposes. This accounting is in turn one type of "early identification" information system that signals possible opportunities and threats. Namely, however important the " what happened" may be, the "what will happen" is more important.

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Budgetary Changes at Local Level in Slovenia in Crisis

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Uroš Pinterič
School of Advanced Social Studies, Nova Gorica uros.pinteric@fuds.si

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Article is addressing one of most up to day topics of social sciences today – economic crisis and its impact. Author is trying to find elements of local budgets that could indicate financial instability at the local level in Slovenia. On representative pattern of municipal budgets he is trying to find changes that could be caused by the economic crisis. However, until 2008 when last budgetary data are available today, he is not able to indicate any serious change that could be systematically connected to the economic situation.

1. Introduction

So called economic crisis that started in the middle of 2008 caused different consequences and reactions at all levels of social system in individual countries as well as on supranational levels. Despite one can strongly doubt about solely economic nature of present crisis, it is truth that main effects were connected to the national as well as international economy. However, all different cases showed so far that economic circle is strongly connected also to the politics, policies and public finances on different levels. One can remember the French support for car industry that was strongly criticized by EU despite effects of French governmental subsidies to the car industry had strong and positive spill over effect in other EU countries such as Slovenia. Main criticism about protectionism of national economies can be at least doubtful. On the other hand, economic crisis connected to the British money saved in stable Icelandic banks showed how combination of economic crisis, increasing external debt and lack of appropriate policy reaction can lead to the bankruptcy of the stare and political crisis, leading to overthrow of government. State cases of different reactions can be translated also to sub national, local level.

We argue that on the local level financial crisis can be even more intense. We expect that municipalities with dominantly rural background will be less affected by financial crisis than those with predominantly industrial or post industrial economy. We expect as well that, later municipalities will realize lower tax revenues and they will change structure of expenditures in a way to keep at least existing bureaucratic expenditures. On the other hand municipalities will try to shrink investment and maintenance expenditures while they will have to increase so called social transfers especially those connected to the maintaining certain level of social security.

Thesis above will be verified on the case of 24 out of 210 Slovenian municipalities in the timeframe 2005-2009. Slovenia has 12 statistical regions and we will take one rural and one industrial municipality for each region and we will avoid municipalities with special status when possible.

Statistical region	Higher share of employees in agriculture in region (as share of employees in agriculture compared to total active population)	Lower share of employees in agriculture in region (as share of employees in agriculture compared to total active population)
Goriška	Brda	Ajdovščina
Gorenjska	Vodice	Škofja Loka
Osrednjeslovenska	Moravče	Mengeš
Savinjska	Solčava	Nazarje
Koroška	Prevalje	Mežica
Podravska	Starše	Hoče Slivnica
Pomurska	Moravske Toplice	Lendava
Zasavska	Trbovlje	Hrastnik
Posavska	Brežice	Krško
Notranjsko-kraška	Postojna	Cerknica
Obalnokraška	Hrpelje – Kozina	Piran
Jugovzhodna Slovenija	Škocjan	Straža

Table 1: List of municipalities *Source: [2]*

None of selected municipalities has special status of city municipality (that brings special position in local government system in Slovenia), however in some cases there are differences in size (area as well as population). Concrete municipalities were selected randomly on the basis of relative share of employees in agriculture. In Zasavska and Posavska region, difference between selected municipalities is relatively low.

2. Measuring effects of economic crisis on local budgets

Economic crisis seems to be most frequent phrase in 2008/10. Brake down of world economy started in mid-2008 officially. However, in August 2007, newly appointed Governor of Bank of Slovenia at meeting of European Central Bank make comment on economic situation that was strongly criticised in European and Slovenian national monetary space. He said that »if there will be stronger turbulence they can cause negatively on demand of households«. The statement was in the context of American mortgage crisis and its effect in EU economic space. His comment was diplomatically marked as inappropriate (as also some others further on), but it was academic warning from political person that should not happen. However, he just warned that what is going on can have global consequences for economy. However he just warned from one thing that was best presented by late US stand up comedian George Carlin who well defined the main problem of economic crisis that emerged. People are spending »Money they don't have on things that they don't need«. He only forgot to add that they will probably not be able to pay for a life-time. Any economic situation can be explained generally in two different ways. First there is Smiths' invisible hand of market balancing the market to achieve moments of optimal ratio between supply and demand. Second, opposite pole is system of state intervention in market economy, generally to prevent few important market failures, such as negative exteralies, providing so called public goods where private economy is not interested or it can ride on natural or created monopoly where demand is irrelevant and consequently service is not provided adequately or prices are not optimized by market.

However, politics/government is strongly connected to the economy or private »players« who hold important positions and can provide economic support to the different political »players«. Over the time this led to strong bonds between economy and politics, causing lobbying, corruption and clientelism. In this condition natural monopoles are generally outsourced to private sector after initial investment. In this sense state finances private monopoly or oligopoly by outsourcing service to one or few private companies who can realise high or medium high profits with more or less no entrance costs and all additional cost are generally paid by final consumer. Under such circumstances it is hard to believe that market economy as well as state driven economy can work separately or together without serious failures.

As we said previously we expect that economic crisis will have certain effects on revenue as well as on expenditure side of local budgets. We could simply take just different types of revenues, maybe create two general categories of tax and non-tax revenues and try to explain potential differences. However, we believe that economic crisis is not day to day phenomena but has longer development procedure. Due to above mentioned history of current economic crisis we believe that in the case of local government following pattern took place.

Personal income tax rates shall drop only in 2008 and fall even lower in 2009,

Real estate tax together with interest rate tax shall get lower in 2008 as well.

Government subsidies form national budgets allow municipalities with lack of their own resources to cover at least so called level of appropriate consumption that is calculated each year for next fiscal year and should be adequate for maintaining developmental status quo in certain municipality. One can assume that state subsidy will not change significantly due to same uncertain economic situation at national level.

Salaries in municipalities on the expenditure level are one of most stable budgetary elements.

Regular transfers will slowly increase in 2008 while different investments will be lowered. We can expect that level of transfers will increase slower than level of investments will fall due to the fact that the difference will cover current expenses for public administration. All categories of expenses will be compared to total expanses.

Empirical results

Gathering empirical data, we were not able to get data on budgets of municipalities for 2009 yet. At the same time it is important to stress that in 2006 there were local elections and in 2007 there was change of municipal finances legislation increasing the share of personal income tax belonging to municipalities to 54%. Due to lack of data for 2009, we are not able to say if small drop of personal income tax at national average is already consequence of crisis or it is within

normal fluctuation. However, we can argue that in all municipalities where change of personal income tax is higher than 5% it is consequence of migration of population, and we believe if net flow is negative as in Trbovlje, Lendava, Moravske Toplice it is also first sign of change in economic situation

	2005	2006	2007	2008
Brda	39,6%	37,7%	54,8%	58,1%
Ajdovščina	39,7%	41%	54,2%	56,3%
Hrpelje-Kozina	22,6%	26,5%	53,8%	41,2%
Piran	35%	20,8%	28,6%	34,4%
Vodice	50,4%	34,7%	45,6%	58,9%
Šk. Loka	48,5%	44,7%	51,7%	51,6%
Solčava	10,8%	11,6%	56,7%	45,8%
Nazarje	33,3%	32,2%	50,7%	57,1%
Prevalje	39%	42,5%	61,8%	60%
Mežica	46,7%	44,1%	68%	52,4%
Starše	31,8%	29,2%	55,2%	54,2%
Hoče-Slivnica	41,3%	44%	64,3%	62,8%
Moravske Toplice	19,1%	19,7%	54,2%	37%
Lendava	29,5%	24,7%	57,3%	47,3%
Moravče	40,1%	37,7%	52,9%	72,3%
Mengeš	57,9%	60,5%	60,6%	66,2%
Žužemberk	23,4%	23,7%	69,7%	58,4%
Trebnje	32,8%	31,2%	62,3%	57,3%
Brežice	31,4%	30%	58,9%	49,1%
Krško	27,6%	29,5%	42,7%	37,8%
Trbovlje	41%	47,3%	62,4%	46,6%
Hrastnik	25,6%	34,9%	62%	55,2%
Postojna	49%	40,9%	52,2%	43,6%
Cerknica	22%	31,3%	54,2%	56,9%
National average	40,4%	39,3%	51,7%	49,4%

Table 2: Personal income tax *[1]*

Real estate and financial taxation indirectly shows how much can people and economy effort bigger expenses. Table shows very good the interest for certain municipalities. In this sense it is obvious that after the break of real estate market prime location like Piran (tourist location at the seaside) or Mengeš (suburb of capital) become much more interesting. While other locations kept their average interest rates. Measured via real estate tax income that is paid in the municipality where sold real estate exists). At the same time it is obvious, that in 2008 overall real estate taxation indicates that slightly lower number of real estate transactions was made.

	2005	2006	2007	2008
Brda	0,6%	1,1%	1,2%	2%
Ajdovščina	1,6%	1,9%	2,3%	1,4%
Hrpelje-Kozina	2,6%	3,7%	5,2%	3,7%
Piran	5,3%	4%	8%	7,6%
Vodice	9,9%	3,8%	2,9%	3,2%
Šk. Loka	3,2%	2,9%	2,4%	2,2%
Solčava	0,1%	0%	0,5%	0,3%
Nazarje	1,5%	2,6%	1,5%	1,5%
Prevalje	1,2%	1,8%	1,3%	1,1%
Mežica	1%	1,1%	1,1%	0,5%
Starše	0,6%	0,7%	1%	0,4%
Hoče-Slivnica	2,3%	4,1%	3,4%	3,1%
Moravske Toplice	1,2%	1,7%	1,7%	1%
Lendava	1,1%	1,5%	1,3%	1,1%

	2005	2006	2007	2008
Moravče	1,8%	1,8%	2,4%	1,7%
Mengeš	3%	4,5%	4,1%	6,2%
Žužemberk	1,1%	0,7%	1,2%	1,6%
Trebnje	1,8%	1,6%	2,5%	1,7%
Brežice	1,7%	1,6%	1,7%	1,3%
Krško	1,1%	0,9%	1,2%	0,9%
Trbovlje	1,7%	1,9%	1,5%	1,1%
Hrastnik	0,6%	0,8%	0,6%	0,7%
Postojna	3%	2,6%	3,1%	2%
Cerknica	1,2%	1,5%	2,3%	1,8%
National average	2,7%	2,8%	3,3%	2,6%

Table 3: Real estate and other financial taxes *[1]*

Government subsidies are in opposite relation with personal income tax in relation to change of legislation in 2007. However, it is more than evident that certain municipalities such as Solčava, Moravske toplice or Mežica are facing certain difficulties and are getting new injection of subsidies after one year of relatively low state budgetary participation. On the other hand it is not possible to assure that governmental participation is strictly connected to the economic situation.

	2005	2006	2007	2008
Brda	25,6%	24,4%	11,9%	3,6%
Ajdovščina	20,5%	21,5%	4,8%	0,9%
Hrpelje-Kozina	14,4%	19,6%	6,8%	9,9%
Piran	3,9%	5,1%	5,7%	5,6%
Vodice	9,1%	1,7%	1,4%	3%
Šk. Loka	6,9%	5,1%	2,8%	2,5%
Solčava	80,3%	78%	28,8%	46%
Nazarje	38,8%	34,5%	13%	16,2%
Prevalje	31,1%	25,2%	7,7%	3,5%
Mežica	27,5%	22,2%	8,1%	18,7%
Starše	20,6%	33%	10,1%	8,9%
Hoče-Slivnica	20%	16,8%	3,1%	8,7%
Moravske Toplice	51,5%	54.5%	13,5%	46,4%
Lendava	29,8%	31,4%	15,1%	17,1%
Moravče	38,7%	34,5%	4,6%	5,8%
Mengeš	3,5%	3,9%	0,3%	0,8%
Žužemberk	61,7%	61,4%	17,4%	21,3%
Trebnje	28,8%	29,6%	6%	8,4%
Brežice	34,5%	33,9%	10%	18,5%
Krško	20,5%	21,4%	6,6%	3,4%
Trbovlje	16,4%	13,8%	3,8%	3,7%
Hrastnik	21,2%	23%	2,6%	2,5%
Postojna	8,7%	13%	8,7%	5,7%
Cerknica	21,9%	24,3%	8,9%	7,5%
National average	18,8%	18,7%	7,4%	7,9%

Table 4: Government subsidies *[1]*

On the expenditure side of local budgets salaries are one of main expenses in municipalities. Other current expenses and social security subsidies are not included. Despite it seems that salaries are more or less constant with slow ratio of becoming less significant part of municipal budgets, one can argue, that they are not systematically connected to the economic situation. Due to governmental measures taken in 2009 only in this year it will be possible to indicate first signs of changes in the field of salaries.

	2005	2006	2007	2008
Brda	6,6%	6,1%	5,8%	6%
Ajdovščina	4,5%	4,1%	3,6%	4,1%
Hrpelje-Kozina	4,2%	3,6%	4,5%	3,6%
Piran	7,4%	6,7%	7,1%	6,5%
Vodice	4,1%	3,4%	5%	6,7%
Šk. Loka	5,5%	5,6%	4,9%	5,6%
Solčava	9,8%	12,7%	10,4%	8,6%
Nazarje	5,8%	4,8%	3,4%	3,3%
Prevalje	7,5%	7,1%	6,9%	6,9%
Mežica	5,6%	5,2%	4,8%	4,2%
Starše	8,2%	5,8%	8,2%	7,7%
Hoče-Slivnica	5,9%	6,7%	5,7%	4,7%
Moravske Toplice	4,6%	4,1%	4,5%	3,2%
Lendava	9,7%	5,6%	9%	6,1%
Moravče	7,8%	6,6%	4,9%	5,8%
Mengeš	6,2%	4,9%	6,4%	6,1%
Žužemberk	3,2%	3%	3,3%	3,5%
Trebnje	4,5%	4,1%	5,1%	4,1%
Brežice	5,1%	4,3%	5,3%	4,5%
Krško	5,4%	5%	5,2%	4,1%
Trbovlje	5,3%	6,2%	5,7%	4,5%
Hrastnik	4,7%	6,2%	6,3%	5,5%
Postojna	7,7%	6%	4,1%	5%
Cerknica	2,6%	3%	3,8%	3,4%
National average	5,6%	5%	5,2%	4,9%

Table 5: Salaries and other payments to employees (without social subsidies and other current expenses) *[1]*

As well as salaries of municipal civil servants also social transfers to private sector and households are slowly lower and lower and in this sense until 2008 it is not possible to confirm that economic crisis demanded any serious measures taken by local authorities in order to protect social stability of areas. On the other hand, we can see that certain municipalities have issues from time to time that are not connected directly to general economic situation but can be more result of local situations.

	2005	2006	2007	2008
Brda	41,6%	34,3%	30,5%	29,7%
Ajdovščina	34,4%	31,4%	29,8%	32,8%
Hrpelje-Kozina	26,1%	29,5%	36,2%	25,6%
Piran	40,7%	36,3%	38,3%	34,5%
Vodice	33%	26,9%	32,8%	38%
Šk. Loka	30%	28,4%	22,8%	24,5%
Solčava	33,4%	29,5%	23,9%	15,4%
Nazarje	38,7%	29,5%	23,6%	23,8%
Prevalje	36,3%	32,8%	29%	29,4%
Mežica	35,4%	32,4%	42,2%	36,2%
Starše	37,8%	25,2%	32,5%	34,1%
Hoče-Slivnica	37,6%	44,1%	37,4%	31%

	2005	2006	2007	2008
Hoče-Slivnica	37,6%	44,1%	37,4%	31%
Moravske Toplice	32%	30,4%	27,9%	17,2%
Lendava	37,5%	23,5%	38,2%	29,8%
Moravče	37,5%	36,6%	27,3%	27,8%
Mengeš	40,3%	39,5%	35,6%	35,3%
Žužemberk	36,2%	27,1%	35,1%	34,3%
Trebnje	36,3%	32,4%	35,3%	29,5%
Brežice	52,9%	43,6%	35,5%	27,8%
Krško	38,8%	33,1%	30,5%	26,7%
Trbovlje	36,7%	42,8%	36,5%	29%
Hrastnik	25,7%	35,3%	38,5%	33,2%
Postojna	38,6%	30,9%	26,8%	24,4%
Cerknica	20,9%	24%	27,5%	27%
National average	38,5%	35,4%	35,5%	33%

Table 6: Social transfers *[1]*

Until 2008, national average shows that municipalities are increasing their investments into local economy or into own municipal projects. On one hand we can explain this with improving ability to use European funds and we can argue that also calls from national government that public sector shall spend more in times of crisis in order to keep economy going were relatively successful. New investments after 2007 are also connected to the greater share of personal income tax allocated from national budget.

	2005	2006	2007	2008
Brda	16,7%	26,9%	28,3%	28,6%
Ajdovščina	40,2%	37,9%	46,9%	42,1%
Hrpelje-Kozina	38,2%	39,6%	31,6%	47,7%
Piran	15,2%	26,8%	31,2%	23,3%
Vodice	34%	44,7%	30,4%	19,1%
Šk. Loka	40,2%	36,7%	42%	34,1%
Solčava	38,8%	29%	43,2%	59,2%
Nazarje	19,7%	27%	28%	33%
Prevalje	16,6%	20,5%	34,4%	37,1%
Mežica	7,7%	9%	18,2%	35,6%
Starše	23,2%	10,1%	16,%	36,7%
Hoče-Slivnica	17,4%	13,6%	23,7%	39,6%
Moravske Toplice	40,7%	43,9%	42%	58,1%
Lendava	31,2%	56,1%	26,6%	33,7%
Moravče	32,2%	25,1%	37,2%	32,6%
Mengeš	30,5%	27,5%	34.3%	33,7%
Žužemberk	32%	38,4%	36,1%	29,5%
Trebnje	27%	27,3%	28,5%	30,3%
Brežice	8,4%	28,4%	30,4%	46,3%
Krško	13,7%	23,1%	35,5%	45,5%
Trbovlje	32,2%	20,1%	31,1%	49,1%
Hrastnik	47,7%	26,6%	20,4%	35,3%
Postojna	21,8%	38,4%	44,4%	45,4%
Cerknica	58%	53,1%	48,1%	49,7%
National average	27,4%	31,3%	33,6%	36,3%

Table 7: Investments *[1]*

4. Slovenian municipalities in times of economic crisis

In order to get clearer picture we will certainly need budgetary data of realized budgets for 2009 and 2010 before being able to state anything ultimate about influence of the economic crisis at the local level. However, data above are indicating so far that local government is not significantly influenced by global instability. This can be explained by fact that Slovenian municipalities have relatively low policy competences, as well as they are not very active in economy. Due to the fact that corporate profit tax is state tax as well as value added tax, municipalities can be influenced significantly only by lose of personal income tax that was in 2008 not so evident (people were still employed and receiving salaries). We expect that main problems will occur in 2009 and especially in 2010 with increasing number of unemployed workers not contributing to personal income tax mass.

We can argue that hypothetical changes in municipalities, as represented in introduction can still occur but with slight delay of 2-3 years. For the analyzed period we can hardly talk about any serious budgetary changes that can be directly connected to the economic crisis. It seems that other processes, such as ongoing reduction of expenses in administration and increasing level of investment into development of local infrastructure and elements providing higher quality of life are much more present.

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Zero Waste as a New Concept for Sustainable Waste Management

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Nataša Petrović[1], Sonja Išljamović[2], Veljko Jeremić[3]
[1,2,3]Fakultet organizacionih nauka u Beogradu

The generation of waste has been one of the most prevalent and least thought about byproduct of human activity in history. The burying or bumping management approaches of the past, however, are no longer acceptable: environmentally, economically, or socially. In addition, predicted levels of population, production, and consumption growth in next century will increase the quantity and complexity of waste materials. If global problems such as climate change and waste remain unresolved, society must choose to continue attempting to incrementally reduce wastes and lessen impacts. Logically, there is a need for Zero Waste, which seeks to eliminate waste wherever possible by encouraging a systems approach that avoids the creation of waste in the first place.

1. Introduction

The world we have created today as a result of our thinking thus far has problems which cannot be solved by thinking the way we thought when we created them.
Albert Einstein

Humanity seems to assume that the world has an infinite assimilative capacity for the mountains of waste that it generates. The problem did not start with the current generation or even with the industrial revolution; rather waste has been a problem since the appearance of humanity. Many solid waste management (SWM) experts refer to waste as a necessary by-product of activity. Furthermore, the economic growth and standard of living enjoyed by many nations today appears to justify the accumulation of waste. Unfortunately, expected growth and development trends indicate that the volume and composition of waste will make management more complex in the future. Solutions to the problems created by waste must first address the way in which waste is perceived.

The economic perspective is that waste is an externality to the industria1 process. However, this approach is being challenged. Industrial ecologists note that waste represents an inefficient use of raw materials and rising raw material and disposal costs may ultimately impair a business' competitiveness. Municipalities and their taxpayers are also victims of increasing waste management costs, particularly in the sitting, building, and operation of high technology landfills.

The concept of sustainable development, widely adopted after the Report of the World Commission on Environment and Development's 1987 report, Our Common Future, reflects the interdependence of environmental, economic, and societal issues. Management of waste, and indeed al1 pollutants, must be examined in the context of long term sustainability. So, the current linear material flow from extraction to disposal is witness to resource depletion based economy and cannot be sustained. In response, many countries have adopted and promoted the concept of a waste management hierarchy based on the 4 R's: reduce, reuse, recycle, and recover. The objective of this hierarchy is to illustrate the relative preference given to the various waste management options and to encourage diversion and ultimately reduction based programs.

Solid waste management has been the focus of increasing attention by all levels of government, environmentalists as well as the public in general. As a result, a plethora of information and literature exists on the subject. In fact, each of the components of the 4 R's has spawned numerous research studies, academic publications, professional journals, as well as conferences. The management of solid waste has traditionally been the jurisdiction of municipal governments, which have concentrated on the establishment and operation of collection and disposal systems. Perhaps this localized management explains the presence of the varied terminology and definitions for waste. The literature lists many types of waste including agricultural waste, radioactive waste, liquid waste, hazardous waste, industrial waste, and residential waste. The primary sources of waste are industrial production and human consumption and the lines between these categories are often unclear.

While waste is woven tightly into our lifestyles, recent attempts to manage its disposal and/or treatment have brought attention to its very definition. In the absence of common physical characteristics, many definitions focus on waste as products or materials that have presumably been used and then discarded. The assumption is that materials and products have a single purpose and once fulfilled are useless. Waste could be defined as "unusable material leftover from a process of manufacture, the use of consumer goods, etc.; the useless by-

products of a process", or "any substance (solid or hazardous) for which the owner generator has no further use and which he/she discards", [4]. The very subjectivity of this traditional view of waste is problematic because it includes all materials that are discarded, including potential secondary materials.

2. Definition of zero waste

The Zero Waste International Alliance broadly defines Zero Waste as: "A philosophy and visionary goal that emulates natural cycles, where all outputs are simply an input for another process. It means designing and managing materials and products to conserve and recover all resources and not destroy or bury them, and eliminate discharges to land, water or air that do not contribute productively to natural systems or the economy", [8].

Unlike our current system of managing waste, Zero Waste seeks to eliminate waste wherever possible by encouraging a systems approach that avoids the creation of waste in the first place. A Zero Waste systems approach turns material outputs from one process into resources for other processes.

Although there have been great strides in expanding recycling over the last decade, recycling more materials is not enough to achieve a truly sustainable economy. If materials are buried in a landfill or burned in an incinerator, industry must extract and process new virgin materials to make new products. It's as if there is a long shadow of depleted resources and wastes left over for every product and package used that is much larger than the product or package itself.

The U.S. Environmental Protection Agency (EPA) also determined that "Source reduction and recycling can reduce greenhouse gas emissions at the manufacturing stage, increase forest carbon sequestration, and avoid landfill methane emissions", [6]. EPA determined that energy use and greenhouse gas emissions were reduced the most by eliminating waste and the reuse of materials. That is why Zero Waste emphasizes the reduction and reuse of materials first, then recycling and composting, so that resources are not unnecessarily wasted in the first place. So, we can conclude that Zero Waste: redesigns the current, one-way industrial system into a circular system modeled on Nature's successful strategies; challenges badly designed business systems that "use too many resources to make too few people more productive"; addresses, through job creation and civil participation, increasing wastage of human resources and erosion of democracy; helps communities achieve a local economy that operates efficiently, sustains good jobs, and provides a measure of self-sufficiency; aims to eliminate rather than manage waste.

Zero Waste strives for:

- 100% Resource Efficiency;
- Zero Solid & Hazardous Waste;
- Zero Emissions - to air, water or soil;
- Zero Waste in Production & Admin Activities;
- Zero Waste in Product Life;
- Zero Toxics:
  - to reduce risks to nature,
  - the presence of toxics creates hazardous waste.

3. The hierarchy of zero waste

Zero Waste focuses first on *reducing* the volume and toxicity of waste by eliminating them in the first place. Zero Waste then focuses on *reusing* materials and products for their original intended uses, and then for alternative uses, before recycling. Once materials have been reduced and reused as much as possible, then Zero Waste focuses on *recycling* and *composting* all remaining materials for their highest and best use.

Waste management strategies should aim at maximizing energy and material recovery while minimizing the final amount of waste delivered to landfill and the pollution related to all treatment and collection steps. Environmental problems must be solved step by step, using appropriate technological, economic and social constraints, achieving Reuse and approaching the ideal target of zero emissions may require that we have to pass through the lower levels of the pyramid of Figure 1, in order to acquire experience, knowledge, understanding and organization.

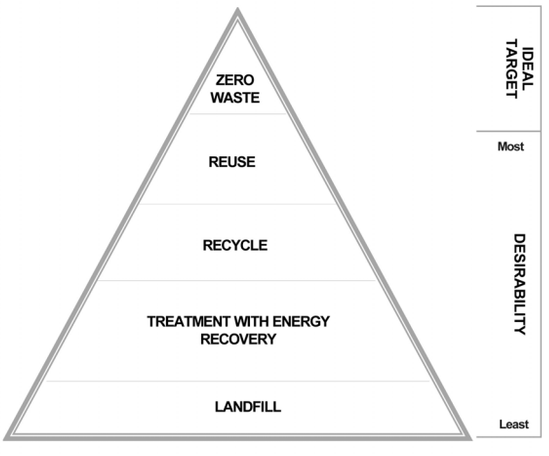

Figure 1. - The waste management hierarchy, [1]

Ecosystems recycle every kind of waste, and the concept itself of "waste" is no longer appropriate. The products from one component or compartment are always a useful resource for another component or compartment.

Ecosystems self-organize in such a way that all available resources are utilized to the maximum possible extent and no unused resources are left. Zero Waste encourages local and regional public-private partnerships to develop Resource Recovery Parks to provide the infrastructure and services needed to accomplish all of these functions. In a Zero Waste system, any materials that cannot be easily and conveniently reduced, reused, recycled or composted are either returned to the manufacturer direct or through retail channels, or no longer used.

Nature, for itself, has life cycles function without producing waste. Goods and materials, at present industrial system, are extracted from the earth's crust, transported to manufacturing sites, used to produce products (all materials not part of end product are discarded as waste), then products are transported to users and finally, at the end-of-life, discarded as waste. To eliminate or reduce waste, we can use the cyclical pattern modeled by nature as the most efficient, less costly, and most profitable, which avoids systematic deterioration of the environment. The cyclical system apply the equation *"waste = resource"* and eliminates wastes from the environment as indicated in Fig.2.

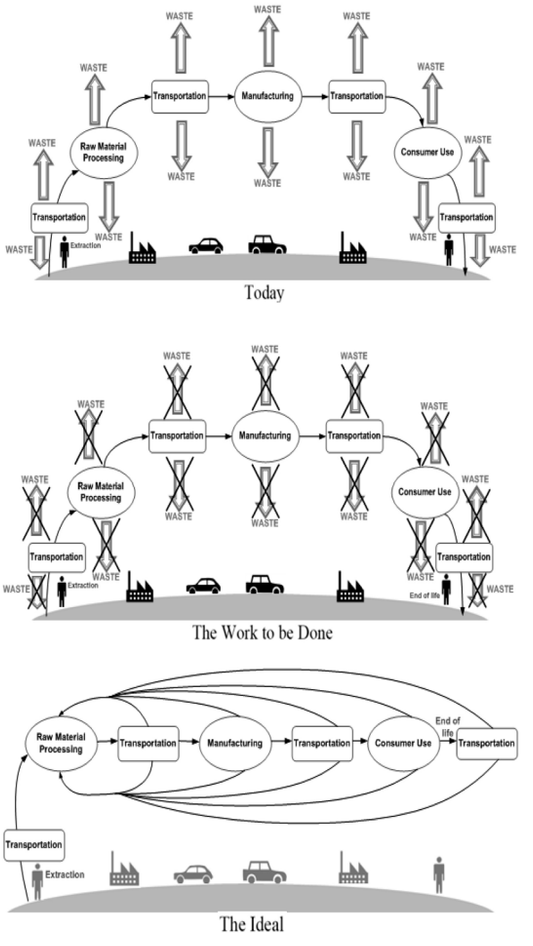

Figure 2. – Nature life cycle and cyclical system

4. Zero waste objectives and strategies

The following objectives and strategies have to been identified in order to provide a framework to guide in the planning and decision making process towards achieving Zero Waste. The Zero Waste goal will only be possible to accomplish if sufficient funding, staffing and authority are provided and recommended policies are adopted.

Objective 1 – Reduce - Work with Residents and Businesses to Eliminate Waste

Strategy 1: Expand educational and technical assistance programs

1. Encourage residents and businesses to eliminate wastes as a priority, on a voluntary basis.

2. Provide technical assistance to local businesses to adopt sustainable best business practices to minimize waste and avoid landfill and incineration (e.g., more waste audits, how-to guides, and periodic advice on how to implement recommendations of waste audits).

3. Promote and incentivize businesses to create and market products and services that utilize processes and means that reduce the volume and toxicity of waste and materials.

Strategy 2 Promote Voluntary Take backs

1. Encourage retailers and their suppliers to take-back products and packaging that are currently difficult to reuse, recycle or compost.

2. Promote take-back programs.

Objective 2 – Reuse – Develop Infrastructure beyond Recycling

Strategy 1 Expand opportunities for reuse of used materials and products

1. Develop and present to citizens and businesses a list of the highest priority materials to be reused, such as used building materials, used plastic toys, textiles and leather, and arrange for each of these materials to be accepted in at least one drop-off location each.
2. Work with local reuse nonprofits and businesses to expand convenient drop off locations.

Strategy 2 Work to preserve residential buildings that are still functional

1. Encourage adaptive reuse as a priority in building standards for residential construction.

Objective 3 – Offer Recycling and Composting Services to All

Strategy 1 Expand Recycling Services

1. Develop and communicate to the public a list of the highest priority materials for recovery of those currently disposed to be added to local recycling programs (e.g., film plastics). Include materials on this list in at least one drop-off location each.
2. Maintain one or more recycling drop-off centers.
3. Support other regional recycling centers and businesses to help them expand and provide additional services needed.
4. Work with independent recyclers to help the community recycle their waste.

Strategy 2 Expand Composting Services

1. Develop composting collection program for discarded food and food-contaminated paper as the second highest priority for new services for both the residential and commercial sectors. Include composting programs on the list of highest priority materials for recovery and provide at least one drop-off location for these materials.
2. Help interested businesses to start food waste composting pilot program.

Objective 4 - Incentives and Support for Zero Waste Initiatives

Strategy 1 Establish Rate-Based Incentives and Disincentives to Reduce Land filling

1. Seek ways to incentivize businesses to adopt Zero Waste goals and to develop Zero Waste plans.
2. An example of a possible progression from rate incentives to mandates is presented as follows:

   a. Stage 1 - In the first stage of this plan, create a progressive multi-stage rate structure tied to measurable material reduction goals to ensure that both residents and businesses that waste less pay less.

   b. Stage 2 - Beginning in stage two, implement first stage rate structure incentives, targeted at high priority waste materials to be reduced. Provide progress report both at mid-year and at year end. Evaluate mid-year progress and move to stage two rate structures if insufficient progress has been achieved.

   c. Stage 3 - Beginning in stage three, if progress meets operational reduction targets, then maintain rate structures. If not, then advance to higher stage rate structures for another six-month trial, reporting back, twice each year until stage 4.

   d. Stage 4 - If, by the end of stage 3, designated materials have not been decreased, following implementation of progressive rate structure and periodic reporting, then consider adopting bans or mandates with fines to require proper handling of those materials which have not been successfully reduced.
3. Develop and communicate to residents and businesses a list of the highest priority materials for recovery of those currently disposed, to eliminate from the waste stream in addition to materials already being reduced or recovered. Suggest viable alternatives to those materials and products and where to get them. Provide information and assistance as needed for implementation.

Strategy 2 Adopt Business Investment Policies to Expand Services

1. Encourage the cost effective development and expansion of services to reduce, reuse, then recycle and compost for all materials. Establish minimum qualifications for service vendors to provide such services as appropriate to ensure public health and safety. Establish mandatory service vendor reporting requirements to accurately capture quantities and weights of diverted materials.
2. Implement policies that penalize the discharge of toxic materials into the environment.
3. Increase public and private collection and processing services on an open, competitive basis, and help develop new businesses that add value to materials recovered and minimize residues that require disposal.
4. Stimulate innovative services to be added by the private sector and nonprofit groups. Encourage different types of services to be provided for different types of businesses.
5. Develop new requirements for owners and managers of multi-family dwellings and multi-tenant commercial buildings that ensure that all tenants have reasonable access to services and premises-based facilities comparable to single-family dwellings and small businesses.
6. Utilize economic resources staff to promote expansion of services related to reduce, reuse, recycle, and compost.
7. Establish target for the full avoided disposal costs to be basis for evaluating economics of Zero Waste programs and policies

Strategy 3 Educate and engage the community to support Zero Waste initiatives

1. Continue to develop and implement a public education and communications program concurrent with the design of new waste diversion programs. Develop new Zero Waste promotional materials. Promote positive Zero Waste buying power and behavior with promotional materials and website.
2. Continue to implement new education and outreach in advance of the implementation of any new programs to obtain the maximum support for new initiatives that will help in achieving Zero Waste goal.
3. Coordinate outreach programs for sustainability and pollution prevention with Zero Waste, waste prevention and recycling programs.
4. Implement community-based social marketing programs to more actively engage residents and businesses.
5. Work with industry groups to promote Sustainable Business and Green Business programs.
6. Recognize business and residential Zero Waste leaders.

Strategy 4 Develop Resource Recovery Park

1. Develop or help developing a Resource Recovery Park to provide location(s) for expansion of reuse, recycling and composting businesses.

Objective 5 -Lead by Example and Advocate Zero Waste

Strategy 1 Maintain a Public Advisory Review Body for Zero Waste Policy

1. Continue a Zero Waste Task Force or other advisory body at discretion of Council, made up of community representatives to serve for limited duration to review the staff prepared Zero Waste Operations Plan and advice the Council on its implementation of and changes to associated City Zero Waste policies.

Strategy 2 Maintain Active State and Regional Profile on Zero Waste Public Policy

1. Work with State and Federal legislators and support other communities in the region to adopt similar Zero Waste goals and plans. Work with them where appropriate to remove and resolve mutual obstacles.
2. Undertake a coordinated effort with regional cooperation, to support state and national efforts to adopt:
   - Extended producer responsibility;
   - Deposit programs;
   - funding of zero waste initiatives through statewide or regional landfill surcharges and product charges;
   - Full cost accounting for waste disposal;
   - Packaging levies (e.g., on plastic bags);
   - Minimum recycled content standards for additional products;
   - Design for the environment programs;
   - Green procurement and green building guidelines for the public sector;
   - National measuring, monitoring and reporting in achieving zero waste goals; and
   - New mechanisms for financial assurance for post-post-closure liabilities for landfills.

Strategy 3 Minimize long-term landfill liabilities

1. Ensure that the full capital and operating, closure, post-closure and post-post-closure costs are factored into current rates and financial assurances, particularly for private landfills.
2. Establish a target to reflect the benefits of avoiding these future liabilities as an avoided disposal cost.
3. Work actively with landfill contractor and regulators to increase mechanisms for financial assurance for landfill liabilities.

Strategy 4 Provide Funding to Implement Zero Waste Plan

1. Create a Zero Waste fund to encourage local innovation and participation. Fund community Zero Waste initiatives with fees levied on the transport, transfer and disposal of wastes where feasible.
2. Leverage the investments of the private sector by adopting supportive policies and providing technical assistance and support letters for independent financing and/or grants. The more that nonprofits and private companies invest in expansion of reuse, recycling and composting programs, the less is needs to invest.
3. Identify and support proposals for state, federal and foundation grants and loans for businesses and service providers.

Objective 6 - Update Waste Data and Develop Zero Waste Operations Plan

Strategy 1 Update Waste Data

1. Proceed promptly with a Waste Composition Study to report updated data in categories and subcategories designed for programs targeted to reduce or recover those materials. Include analyses of different

segments of the commercial and industrial sectors, and institutions (including restaurants, medical services, retail, offices, multi-family dwellings and government/schools).

2. The Waste Composition Study should clearly identify reusable materials and materials in the waste stream that are likely to be significant targets for programs to reduce or reuse such materials.

3. After the Waste Composition Study is completed, monitor measure and keep the community informed of progress and results. Provide annual reports on progress of all waste reduction initiatives. Highlight results of recent policy and program changes.

Strategy 2 Develop Zero Waste Operations Plan (ZWOP)

1. Identify what type of facilities need to be developed by and for to meet the service needs identified in this Strategic Plan.
2. Evaluate whether facilities exist or will be built to meet needs by the private sector, or recommend what facilities the public sector will be required to build. Compare costs of capital-intensive approaches that could be built on more expensive land vs. more land-intensive lower cost approaches that exist or could be built on the outskirts (e.g., for composting facilities).
3. Evaluate the market value of reusable materials, recyclables and compostable material still being land filled.
4. Identify public or private programs necessary to reduce, reuse, recycle or compost the materials identified from the Waste Generation Study.
5. Design different programs for different sectors, including multi-tenant buildings (residential and commercial), downtown businesses, strip malls, restaurants and hospitality industry, and major industrial areas. Provide universal access to opportunities to reduce, reuse, then recycle and compost.
6. Evaluate long-range reliance on single-stream recycling services versus expanded source separated collection.
7. Identify candidate locations for other new public and private facilities that might be required, with a conceptual basis for how to pursue the development of those facilities.
8. Reduce potential releases from degrading landfill sites that has a growing stake in.
9. Recommend policies and incentives consistent with this Strategic Plan.
10. Estimate jobs expected to be created and financial benefits from implementing the Zero Waste Operations Plan.
11. Identify which financing tools might be most helpful to local businesses to expand services needed to achieve Zero Waste.
14. Determine what funding, staffing and authority will be needed for staff to implement a Zero Waste goal.
15. Establish targets and goals for the Operational Plan.
16. Establish criteria for implementing bans and mandates where voluntary efforts have not been effective in meeting Zero Waste.

5. Conclusion

Sustainable development represents a commitment to advancing human well-being, with the added constraint that this development needs to take place within the ecological limits of the biosphere. Human economy depends on the planet's natural capital that provides all ecological services and natural resources. As a result of population increase and economic development, humans have exerted a considerable impact on the earth and are facing a series of incompatibilities among the natural resources, environment, and economy, such as the dichotomy of population growth and depression of resources and environment deterioration.

By understanding why human race need to reduce the amount of waste that all of us produce and dispose of, we can make a big difference to the scale of residual waste that needs to be treated. We (people) all need to make a concerted effort to think about the types of products we are buying, and consider whether they can be reused or recycled. Human interaction with the regenerative capacity must thus be managed carefully. Just as it is in our self-interest to track our financial assets carefully, it is equally important to track our ecological assets, which provide the ecological services that sustain human life and economic activity.

On the other hand, Zero Waste has to be a design principle for the 21st Century that seeks to redesign the way resources and materials flow through society. Zero Waste requires eliminating subsidies for raw material extraction and waste disposal, and holding producers

responsible for their products and packaging 'from cradle to cradle'. The goal is to promote clean production, prevent pollution, and create communities in which all products are designed to be cycled safely back into the economy or environment.

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Measuring Competitiveness as a Precondition of Economic Management

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mr. Nikola Milović
Faculty of Economics, Podgorica

Since 2005, the World Economic Forum (WEF) has based its research on competitiveness in the Global Competitiveness Index (GCI), a comprehensive index that measures the microeconomic and macroeconomic foundations of national competitiveness. According to the WEF, competitiveness is defined as a set of institutions, policies and factors that determine the level of productivity of a country [1]. The level of productivity, in contrast, establishes a sustainable level of prosperity that can be created by the economy. In other words, more competitive economies tend to be able to produce higher levels of income for their citizens. The level of productivity also determines the rate of return on investments into the economy. The rates of return on investments and the return on investments themselves are very complementary to achieving economic growth in the economy; more competitive economies are those whose growth is faster in the medium term compared to the long term. The concept of competitiveness thus involves both static and dynamic components. Although the productivity of the country clearly determines its ability to maintain its income levels, it is also one of the central determinants of returns on investments, which is one of the key factors when explaining the growth potential of the economy. The following paper presents a methodology of measuring competitiveness by the GCI index, statistical data related to the world economy, European Union countries, the countries that are in the process of accession to the EU, global advantages and disadvantages of the position of Montenegro and the countries of the region.

1. Introduction

The position of individual countries as regards certain competitiveness aspects is an issue dealt with by numerous international organizations. Some of them, such as the WEF (World Econimic Forum), the GCI

(Global Competitiveness Index) use the notion of competitiveness already in their name; other methodologies use terms such as economic freedom, progress in transition, or conditions of business doing. Our aim in this paper is not only to merely state the rankings of countries, but to offer these countries an opportunity to identify their weaknesses, overcome them, and consequently improve their competitiveness.

Generally, the research conducted by international institutions can be classed into two categories. One includes the research done by the WEF and the IMD. In these analyses, the competitiveness level of an individual country is ranked in accordance with its economic system (social and international relations), the role of the state and the institutional environment. The other group of research (the World Bank and Heritage) are related to an important determinant of development – regulations concerning business operations. The group of transition countries can also use the EBRD transition progress index. Common to all the quoted research is that in defining the position of a certain country, specially designed polls (the so-called soft data) are used in addition to the “hard“ statistical indicators (hard data). The purpose of such polls is to measure those competitiveness factors that are not available from standard statistical data, primarilly concerning the performance and independence of judicature, the preference for innovation, the quality of firm management, corruption, and the extent of the state impact upon business doing in the particular country. These indicators are evidently, at least in the part concerned with poll surveys, the result of the perceptions the respondents have on the current conditions prevailing in the economy (soft data) [2].

2. Measuring competitiveness using gci methodology

The GCI offers a weighted average of different components each of which reflects one aspect of a complex concept called competitiveness. All these components are grouped into 12 pillars which individually measure the competitiveness levels.

The GCI is composed of 12 individual pillars (subindices) that can be classed into three categories: basic requirements, efficiency, and innovation. Each individual pillar explains one aspect of a complex concept known as competitiveness.

The economy fonded on basic factors includes four pillars measuring individual indices: institutions, infrastructure, macroeconomic stability, health and primary education.

In the economy founded on efficiency factors we observe 6 pillars or subindices: higher education and training, goods market efficiency, labour market efficiency, financial market efficiency, technological readiness and market size.

The third category, the economy founded on innovation factors includes the last two pillars of global competitiveness: business sophistication and innovation.

3. Phases of development and weighted index

According to the GCI, in the first phase of its development, economy is founded on the *basic factors* and the production is conducted on the basis of the factors such as insufficiently skilled labour force and natural resources. The companies compete on the basis of low prices which are a consequence of the primary product and goods manufacturing, with decreased productivity and low wages. Maintaining competitiveness in this development phase of economy depends on a good work of public and private institutions (1st pillar), well developed infrastructure (2nd pillar), stable macroeconomic environment (3rd pillar), and healthy and educated labour force (4th pillar).

As wages rise together with the development of economy, the country moves to *efficiency factors* and the development phase based on them, and companies start manufacturing on higher productivity levels, the results being new and higher quality products. In this phase of development the competition lies in higher education and training (5th pillar), efficient goods market (6th pillar), efficiency of the labour market (7th pillar), efficient capital market (8th pillar), as well as the competence to implement current technologies (9th pillar).

Finally, as economies move towards the phase characterised by *innovation inclined factors*, higher wages and standard of living are only possible on condition business doing is oriented towards manufacturing new and unique products. The competitiveness of firms in this phase is based on innovation (12th pillar), product manufacturing and development implementing the most up-to-date production processes (11th pillar). The concept of the phases in the development is integrated into the Index, with most attention paid to those pillars relevant for the country and its current level od development. Similarly, although there are 12 pillars for each individual country, the importance of individual pillars depends on the phase the country is in. Finally, all the pillars are structured into three subindices, each of special importance for a particular phase of development.

The subindex of the basic development factors groups those pillars that are most critical for the country in the phase of the basic factors founded development. The efficiency subindex includes those pillars that are necessary for the country in the development phase characterised by the efficiency factors. The innovation and business sophistication subindex includes the pillars observed in the final phase of development based on innovation factors. The specific nature of weighting and of importance assigned to each of the subindices within different development phases is presented in Table 1.

Table 1. Weighting three subindices within different phases of development

Subindex	Economy established on basic factors %	Economy established on efficiency factors%	Economy established on innovation factors %
A: Basic conditions	**60**	**40**	**20**
B: Efficiency	**35**	**50**	**50**
C: Inovations	**5**	**10**	**30**

Source: WEF

In order that it should be specified which phase of development a country is, the GCI measuring methodology has been extended to include two more criteria. One, the per capita GDP indicator is used as a widely available fact, given that the income level is not available for all the countries covered by the research. The other, the indicator of the level of economy established on the basic factors, is measured by the share of the exports of primary products in the total exports and assumes the countries which export more that 70% of primary products in the total amount of exports (measured by a five-year average) to be basic factor driven economies to a large degree. Table 2 presents the per capita GDP level used to define the development phase the country is in.

Table 2. Income level used to define the country development phase

Development stage	GDP per capita (US$)
Phase 1: Economy established on basic factors	< 2.000
Transition from phase 1 to phase 2	2.000-3.000
Phase 2: Economy established on efficiency factors	3.000-9.000
Transition from phase 2 to pha se 3	9.000-17.000
Phase 3: Economy established on innovation factors	> 17.000

Source: WEF

The countries in between the quoted development phases are considered to be in the transition process. Their development process is characterised by a slow trensition from one phase to another. The knowledge of the development phase a particular country is in and the comparison of the countries, emphasises the development factors of crucial importance for the transition to a higher level of development. Each of the countries included in the study is ranked as related to other countries on a 1-7 scale, where 7 is a maximum score or rank that places the country among developed countries by a particular subindex or pillar.

Table 3. Global competitiveness, top 10, 2007-2009.

Year	2007	2008	2009
1.	USA	USA	Switzerland
2.	Switzerland	Switzerland	USA
3.	Denmark	Denmark	Singapore
4.	Sweden	Sweden	Sweden
5.	Germany	Singapore	Denmark
6.	Finland	Finland	Finland
7.	Singapore	Germany	Germany
8.	Japan	Netherlands	Japan
9.	Great Britain	Japan	Canada
10.	Netherlands	Canada	Netherlands

Source: WEF

4. Global competitiveness report – the position of Montenegro

According to the World Economic Forum statistics for the year 2007 and the global competitiveness index computed, this is the first time Montenegro entered the the official ranking list together with 131 countries in the world. Table 3 presents competitiveness worldwide from the aspect of global competitiveness for 10 best countries.

In 2009, Switzerland overtook the U.S.A. and climbed to the first position. Due to the consequences of the global crisis, Denmark, positioned 3rd in 2007, fell to position 5 in 2009. Out of 131 countries on the list, Sweden, Finland, Germany and the Netherlands occupy positions number 4, 6, 7, and 10, respectively. Great Britain was not in the top 10 group in 2008 and 2009. The above table shows that certain EU countries are positioned among the top most competitive countries in the world. As many as 5 countries out of the top 10 countries are the EU member countries.

The success of the countries and their position on the competitiveness scale is based on: a) greater openness of the market; b) macroeconomic stability; c) removal of barriers to competition; d) improved business environment. The position of Montenegro and the survey of the three previous years stressed a steady improvement of the competitiveness level and the position on the scale. Table 4 presents the values in the ranking for each pillar and the position of Montenegro.

According to the 2009 WEF Report, Montenegro climbed to position 62 measured by the Global Competitiveness Index, its total rate being 4.2. Compared to 2007, when it was first ranked, Montenegro improved its position by 20 positions. The analysis, as do others too, proves that Montenegro achieved best scores in the "financial market efficiency" where it is positioned 17th. Also, in view of macroeconomic stability, Montenegro occupied the 33rd and 35th positions in 2007 and 2008, respectively. The global crisis consequences affected its 2009 score; it is considerably lower, i.e., Montenegro is ranked 70th out of 134 countries. The lowest rates were obtained for the "market size" (124th position), "infrastructure" (93rd position), and "business sophistication" (80th position) criteria.

The data in Table 4 show that Montenegro is well-ranked according to a majority of subindices. The biggest move within the structure of individual pillars of competitiveness was a result of improvements in all three individual subindices. Similarly, the high position is mirrored in the aspects concerned with institutions, where Montenegro is ranked high, 52nd, an improvement compared to 2007 when it occupied the 78th position. The goods market efficiency and better rates of this pillar of competitiveness also resulted in an improvement of its position, from position 91 to position 58 in 2009. Measuring competitiveness using the GCI and the scope of economy of Montenegro on the WEF list suggests further guidelines in managing economy. The creators of macroeconomic deveopment policy will find the subindices within the competitiveness pillars to be a valuable indicator of the achieved development level [3].

Table 4. Global competitiveness report 2007-2009, Montenegro

	2007/131	2007/7	2008/134	2008/7	2009/134	2009/7
Global competitiveness index	82	3.91	65	4.1	62	4.2
Subindex A: Basic requirements	59	4.47	59	4.5	65	4.4
Pillar 1: Institutions	78	3.69	59	4.1	52	4.3
Pillar 2: Infrastructure	90	2.79	100	2.7	93	3.0
Pillar 3: Macroeconomic stability	33	5.40	35	5.5	70	4.6
Pillar 4: Health care and primary education	33	6.00	42	5.8	40	5.8
Subindex B: Efficiency	87	3.60	72	3.9	65	4.1
Pillar 5: Higher education and training	79	3.71	55	4.2	57	4.2
Pillar 6: Goods market efficiency	91	3.89	69	4.2	58	4.3
Pillar 7: Labour market efficiency	52	4.42	53	4.5	53	4.5
Pillar 8: Financial market efficiency	43	4.75	35	5.0	17	5.0
Pillar 9: Technological readiness	48	3.53	43	4.0	45	4.1
Pillar 10: Market size	130	1.31	125	1.9	124	2.2
Subindex C: Inovation	97	3.18	88	3.3	68	3.6
Pillar 11: Business sophistication	90	3.68	90	3.7	80	3.8
Pillar 12: Innovation	104	2.69	88	3.0	56	3.3

Source: WEF

The knowledge of the development phases of certain countries and making comparisons with them the impact factors for the move to a higher level of development are stressed. The 2009 amount of GDP and the range of per capita $3,000-$9,000 proves that Montenegro is in phase 2, marked as an efficiency factor based development level of the country. All the Balkan countries save Croatia are in this phase of development.

5. Wef lisbon review

The Lisbom process has been a ten-year attempt of the European Union to achieve the goals set in 2000. The European leaders met in Lisbon in March, 2000 and adopted the Lisbon Strategy stating that by 2010 the European Union is to become the most competitive, most dynamic, knowledge-based economy in the world, capable of sustainable growth with a larger number of quality jobs and a higher level of cohesion. The current economic crisis has clearly stressed the importance of competition-supported economy, sound and able to provide a solution to the market shocks and reduce the impect of negative effects of economic trends. The objective of the Lisbon Strategy is to increase the productivity and competitiveness of the European economy that will be supported by the economic policies and previously established goals. This means building an information based society, establishment of a European field of research and development, development of a quality business environment, completion of a single market, establishment and integration of financial markets, building a knowledge-based society, a larger number of quality jobs, social cohesion, as well as a sustainable growth.

The WEF Report is the fifth and the last survey assessing the progress achieved in pursuing the Lisbon Strategy goals in economic and structural reforms. The study published in 2010 includes three types of comparisons. In addition to assessing the achievement of 27 EU member-countries, the study measures the competitiveness of the EU countries as compared to the most competitive countries in the world and Asia, as well as the competitiveness of the candidate countries for accession to the European Union.

The last decade was rather turbulent for the European Union; the number of member-countries has almost been doubled, from 15 to 27, followed by a failure in adopting the European Constitution in 2005. The process of European political uniting was finally completed by adopting and enforcing the Lisbon Treaty in December 2009. Due to these circumstances, Europe failed to achieve all the stated goals, therefore it extended its own strategy and in March 2010 it presented the Europe 2020 – a Strategy for smart, sustainable and inclusive growth [4].

6. Areas of lisbon strategy analysis

The Lisbon Report [5] explained further in this report assumes several dimensions of tracking the progress towards achieving the goals set in 2000. The division of the Lisbon Strategy into eight different areas rasulted from the European officials' understanding of the ways to build Europe into the world's most competitive economy. The eight areas that are presented are as follows:

1. Building an information society for everyone. This area measures the impact of information technologies upon the knowledge dissemination and industry pro-

ductivity improvement. The information-based society is a precondition for the development of all the sectors and all the areas in the society. The countries that implement developed information technologies and keep up with the latest achievements in the field witness the improvement in the productivity of all their industry sectors. Such an importance of these technologies for the development of economy requires that all the economic entities, the government, the companies and individual citizens be included into their implementation and valuation. The 2000 Lisbon Strategy pointed out that both economic entities and citizens should be granted access to inexpensive information infrastructure of world class that offers a wide range of services. The index under consideration in this area includes the following variables: the ICT priority granted by the government, the ICT penetration (the Internet, mobile phones), the use of the Internet by the businesses, the availability of the Internet in schools.

2. Development of a European area of innovation, research and development. Innovation is important for economic development. The challenge in this area is even greater for technologically advanced countries in this field. In order that they ensure that innovation be effective, they must develop an institutional environment that supports the innovation development. the Lisbon Strategy defines and stresses the importance of this area. It is a common attitude that private investments into research should be increased, that research and development centres should be established and that improved communication and cooperation between the state and the private investors in this area be ensured. A rather demanding goal set in 2000 and amended in the strategy for 2020 is the expenditure and allocation of 3% og the GDP to research and development. Similarly, the quality of research institutions, the level of relationships between universities and industry, the number of per capita registered patents, as well as the intellectual property right protection and innovation stimulation through state grants are all the focus of attention of this area.

3. Liberalization: Setting up common market. State aid and Competition policy. The protection of the free flow of goods, services, capital and labour within the EU common market is of paramount importance for the further work on economic uniting of the European continent. This area is viewed via the free flow of goods and services which is essential for the competitiveness of the European industry. A certain progress in the common market building has been achieved, however, some sections of the market of goods and especially services as well as of certain industries are still controlled by the state. Lowering the barriers in service delivery is followed by the setting a clause of national treatment for certain services. The introduction of the Services Directive in December 2006 and setting its time line for implementation to 2009 has not been completed yet. Securing equal conditions for domestic and foreign investors and enforcing an appropriate competition policy are the key elements of the market liberalization. Hence the Council recognized the importance of the reduction of the state aid for the domestic industries and emphasized common interests such as employment, regional development, collaboration in environment protection and the like. The home market is marked as a crown jewel of the European policy and its further improvement is a firm basis for achieving the best competitive position in the world.

4. Building industry network: Telecommunications, Services and Transport. The Lisbon Strategy measures oriented towards a better functioning of the market are concerned with the liberalization and building of industry network. These industries, as part of services, are not fully spread over the common market yet. Telecommunications and airline markets are almost entirely liberalized. After a 15-year long process of opening the postal service market, the third Postal Directive adopted in February 2008 ruled that the member states shall abandon monopoly on postal services by the year 2010, or by 2012, for some countries. A successful implementation of the Directive is essential for the efficiency achievement in this sector. The single electrical energy market, improved through the Directive adopted in 2004 and 2007 is meant to ensure a quality, steady and efficient energy supply for the EU consumers. The free choice of an electric power supplier will allow for higher quality services as well as for an increase in the overall competitiveness of the whole system. The observations of this area are focused upon two dimensions of industry infrastructure: telecommunications and transportation. The infrastructure in the transport sector is crucial for the reduction of costs and the improvement of production efficiency.

5. Building efficient and integrated financial market. The recent events on the financial market that eventually caused a financial crisis have resulted into considerable attention being paid to this sector. The financial sector has a large impact upon the dynamics of the economy itself. An efficient financial sector affects the flow of capital and investments from banks, to the securities market, to all other types of securities markets. An integrated and legally regulated capital market will allow for a more appropriate resource allocation on the EU level, as well for easier investing and lower operational costs. A stress on a common currency, Euro, and a monetary union on the EU level ensures the stability and improvement of the financial sector operations. The strength and stability of this union will be of crucial importance for the further development of all the markets on the European Union level.

6. Building business environment: Settung up a business/legal framework. The improvement of the growth and employment prospects on the EU level means the building of a quality and efficient business environment. In order that this goal be achieved on the Lisbon strategy level, it is necessary that adequate legal regulations should be adopted, ones that allow for the development of business and an increase in the overall economic activity. This strategy defines the entrepreneurship incentives, removing the barriers to setting up businesses as well as tax reduction in this field. A less expensive and easier start up of a business is the ultimate goal of the legal regulations, ensuring a higher utility within the economy. The EU has started building a business environment that allows for the start-up of businesses to be completed within a week time and at one single counter, in a majority of countries. The reduction of all kinds of costs and time saving are very important in achieving a more favourable competitive position of some countries and of the EU in general.

7. Improving social inclusion. Creating new jobs and higher employment rate make one of the Lisbon Strategy goals. The increase in employment rate to a level of 70% by 2010, as well as a demanding goal that this rate be raised to 75% by 2020 is another. According to the official Eurostat, the average employment rate on the EU level towards the end of 2008 amounted to 65.9%. The EU will have to increase its employment rate in order that it should obtain sustainability in inflows for pension plan expenditures. In order that employment be increased, attention should be paid to highly qualified labour force willing to re-qualify in an increasingly demanding business environment. Currently, attention is focused on the achievement of the Danish model meant to increase the flexibility of labour market by payments for the unemployed and investments into re-qualifications. Of vital importance here are facilitating the access of women and the elderly to new employment and training services. Finally, modernization of welfare programmes, poverty reduction and the reduction of the exclusion of certain groups of society are a path to an incresed social inclusion and cohesion.

8. Improving sustainable development. Ensuring sustainable growth and development is a long-term Lisbon objective, added to the Lisbon Strategy in Stockholm in March 2001, and becoming highly important in the new 2020 European Strategy. Attention is focused upon the achieved living standard by which a country has a favourable impact upon future generations. Similarly, it is an opportunity that future generations should enjoy the same or higher level of development in comparison to the generations today. Special emphasis is put on: climate changes, traffic, public health and natural resources. Such a development means friendly technologies, ones that do not pollute the environment to a large extent, in the energy and in the transportation sectors. Efforts made to achieve sustainable development are linked to both the local and the European levels [6]. The index calculating this area is related to the design and implementation of environmental protection laws, the ratification of world contracts in this area, as well as the real quality of environment.

7. Lisbon review of Montenegro position, 2008-2010

Table 5 presents the positions of the candidate countries, the prospective candidates for the EU membership and the East-European countries for the 2008-2010 period. The progress of prospective candidates for the EU membership is evident, which proves the quality and the scope of positive changes in the economies that wish to be part of the EU.

Table 5. Measuring progress of prospective candidates, 2008-2010

	2008			2010	
	Position	Index		Position	Index
Croatia	1	4.10	Montenegro	1	4.19
Montenegro	2	3.96	Croatia	2	4.18
Azerbaian	3	3.88	Azerbaian	3	4.02
Turkey	4	3.82	Turkey	4	3.85
Russia	5	3.82	Macedonia, FYR	5	3.79
Kazakhstan	6	3.70	Georgia	6	3.78
Ukraine	7	3.69	Russia	7	3.75
Georgia	8	3.66	Kazakhstan	8	3.67
Macedonia, FYR	9	3.53	Ukraine	9	3.62
Moldavia	10	3.50	Serbia	10	3.51
Serbia	11	3.44	Armenia	11	3.50
Tajikistan	12	3.35	Albania	12	3.47
Armenia	13	3.29	Tajikistan	13	3.38
Kyrgystan	14	3.23	Kyirgystan	14	3.20
Albania	15	3.12	B&H	15	3.07
B&H	16	3.12			
EU 27		4.73	EU 27		4.81

Source: WEF

Among the eleven East-European countries non-members of the EU, with the mark of 4.19, Montenegro is closest to achieving the goals of the Lisbon Strategy of economic and structural reforms. [7]. According to the 2010 Lisbon Review, Montenegro is better than Croatia, and being positioned at the top, has become the "top reformer" among the countries non-members of the EU. Also, Montenegro has overtaken the five lowest ranked member-countries of the EU – Greece, Poland, Italy, Romania, and Bulgaria. Croatia is positioned second on the list, with a mark of 4.18 and is ranked equal to Greece; Azerbaian overtook Romania and Bulgaria, while Turkey and Macedonia are positioned higher than Bulgaria. The most successful non-members and prospective candidates have achieved higher marks compared to the total number of present member-countries. Montenegro is best in the area of financial services and social inclusion, with marks higher than the average marks of the 12 new members of the EU. In these areas its marks amount to 4.74 and 4.28, respectively. The country is also ranked high in the areas of sustainable growth, 3.9 (second position, below Croatia), in network industry, 4.6. In the area of liberalization, Montenegro is on the second position, with a mark of 4.34, and in business environment area it occupies the sixth position, with the mark of 4.32. The two bottom positions on the list of 11 East-European countries belong to Albania and Bosnia and Herzegovina, with marks 3.47 and 3.07, respectively.

8. Conclusion

On the basis of the facts presented a following conclusion can be drawn: the World Economic Forum based its research into the competitiveness on the Global Competitiveness Index (GCI), a comprehensive index used to measure microeconomic and macroeconomic foundations of a national competitiveness. According to the WEF, competitiveness is defined as a set of institutions, policies and factors that determine the productivity level of a country. The GCI is composed of 12 individual pillars (subindices) that can be classed into three categories: basic requirements, efficiency, and innovation. Each individual pillar describes one aspect of a complex concept called competitiveness. The developmentphase concept is integrated into the Index, emphasizing the pillars relevant for the country and its current level of development. Similarly, although we have all the 12 pillars for each country individually, the importance of some of them depends on the phase the country is in. Each country covered by the research is ranked in relation to other countries: on a 1-7 scale, where 7 is the maximum score, i.e., the rank that places the respective country among the developed countries by the individual subindex or pillar. According to the 2009 WEF Report, Montenegro ranks 62nd out of 134 countries, measured by the Global Competitiveness index, with a total score of 4.2 on the 1-7 scale. The score is improved by 20 positions, compared to year 2007. Montenegro scored highest marks in the area of "financial market efficiency", where it is ranked the 17th country in the world. In view of the Institutions pillar, Montenegro is ranked 52nd, a progress compared to year 2007, when it occupied the 78th position. Similarly, the goods market efficiency and higher marks of the third pillar of competitiveness raised the country from position 91 to position 58 in 2009. The consequences of the global crisis affected the results in the Macroeconomic stability pillar in 2009, placing the country on position 70 out of 134 countries. The lowest scores are found in the areas of "market size" (position 124), "infrastructure" (position 93), "business sophistication" (position 80).

Measuring the competitiveness enables the economists to identify the basic problems in development as well as to make suggestions to the creators of macroeconomic policy as to how they should act in certain situations. [8] The GCI and the World Economic Forum Lisbon Review are methodologically and practically good research works with an impact upon the quality of management as well as upon the economic progress of certain countries.

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New Paradigm of Management: the Commitment to Innovation and Sustainable Competitive Advantage

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Valentina Malešević
Information and Communication College, Belgrade

The environment in which companies operate in the 21st century requires management to respond to the challenges relating to entirely new paradigms of management processes, primarily to employees in the direction of maintaining strategic performance and competitive advantage. The main objective of this paper is to highlight the challenge that is before the management, which is that it necessarily has to create such a working environment that encourages each employee to make their best, and be committed to and fully engaged. The paper analyzes the necessity of innovation management system, the current state of engagement of employees, commitment of employees as a route to continuous innovation and guidelines for management towards employee commitment.

1. Introduction

The environment in which companies do business in the 21st century is characterised by a host of challenges and uncertainty. The new era triggered a large number of issues and a necessity that paradigms be changed in the process of company management. With an accellerating rhythm of changes, an increasing number of companies are found on the wrong side of the change curve, and a competitive advantage is likely to expire even much faster[1]. Overtaking the competition is not so much a consequence of market power as it is a result of skillful negotiations. From the traditional approach to performing an obligation towards the community, the corporate responsibility embraces a new approach of delivery as a strategy. The world of digitalization is increasingly characterised by the need that information and ideas be free, hence the firms creating and selling intellectual work encounter certain problems. The Internet allowed for the consumers to control the situation more than ever before[2]. They obtain perfect information, therefore there is less and less space for average quality products and services. A new truth in the economic environment is also reflected in the fact that a new company is possible to improve in a much shorter time as life cycles of strategies become shorter and technological advantage is of a short date. The power of outsourcing and that of a global approach to the Internet are greater and greater, and extremely low prices of communications and the globalization open the doors to a large number of new competitors who offer remarkably low prices.

Such new environment requires new organizational and managerial competences. In order to survive, the companies have to become strategically adaptive and operationally more efficient than ever before. The managemnt has to: encourage innovation, build new tools for an efficient capital allocation, cherish and improve the intangible assets in a completely new way, encourage, use and reward the creativity and innovativeness of the employees.

All the above quoted point to the importance and power of the people who work, from the top management to the basic line of the employees. We notice a great power of resources that is increasingly underlined today, and this is an engaged, committed, labour force. The management, therefore, has to change the paradigm of relationships towards the resource that is called the employee. From the intellectual feudalism paradigm: "why is it that whenever I want to employ a pair of hands, I get a brain alongside"[3] it changes to "I want to encourage the spirit of enterprise, creativity, and innovativeness in every man". The advantages of the new paradigm of relations to the employees are embraced by many successful companies as their sustainable competitive advantage that is hard to copy.

2. Management innovation as necessity

On the basis of observation of significant changes that have taken place on the technology, life style and geopolitical fields in the last fifty years a conclusion can be drawn that management technology develops at a "snail's pace" [1, p.34]. The majority of the today's managemnt patterns are somewhat different from the ones

[1] Whether we talk abour airlines, generally known trade marks, tv networks, pharmaceutical companies, car manufacturers.
[2] In the past, the customer loyalty used to result from ample reasearc costs and limited information so the companies often profited from the customers' ignorance.
[3] A well known Henry Ford's sentence used to illustrate that in the early twentieth century the plain workers' intelligence was belittled. Unfortunately, some managers today can still be identified with that managerial dogma about the resource that is not timely employed and encouraged.

prevailing in the previous generations, while the environment has suffered enormous changes.

The hierarchy and bureucracy are still the dominant pillars. The top managers, as most intelligent and most qualified, are expected to act in accordance with the directors' decisions. The lower-level managers are still appointed by the higher-level managers. The strategy is still defined by the most important people in the company. Everything is still besed on the Taylor's scientific principles of modern management at the beginning of the last century. The above quoted opens the issue of the necessity of innovating the management paradigm. Because, if the Taylor's management principles were revolutionary then, and if Henry Fayol defined management as an activity of planning, organization, conducting, motivating, and control, which the 21st century managemnt could hardly extend, then today's business environment urges that, one hundred years later, some real innovations have to be introduced. Anything they could significantly change the todgay's managemnt practice for the purpose of business efficiency and effectiveness and competitive advantage sustainability can be defined as innovation.

"The management innovation includes the change in the organizational structures and roles that create values. The companies consist of business units, departments, work groups, relations with suppliers, partners and major customers. The new method of linking these groups may be considered an innovation of management" [1, p.20]. Major advances in the management practice often lead to important changes that make it difficult to competition to respond to. The advantages of systemic innovation are reflected in the network of individual innovations that permeate numerous management processes, which is rather hard to immitate. Namely, even a superficial insight into a competition management practice has a limited value if anybody tries to copy it[4]. Innovation, therefore, is a new competitive advantage, however, it has to stem from a managerial innovation system. Its importance is greatest in the hierarchy of all the effective innovations since it results into a decisive and long-term advantage. For example:

- operational innovation: IT infrastructure, outsourcing[5] and offshoring can still be benchmarked;
- product innovation: things can be imitated immediately;
- strategy innovation: products-brands at low prices, low-cost airlines that spread at highest speed or are benchmarked.

"The management information has a unique capacity that is difficult to imitate, because it is as if you should change your religion. The majority of directors find it easier to recognize the merits of the business model that brings a general tumult than do away with the basic principles of fundamental attitudes on managemnt" [1,p.34]

The modern environment is characterised by one important feature: an uncontrolled accelerating rate of change. Thus the balance between the promising situations and the threats for any organization depend on its ability to adjust. This normally raises a question of: if the environment changes fast and without control, which speed do the organizations change at? The answer is, of cource, well known and negative. Therefore it is necessary that organizations be created that are capable of permanent renewal, that do not bring any shocks, since any late adjustment costs dearly, sometimes too dearly[6].

Excessive investment into what is settled, known in relation to what could become if change is implemented is the reason that many a company risks its future[7]. Investment into "what could be" has become the only path that leads to survival and prosperity in a world of ruthless competition. Many companies that introduced innovation, implemented the "blue ocean strategy" [3, p.17] and made a turnround in their business operations did so in that they took the advantage of the first move in one of the three dimensions: they have the concept, they have the customer and/or they have specific skills" [2, p.229] The strategic renewal, however, usually starts with an attempt to improve that initial advantage. In the long run, the continual success becomes a matter of entering a completely new cycle of advantages. "Successful companies have to create strategic spirals in which the end of one cycle of advantages marks the beginning of another, new one" [2, p.229].

All the above quoted suggests that three major challenges the company managers encounter in this new century [1, p. 41] are as follows: 1. a dramatic acceleration of strategic renewal in both large and small organizations; 2. achieving a situation in which innovation is a daily job of all people; and 3. creating an especially favourable work milieu that motivates every employee to do their best.

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[4] "It would be as if you imagined to weave a Persian rug from a few threads of silk"[1, p.31]

[5] "Synergy is not in any longer, outsourcing is. The managers used to believe that 2+2=5. Now, 5+2=7, since the more subsidiary operations you do outside the firm, the more value you get. The new model settles gradually. It is estimated that from 1998-2000 a number of companies that outsource production trippled". [2, p. 221]

[6] IBM, Apple, Nissan, Kodak, Sony, General Motors ... experience

[7] The management is often more prone to risk in order to avoid losses instead to risk in order to earn profits.

Special ettention in this article is paid to the challenge of creating a highly favourable work milieu that motivates every employee to do their best, that is, to be defined as a committed and engaged worker.

3. Employee committment is a path to innovation

"In the times of the domination of the markets that feed on information and grow thanks to the information, organizations necessarily feed on ideas. Innovation is not created by markets, it is created by proactive companies that consider succes a maximum creation of value by satisfying real customers' needs in an innovative manner" [2, p. 221]. Such companies have created a work milieu that motivates an increasing number of employees to earn a status of the committed, and consequently innovative workers. Such a paradigm of relations to the employees is an innovation of a systemic character that leads towards modern competitiveness and the adaptation capability.

We therefore deal with two aspects of perception of the process achieving innovativeness that is a precondition of modern operations on the market. One aspect are the employees and their competences, skills, qualifications and the value system, whereas the other refers to employers and their readiness to change the pattern of valuating the employees as an important resource of innovation resulting from committment.

3.1. The perception of employee committment

The average employers' perception today can be described as follows: they seek for the methods and opportunities to ensure growth or at least survival, and consider the payroll to be an enormous expenditure, perhaps the largest of all. There is, however, a significant potential that failed to be rightly articulated for the purpose of minimizing the negative and maximizing the positive effects. These are the aspects of perception of the engaged employees as the source of improving the business performance, who in the long run achieve larger incomes and larger profits, and besides, they provide innovation support, a competitive advantage and a strategic sustainability.

Where does the importance of this perception of the employees who are the resource for improving business performancelie? The importance lies, A. Schveyer [4, p.2] mainatins, "in the very identification of a vast potential of the committed and engaged employee, as opposed to a disengaged or a non-engaged employee". The traits of the above mentioned employees are described in Table 1. Every manager would appreciate it if engaged employees were dominant in the structure of the employees, and if others are as small a minority as possible (or non-existant at all).

The principles and processes of the present, modern management are characterised by certain constraints reflected in a sort of disregard for fostering the competences, originality, courage and enthusiasm in the employees. On the contrary, much importance is attached to discipline, punctuality, economising, common sense and order, i.e., to formal excellence. The result is that a large number of organizations operate below their real potentials [1, p.57].

Fully engaged	Non-engaged	Disengaged
• ready and able to contribute to the company's success; • high level of discretional investment in the form of additional work and energy; • prospective innovators; • rarely absent from work; • often used as synonym for motivated and loyal worker; • adopt company's goals as their own and make best efforts to achieve them; • emotionally committed to company, • optimistic in viewing the company's future; • important and valuable ambassadors of the company.	• not goal-oriented; • task oriented; • assigned a task, they accomplish the task, switch off until the next task; • feel their contribution is not valued and paying accordingly; • no productive relationships with managers and collaborators; • do not implement thir inventiveness and creativity; • potential not used.	• absent, switched off even when at work; • often pessimistic in changes and creation or adoption of new ideas; • high level of absenteeism; • spread negative effect including prospective customers, consumers; • prone to undermining work atmosphere and have impact upon non-engaged workers; • potential carriers of high risks that can seriously harm the company.

***Table 1**. Employee types and characteristics according to engagement level*

Similarly, the management has to measure their non-engaged employees' level and implement a new concept to transfer as many as possible of them into the level of committed and engaged employees. According to the 2008 research conducted by Towers Perrin, described in Table 2, the level of non-engaged is a serious threat to the survival and development of any organization. According to one study [8], the costs of demotivated labour force in the USA economy amounts to billions. On the other hand, Schveyer A. [4] stresses, motivated, engaged employees work in a smarter way, they try to find the ways to improve performance. The effects of such committment are a higher level of sales, cost reduction, a higher quality and innovativeness of the products or services. They communicate, share information with their colleagues, they transfer ideas, suggestions and advice. All this results into better performance, satisfied and hence loyal customers and higher profits.

The management's competence is reflected in the structure of the employees, from fully engaged to non-engaged workers. Sadly, many managers still ignore this fact about non-engaged workers, i.e., about unemployed potential and protect themselves with obsolete paradigms of leading their employees. On the other hand, there are other managers that build their competitive advantage on the very respect of this potential. Managers could have ignored this in the past, however, today, in the environment that primarily calls for adaptability and innovativeness, it is a serious risk for survival.

Employee committment level	% share
Committed-engaged	22%
Non-engaged	66%
Disengaged	11%

Table 2. *Employee structure according to engagement level*

Source: according to 2008 Towers Perrin data [4, p. 4]

In recent literature on the human resources management there is a concept of adequate and inadequate human potentials. "The concept of adequate human potentials refers to individuals within an organization that contribute significantly to achieving the goals of the management system, whereas the concept of inadequate human potential refers to those members of the organization who do not contribute to achieving the goals of the management system. For one reason or another, these individuals are not productive in their jobs" [5, p. 276]. In the companies where there is a human resource service or sector there is a whole procedure in the management process to find efficient ways to raise the employee motivation level that will in turn result in committment. This, however, may not be enough in some cases, as the paradigms of employee management remained the same.

3.2. Management towards committment

Modern business environment has differentiated among highly important intangible values of the company that cannot be copied. One of these values is the

Passion	They know no barriers and do not give up. Passion is a secret element that turns intention into achievement. Their passion is contagious and turns the initiative of one person into a mass movement.	**35%**
Creativity	They are curious, uninhibited. They do not fear unknown, they are optimistic and enterprising.	**25%**
Enterprising spirit	They look out for new challenges. They do not wait to be told to do something. They are always in search of new ways to increase the company's value.	**20%**
Knowledge and intellect	They are talented, smart. They are willing to invest into the improvement of their skills and they generate good practice. Companies want to have them.	15%
Hard work	Hard-working employees are responsible, they never take an easier path. They are conscientious and well organized.	**5%**
Obedience	They know how to pay attention to instructions and behave according to the rules.	**0%**

Table 3: *Hierarchal succession of human potentials that contribute to competitive advantage*

Source: Author's own plot on the basis of the data [1, p. 59]

employee relation or the participation of engaged, committed workers in the structure of the total number of employees. Employees increasingly become a "key" that is called competitive advantage and development. "The employees become the primary significant stakeholders of the company since really engaged employees make better ambassadors of the company's brand than any slogans or a promotion of the brand itself" [6, p.2].

The challenge before the today's management is to create and modernize the system approach to encourage the employees to engage all their creative skills at work, on a daily basis. Human skills that contribute to the quality and success of competitiveness have their hierarchal succession and this is presented in Table 3.

This hierarchy of potentials is important from the point of view of competitive advantage they create. It is easy today to find hard-working, expert and dutiful employees, however, they cannot create competitive advantage. It is the committed: passionate, creative, innovative, enterprising employees who create that value.

In addition to these potentials, there are some types of skills that employers find important for success at the workplace. According to R. A. Noe [7, p.22], the employees born between 1965 and 1975 find unexpected rewards for achievements, opportunities to learn new things, praise, awards and time spent with the manager to be significant, while the employees born between 1925 and 1945, the so-called "traditionalists" attach importance to income and job security. All employees, however, value a number of key aspects, for example: they view their job as a means of self-realization, i.e., a way to employ their skills and potentials as best possible and satisfy their interests, as well as a means to live in a desired life-style. "One report revealed that committment to a company is higher in those employees who are given opportunity to fully employ and develop their skills, take more responsibility at work, believe that the promotion system is fair and have a reliable manager who works to their best interests" [7, p.22].

From the management point of view, therefore, the above-quoted potentials and skills are highly important, and so is the knowledge of the value system of the employees that motivates them towards committment. In order that the potentials and skills should be implemented, engaged and in accord with a new value system of the employed, it is necessary that the management itself pass from the traditional pattern of the management system to one leading to a maximum activation of potentials, from the non-engaged to the engaged, committed, innovative. This is a condition without which competitive advantage and sustainable growth cannot be achieved.

Recruiting as many fully committed employees as possible is based on the condition that the managers themselves possess a high hierarchal level of competences and a new paradigm of relations towards employees. They are the primary drivers to the committment compared to all the others in the organization. This condition can be followed by the elements that make a necessary framework for the management towards committment:

- working milieu with all the necessary tools;
- favourable structure of intellectual and qualified employees;
- positive and incentive, innovative atmosphere;
- incentives through innovated programmes (carefully planned and still more carefully executed);
- continuous information flow and exceptional transparency;
- reduction of hierarchal levels and bureaucratic formality and extending of authority and responsibility.

Given that the working milieu is equpped with all necessary tools, that the strategies are clear and the goals are innovated, as well as that there is a favourable intellectual and qualification structure, it is necessary that a positive and incentive, innovative atmosphere be created. This means that the management has an entirelly new pattern of relations with the employees, i.e., that it is capable of motivating and encouraging them towards creativity, enterprise and innovation.

An incentive, innovative atmosphere and incentive programmes are significantly interrelated elements since human motivation is a complex category. It has been the subject matter of organizational studies for more than five decades and numerous theories have evolved. As an inward state due to which an individual acts in such a way as to achieve a goal, motivation is a continuous process. It explains why people behave in a way they do behave. The process of activating, directing and maintaining the employees' activity towards achieving organizational goals therefore is a motivational process, based on a need, movement, reward and praise. Motivation is primarily perceived as internal and external. In case of internal motivation, the activity is a benefit in itself, whereas in case of external motivation, the benefit, the reward and the praise are expected to come after the activity has been accomplished. The better the manager understands the behaviour of the members of his organization, their system of values, or what activates them, the more influence he will have upon their behaviour and the more he will be able to adjust it to achieve the organizational goals [5, p. 382]. Hence it is the responsibility of managers to create such

an environment and incentives that will activate the employees towards a desired manner of behaviour, in accordance with the inward needs of an individual.

A large number of companies spend a lot of time and enormous capital on research into their prospective customers, disregarding the need to study the motivation and behaviour of their employees. The management can make use of the traditional methods, such as wages, bonuses, trainings, professional improvements, promotion opportunities to motivate their employees, however, there are also incentive (stimulation) programmes which in addition to remuneration in merchandise or in money, in business meetings, or in conventions, include prize travels [9, p. 438]. A typical ratio in a majority of companies is 70% in basic salary, plus 30% of various incentives [10, p. 228].

The incentives in building new relationships with the employee, reflected in incentive schemes or programmes, include carefully planned and still more carefully conducted programmes that are in accordance with the system of values the employees cherish. These incentives are considered valuable only on condition they can really reflect the management feeling of value, trust and care for the committment engaged. According to the managements that implement them, the above-quoted incentive programmes really achieve such effects[8].

Similarly, the new management paradigm includes a necessity that management acts through important segments of committed relations with the employee in the process of creating a positive and innovative work atmosphere. It is necessary:

- that they spend a substantial amount of time with their employees[9] in order that they should share in the daily efforts to achieve mutual goals, foster mutual trust and understand their employees' system of value;
- that a favourable, incentive environment be created in which the individuals will improve their advantages, creativity and offer innovative solutions[10];
- to define excellence as a challenge for each employee and reward it with praize, prestige, title, through modern incentive programmes[11], and not only with money.
- to encourage innovation in all the lines of business operations. This means that perception and logic should not be a privilege of only a number of top managers or directors. Creativity and innovativeness have to be incited and valued on all levels;
- that principles be developed that will inspire and motivate people, develop ideas that will permeate their work places with positive and creative energy. This means that a vision should be developed and ensured for each member of the organization that activates the talented and the ambitious;
- that the employee is allowed to develop his/her identity and the system of value and yet satisfy his/her need to belong and to retain corporate identity,
- to create such a relationship with the employees that builds trust through expertise. As a leader, the manager has to trust people, otherwise, he cannot expect to get new ideas, creativity, and results. Trust is also built through the system authority and responsibility delegation. A task is usually delegated, while authority and responsibilities are not clearly defined, hence the path is lost that leads to committment in accomplishing goals and tasks.

3.3. Experience: from committment to innovation and competitive advantage

The experience of some companies, presented by Gary Hamel [1], whose management system is based on new paradigms and principles, is a revolutionary innovation in the management system. This innovation is primarily reflected in incentives of committment that results into creativity, enterprising, innovativeness as paths to sustainable competitiveness. Among these companies are the Whole Foods and Google[12]. New business philosophies, new management paradigms in these companies resulted in a maximum committment among their employees.

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[8] The research carried out by the Incentive Research Federation (IRF) [11] 2001 and [12] 2007 have indicated a steady growth of the market and expenditures of the USA companies. According to this source, companies spent around $ 26.9 billion in 2001 and $ 46.08 billion in 2007 for the incentive programmes of prize travels.

[9] "Jeffrey Immelt, the General Electrics chairman and CEO, spends about 40% of his time with the employees; other members of management do that too" [2, p. 165].

[10] In the absence of such an environment chances are that even that small number of committed employees leave the company. The fact is that a majority of people do not leave the company, they leave the manager.

[11] A large number of research in this field, among them Stolovich H. [13], P. R. Ricci and S. M. Holand, [14], [15], based on motivation theories and incentive programmes, are just about the implementation of this method in improving the committment towards achieving business goals.

[12] According to the reviews of the Fortune magazine, they are top companies by a number of criteria, especially as companies in which the employees are highly satisfied.

WHOLE FOODS COMPANY, Austin, Texas, USA
Organic food chain of shops / 194 in total / more than 30,000 employed.
Goals: 1.offer the customer an alternative in the form of total service and organic food via a new type of supermarkets that satisfy customers' needs in new ways; 2. shopping should be less of an obligation, more a cullinary adventure.
Incomes: earns approhimately $ 6 billion annually; the most profitable American retail food industry chain according to the profits rate.
Average annual sales growth rate: 11% , almost three times as the average of the industry itself.
Management system characteristics:
1. ***Radical decentralisation.*** Organizational hierarchy form : teams, team leaders, shop managers. The basic organizational unit is the team, not the shop. Team members command high authority, however, graet responsibilities. Each shop has about eight teams. The team is in charge of all key operational decisions: pricing, orders, employment and promotion. There is one condition: comply with strictly set standards. The team acts as a profit centre based on the employee productivity. Incentives defined in the form of rewards and bonuses. Rather a community than a hierarchy. **2.** ***"No secrets" managerial philosophy.*** Information transparency**.** Everybody has access to information on the progress of other teams and other shops. Information available includes: daily sales in shops, team sales, product-related costs, profit of each shop, earnings and remunerations of all employees. **3.** ***Minimum bureaucratic elements.*** Close realtionship between autonomy and responsibility reduces the need for bureaucratic control that inhibits motivation. **4.** ***Mutual mission.*** Supports the feeling of mutual fate and faith in mutual mission. This is manifested in incentive rewards on the team level, in the financial data transparency, as well as in the limitations of the rewards to the top management. The succes is directly translated into rewards, bonuses, promotions. Profits are a result, not a game. Innovativeness of all employees in sustaining a competitive position.
Management principles: love, community, autonomy, equality, transparency, and mission.

A similar situation is found in the Google company with a specific type of operations. A managemenent model is implemented that is characterised by: negligible hierarchy, a thick network of lateral communication, the policy of awarding special rewards to people and teams that create extraordinary ideas, the approach by focusing of the whole team upon the product development and the company trust that encourages the employee to put the consumer first. This management model is also based on small work units, numerous experiments, a constructive feedback information from colleagues and on the mission of improving the world. Everybody in Google is considered to be of special importance, from the first line of employees to the top management, as they are all committed to innovation.

4. Conclusion

The new circumstances of the 21st century in which the companies operate demand that the management system be innovated. New environment requires permanent innovation to ensure stability, growth, and sustain competitive advantage. On the other hand, however, the today prevailing management system, based on orthodox principles displays its inefficiency. Still a high level of hierarchy and bureaucratic elements of management are reflected in an unfavourable structure of employees from the aspects of motivation and committment. The research and analyses clearly show that a large number of people are demotivated and non-engaged and thus represent a significant potential that is not employed. It is not only the unexploited potential; in the long term, and increasingly in the short term, too, this potential will lead to large losses and problems. The management has to pay due respect to this and implement an innovative approach to use it as its competitive and strategic advantage. The article offers one approach of a new paradigm of management towards committment. In addition to the work milieu with all the necessary modern tools and a favourable qualification and intellectual structure of employees, the new paradigm is based on: 1. a positive and incentive atmos-

phere; 2. innovated incentive rewards programmes in accordance with the employee system of value; 3. exceptional transparency of a continuous information flow; 4. reduced the hierarchy levels; 5. substitution of bureaucratic precision and formality by freedom of expressing enterprising spirit and creativity through a higher level of authority and responsibility.

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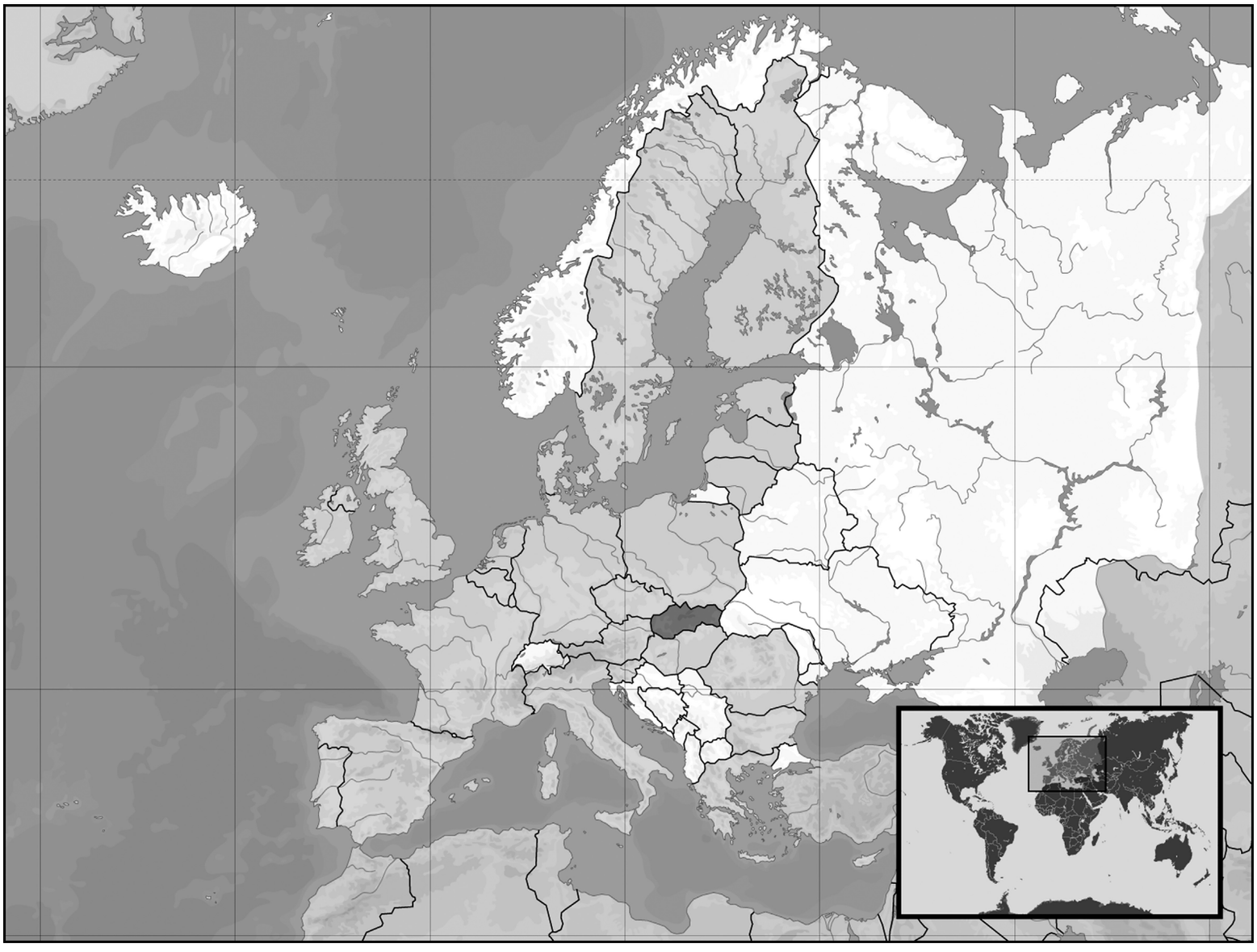


Conceptual Basis of Policy of Competitiveness under the Conditions of the Slovak Economics

UDC: 338.22 (437.6) ; 339.137.2

Jaroslava Hečková[1] – Alexandra Chapčáková[2] – Ivana Butoracová Šindlerová[3]
[1]Fakulta manažmentu Prešovskej univerzity, Slovakia, e-mail: jheckova@yahoo.com;
[2]Faculty of Management University of Presov, Slovakia, e-mail: chapcakova@yahoo.com;
[3]Faculty of Management, University of Presov, Slovakia, e-mail: ivkasindleryova@yahoo.com

The paper is devoted to justification of legitimacy of creation and application of policy of competitiveness in comparison with industrial policy and taking the real key factors of competitiveness, preferences and instruments of competitiveness policy into account it defines the conceptual basis of policy of competitiveness appropriate to the conditions of the Slovak economics.

Introduction

The problems of competitiveness are a multidimensional phenomenon, highlighting the importance of mechanism of application of a product on global market and, at the same time, the necessity of improvement of offer side of economics [4]. If we define the competitiveness as the ability of economics to export goods and services with the aim to ensure external economic balance at concurrent ensuring of continuous growth of per capita income, sufficient rate of utilization of production factors while respecting social and environmental aims, or the ability of the country (or undertakings operating within) to produce relatively more wealth than competitors on world markets, always the same conclusion will result from these definitions [7]. There is a need to assign a decisive task not only to business undertaking level in generation of competitive advantage [2], but also to active macro policy in creation of macro-environment stimulating an increase of effectiveness of relevant real sources of competitiveness.

The economic policy in economically advanced economics focuses predominantly to stabilization of macroeconomic development as one from necessary conditions of growth of competitiveness of economics [8]. The other sphere of its influence is common liberalization, which determines especially relative reduction of costs as one of the preferences of competitiveness under the conditions of standard acting market mechanism. The concept of policy of competitiveness in these economics accents the increasing of efficiency of offer side of economics under new conditions of globalization [9] and usefulness of meaningful visions about efficient utilization of nationally oriented sources [5].

The aim of the paper is to justify the legitimacy of creation and application of policy of competitiveness with emphasis on theoretical definition of factors of competitiveness, preferences and instrument provision of policy of competitiveness and based on the given knowledge to define the conceptual basis of policy of competitiveness for conditions in the Slovak economics. This paper is processed within the framework of project VEGA No. 1/0667/08 „Funding and support of innovation development of small- and medium-sized companies in SR and in selected countries of the EU“.

1. Legitimacy of policy of competitiveness

Transforming economics of Central and East Europe have worked out a concept of industrial policy in the effort to overcome low competitiveness in comparison with advanced countries [7]. The concept of industrial policy elaborated in the period of time of decline of conversion of many industrial branches, was not only new concept of policy of competitiveness, but it was significantly specified policy type. The industrial policy in transforming economics was drawn on branch or business undertaking principle of determination of structural modifications on one hand, but on the other hand, as a separated part of economic policy it was insufficiently connected with currency and financial policy. If the functions of economic policy are taken by various special interest group representing usually short-term partial aims of representatives of the major industrial groups, the industrial policy could not even be the real component part of economic policy.

The industrial policy interpreted in this way, elaborated as a branch type of specific policies may interfere with the principles of market system acting along with broadly operating policies and thus result in non-optimal allocation of sources from the long-term point of view [8]. On the other hand, an unbalance of economic policy in connection with increase of competitiveness of economics is shown in its orientation only to creation of stable macroeconomic development as one of the conditions of competitiveness of economics without more broadly applied ambition to stimulate qualitative parameters of economic development and improvement of competitiveness. It results from abovementioned that the concept of policy of competitiveness (diagram 1) is more adequate at ensuring of the increase of competitiveness of economics in comparison with the concept of industrial policy.

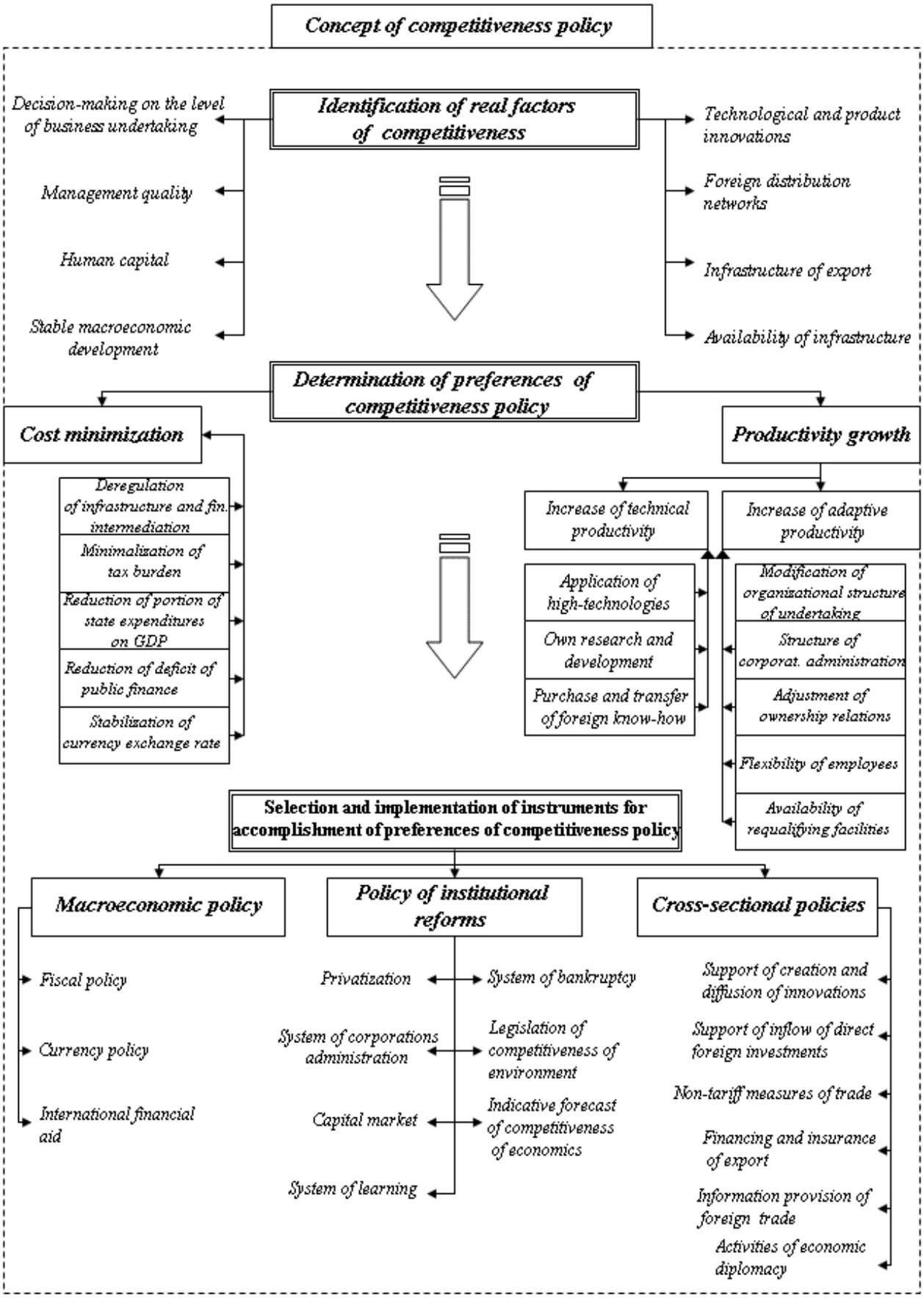


Diagram 1. A draft of policy of competitiveness *Source:* Own diagram

Total draft of policy of competitiveness has to identify, analyze and indicate possible or required development of key factors and main indicators of competitiveness in the economy as a whole and at the same time it has to define a setting of relevant sources of policy of competitiveness in mutual interconnection.

2. Policy of competitiveness under the conditions of the Slovak economics

Improvement of economical and political approach for support of competitiveness of the Slovak economics requires broader understanding of the problem of support of competitiveness improvement. It is needed to understand the problems of central government support of competitiveness as a support of total increase of economics [1] and based on this, it is necessary to interconnect particular policies within macroeconomic policies, as well as within cross-sectional (specific) policies from the position of preferences of competitiveness improvement. Anyway, an accomplishment through branch approach does not enable needed interaction of aggregate and relevant cross-sectional and structural views on improvement of competitiveness of economics and its improvement as a whole, especially in the case when the result of interaction is limited to the balance of state budget on the level of relevant chapters. By this reason, the National strategic reference framework of SR as a draft document for policy strategy of competitiveness of economics of SR has been worked out, approved by the Government of the Slovak Republic on December 21, 2006 and officially adopted by the European Commission on August 17, 2007, which document enables the interconnection of the given policies and instruments including a creation of balanced economic legislation (in accordance with the EU legislation) on one hand, and on the other hand, it represents the basic strategic document of SR for utilization of means from funds of the European Union in 2007-2013.

The problems of competitiveness of economics has all-economics nature, while an unsubstitutable place of macro policies included within results from the fact that it is possible to express the comparable level of competitiveness of the given economics in an aggregate by the difference of price levels or by Exchange Rate Deviation Index (ERDI). It applies in general that the increase of price level and the reduction of its difference against advanced economics causes the improvement of economic level of the country what results in ERDI decrease and economics competitiveness improvement at the same time. The increase of price level for the interest of its approaching to the price level of advanced countries is usually connected with inflation increase the control of which is the domain of currency policy. The approaching of price levels is usually carried out by real appreciation of currency, i.e. faster increase of inflation than devaluation rate. However, the problem consists in the fact that really appreciation of currency may not correspond in general with really improved economics performance. The currency may be overestimated due to various non-economic and speculative factors, what will cause that real effective currency exchange rate are not reliable indicator for currency policy. It results from the abovementioned that it is needed to monitor continuously the development of real effective exchange rate and confront it with real increase of labour productivity, reported based on indicators characterizing the level of technologies, product differentiation, development of exchange relations, and so on.

The currency should be retained in a tendency of real appreciation in the case if this appreciation corresponds with real growth of labour productivity. Devaluation of currency does not stimulate entrepreneurial sphere to a growth of quality competitiveness due to expectation of occurrence of a trade gap, rather on the contrary, it causes to slowing-down of reforms, innovation processes and maintaining on policy of low wages.

From the point of view of improvement of competitiveness of economics, the expenditures of state budget and tax burden of entrepreneurial subjects would be gradually decreasing within the framework of fiscal policy. The maintaining of a deficit of the state budget on relatively low level is of the same importance, what subsequently results in lower level of interest rates and expanding space for provision of loans to entrepreneurial sector for loan portfolios of commercial banks.

An application of specific instruments at support of improvement of competitiveness must have cross-sectional nature, but only in accordance with market conformity it is needed the selection criteria of support of certain segments of economics to have also a horizontal nature. Proceeding from the production priority contributing to quality aspects of economic growth, and after all to total gain of economics, it would be appropriate to concentrate to such segments of economics, which have relatively high dynamics of trading on world markets (more than 5% annually), which are characteristic by high level of processing (higher rate of value added, relatively higher price per kilogram and export prices) and which would contribute significantly to improvement of the balance of trade by replacement of import and increase of export.

The key place within specific policies of support of competitiveness improvement would be taken by policy of support of creation, diffusion and subsequent implementation of technologies and innovations, so called *technological and innovation policy* [3]. In contrast to industrial policy, the technological and innovation poli-

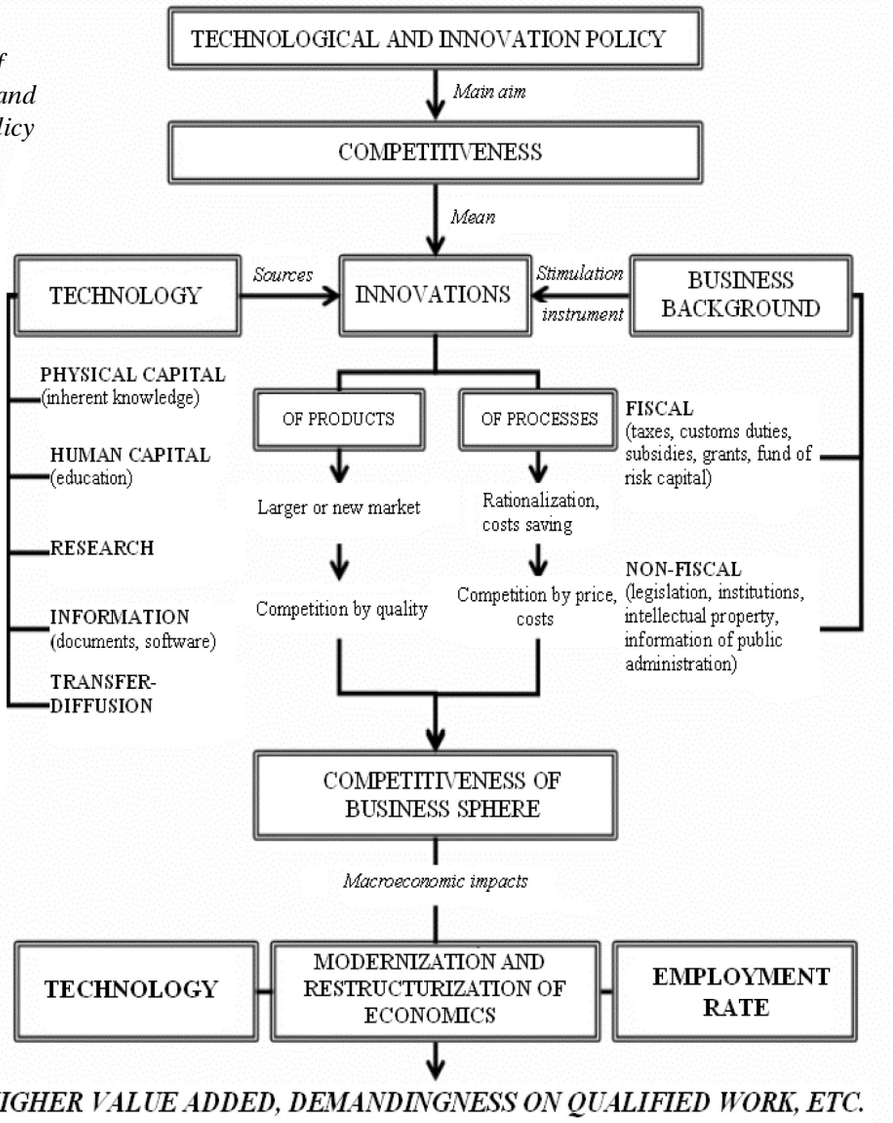
cy does not concentrate on support of economically more favourable structure of branches, or departments, but on quality and products and services competitiveness by innovations. Under the influence of innovation, especially radical ones, a whole series of new branches (information technologies, biotechnologies, nanotechnologies and so on) is establishing. The branches which will go beyond traditional branches in their competitiveness are taking the growth potential and become the significant factors of structural changes and modernization of economics. The existence of technological and innovation policy is more pressing as the competition presses on international market become more intense, a period of time of innovation cycles becomes shorter and demands on timeliness of innovations become higher.

Technological and innovation policy represents now the comprehensive system taking long-term of society and impacts on its future development into account, as well as the systematic analysis and development assessment. It includes the measures supporting *the offer side,* i.e. penetration of innovation into market, as well as *development of pro-innovation business environment.*

Efficiency of technological and innovation policy as a mean of improvement of economics competitiveness depends on *sources,* representing knowledge and research potential, including the channels of transfer and diffusion of technological progress on one hand, and on *instruments* stimulating the willingness of business sphere to undergo increased risk connected with innovation activities, on the other hand. Also balance in orientation of innovations to product- and process ones is of the same importance, what determines the way of achievement of competitive advantage (by qualitatively new utility parameters of products or by rationalization by lower production costs influencing the price of products).

Diagram 2 shows the structure of technological and innovation policy.

Diagram 2. Structure of technological and innovation policy



Source: [6, p. 175]

Under the conditions of the Slovak economics, similarly as for other transforming economics, technological and innovation policy is not accomplished thoroughly by then. It is necessary to identify directions of industrial research and development by a program, which could be used in the process of product differentiation, within a common tendency of support of creation, diffusion and implementation of technologies and innovations (enforcing in economically advanced economics). According to our opinion, the program contents of industrial research and development would be focused to three main areas [4], [8] as it follows:

1) Research and development focused to achievement of high value added

The aim of the given group of industrial research and development will be to contribute to the increase of value added of industrial production in SR. It is desirable to utilize the intensifying factors including research and development in the long-term horizon, so that the portion of value added on gross production in processing industry to increase by 2020 to the level of 35%.

2) Research and development ensuring standard innovation development

The aim of the given group of industrial research and development will be to ensure an increase of competitiveness of domestic production within opened internal market of the European Union. In the long-term horizon, it would be reflected by an increase of coverage of domestic consumption by domestic production, especially in the furniture industry, paper industry, pharmaceutical industry, footwear industry and textile industry by 15-20%, what means that the level of domestic coverage in light industry (including pharmacy) would attain 60-65%. At the same time, it is desirable to increase competitiveness of standard commodities of processing industry by innovation process, especially of machinery industry, electrotechnical industry and chemical industry so that this increase of value could be shown in long-term horizon up to the adjustment of foreign-trade balance of Slovakia.

3) Research and development supporting global problems handling

The aim of this given group of industrial research and development shall be to join to handling of global problems, especially in the sphere of protection of living environment, health of population and ensuring of fulfillment of indicators of sustainable development.

In the long-term horizon, it means to increase total expenditures to research and development gradually, so that we could attain the level of economically comparable countries of the EU. It is expected that the indicator of total expenditures for research and development could be on the level of 1,5% GDP by 2020. However, it requires to increase dynamically the portion of expenditures for research and development especially from the part of entrepreneurial sphere.

The indivisible part of technological and innovation policy is a stimulation of development of entrepreneurial environment. The entrepreneurial environment creating the framework of financial, tax, legal and other control instruments influences the side of offer as well as the side of demand. It principally influences the behaviour of entrepreneurs, their willingness to undergo needed risk and thus at the same time determines the space of occasions for utilization of benefits of innovation activities.

Main instruments of creation of favourable entrepreneurial environment include tax measures, patent protection, and legal regulations facilitating the execution of all the transactions connected with entrepreneurial activity. Innovation business making is, based on experiences, limited mostly by inappropriate regulations, directives and insufficient flexibility of legislation. It prevents to use new possibilities of scientific and technical progress, especially in the first phases of development of innovation, when the uncertainty of penetration into market is the highest.

Creation of appropriate business environment requires the application of governmental coordination function. It results from abovementioned that technological and innovation policy and support of scientfic and technical progress is effective only if it is based on consensus of government, commercial sphere, research and educational institutions, independent experts and representatives of employees organizations.

The important motivation factor for business sphere in the area of fulfillment of aims of technological and innovation policy is to be an application of *Operational program Competitiveness and economic growth*[1], which has earmarked EUR 772 millions for this area.

[1] Operational program Competitiveness and economic growth (OP C&EG) is based on the National strategical reference framework of SR (NSRF of SR) for 2007-2013, including all basic policies of the European Community for economic, social and territorial cohesion (Strategic general principles of Community for cohesion; Strategy of competitiveness of Slovakia up to 2010, Lisbon' s strategy for SR and connected set of „integrated principles" for 2005 – 2008 approved by the Commission in the area of support of economic growth and labour occasions in Europe; industrial and energy policy of the EU as well as the strategy of the EU for provision of sustainable development). The priority lines of OP C&ED with focus to support of innovations and new technologies are to fulfill long-term vision of economic and strategic development of the country, which NSRF defines as General convergency of economics of SR to the average of the EU 15 by sustainable development. The strategy of fulfillment of outlined vision results from this, defined as Considerable improvement of competitiveness and performance of regions and Slovak economics while respecting sustainable development up to 2013. OP C&ED works out the specific priority of NSRF „Support of competitiveness of business undertakings and services especially through innovations" through priority line 1 „Innovation and growth of competitiveness", priority line 2 „Power engineering" and priority line 3 „Tourism", which are classified within NSRF hierarchically as a specific priority under the strategic priority 2. „Knowledge economics".

In our opinion, developing of technological ability is needed to understand as an institutional process of learning, which must be undergone by entrepreneurial subjects in order to have an overview about the offer of technologies, be able to assess it, evaluate, select, use, adjust, improve and develop it independently. This process would lead gradually to creation of national innovation system, what represents, in principle, long-term goal of strategy of technological catching up.

The support of this process requires, of course, a whole complex of measures the frame characteristic of which is included in the draft strategy of technological catching up. The key importance belongs especially to development of education, research and development as well as knowledge diffusion. In our opinion, it is possible to implement the program of support of implementation of strategy, technological catching up by the following specific measures given in Table 1.

Table 1: Draft measures and forms of execution of strategy of technological catching up.

Measures	**Execution form**
Measures for creation of market-conforming incentives	Deregulation and liberalization of market environment
	Application of selection process of entry into market and exiting it
Measures in the area of tax policy	Application of transparency of tax system
	Option of deduction of expenses for research from legal corporate income tax basis
	Selective application of tax allowances of PZI inflow with emphasis on support of long-term oriented investments generating additional investments
Measures in the area of improvement of material infrastructure	Completion of transport, logistic and telecommunication network
Measures in the area of technological infrastructure	Completion of technologic networks
	Support of technologic institutions, state research and development capacities
	Establishing of technological centers
	Creation of information channels
	Support of international exchange of scientific knowledge
	Development of customer electronic commercial modules for MSP
Measures in the area of development of human capital	Support of business-making and innovation within the framework of education and trainings system
	Continuous improvement of quality of common and university education
	Support of university education from the point of view of creation of a basis of research activities
	Interconnection of qualification basis and activities of state education system with the needs of private sector
Measures in the area of financial infrastructure	System recovery of financial flows in the entire economics with direct connection to legislation
	Availability of short-term loans for financing of contracted production and investment loands for implementation of investment projects
	Selective subsidizing of loans at possibly successful technologically-oriented investments
	Establishment of technological loan funds
	Preparation of implementation of programs of financial support of technologically oriented MSP

Source: [3, p. 94]

Based on complexity of draft measures, it results that implementing innovation of approach to conceptual basis of technological and innovation policy would be a multidimensional process. In this relation, it is necessary to reassess the role of state based on really applied proposals in the most successful economics in the European Union with a special attention paid to pro-innovation adaptation of state functions under the conditions of technological manner of production, exchange and information communication.

2. Conclusion

The conceptual basis of competitiveness policy is oriented firstly to harmonization of competitive background of the Slovak economics with conditions for support of compatibility on the European market.

Long-term absence of effective policy of competitiveness combined with broader transformation problems has caused considerable and increasingly dangerous gap in structural and innovation adaptation of the Slovak economics and thus a lagging of its competitiveness. This trend can be reversible only under the assumption that determining factors of modern development such as science and research, learning and creative productivity of human factor, as well as effective infrastructure for diffusion of inventions and innovations will move from a periphery into the center of attention and become a centre of policy of competitiveness. Its specific aims, content and instrumentary have, at the same time, be responsive sensitively and soberly to real power, strategy and specific activities of determining subjects in the process of globalization, especially of transnational corporations. In other words, globalization and integration dimensions are to be incorporated into conceptual basis of policy of competitiveness of SR, appropriate to conditions of the 21st century. Thus, the following can be considered to be its determinants:

- continuous developing and expanding of investment background of economics based on purposeful combination of transfer of knowledge from abroad and universally supported development of science, research and development in Slovakia,
- permanent development of learning of population reflecting the dynamic needs of new technological manner of production, exchange and information communication,
- systematic building of technological and information infrastructure enabling and supporting the diffusion of new knowledge and innovations from domestic and foreign sources,
- implementation of economic policy which supports the creation of necessary space for continuous enhancement of economics structure by new elements through its instruments based on implementation of innovations and establishing of new, innovations-oriented companies,
- systematic survey of „possible futures“ in the form of visions, prognoses, strategies, plans and programs enabling to identify possible trends of varying reality in due time and to response to them in a certain advance,
- application of principle of participation based in which all the relevant structures and interest groups – representatives of science and research, business sphere, employees, regional self-government participate along with government – as necessary assumption of objectification of development goals, as well as of harmonization of interests and motivation of the subjects participating in their implementation.

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Data Envelopment Analysis and its Application in Education

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Violeta Cvetkoska[1]

[1]*Faculty of Economics - Skopje, vcvetkoska@eccf.ukim.edu.mk*

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Data Envelopment Analysis (DEA) is a relatively new nonparametric approach for evaluating the performance of complex entities called Decision Making Units (DMUs) which convert multiple inputs into multiple outputs. In a relatively short period of time Data Envelopment Analysis (DEA) has grown into a powerful, quantitative, analytical tool for measuring efficiency of decision making units. DEA has been successfully applied in many different fields in worldwide. This paper provides introduction to DEA and describes the application of Data Envelopment Analysis in education.

1. Introduction

Data Envelopment Analysis (DEA) is a relatively new "data oriented" mathematical approach for evaluating the performance of a set of peer entities called Decision Making Units (DMUs) which convert multiple inputs into multiple outputs. Since DEA was first introduced in 1978, researches in a number of fields have in a short period of time recognized that DEA is an excellent and easily used methodology for modeling operational processes for performance evaluations. In [31] is given survey and analysis of the 30 years of scholarly literature in DEA up to the year 2007.

This paper is in 8 parts of which this is the first. Data Envelopment Analysis (DEA) as a tool for determining the relative efficiency is presented in Section 2. The history of DEA has been mentioned briefly in Section 3. DEA methodology is described in Section 4. Strenghts and limitations of DEA are presented in Section 5. Literature search for application of DEA in education is overviewed in Section 6, while conclusions are given in Section 6. Bbibliography citations are presented in the final section.

2. Efficiency and data envelopment analysis

Fried, H. O., Lovell, C.A.K., and Schmidt, S.S., in [34] explain that the interest in measuring efficiency has two reasons. First of all, they are success indicators, performance measures, by which production units are evaluated. Second, only by measuring efficiency and productivity, and separating their effects from the effects of the production environment can we explore hypotheses concerning the sources of efficiency or productivity differentials. Identification of sources is essential to the institution of public and private policies designed to improve performance.

Productivity efficiency has two components. The purely technical, or physical, component refers to the ability to avoid waste by producing as much output as input usage allows, or by using as little input as output production allows. Thus the analysis of technical efficiency can have an output augmenting orientation or an input-conserving orientation. The allocative, or price component refers to the ability to combine inputs and outputs in optimal proportions in light of prevailling prices.

Koopmans in [48, p.60] provided a formal definition of technical efficiency: a producer is technically efficient if an increase in any output requires a reduction in at least one other output or an increase in at least one input, and if reduction in any input requires an increase in at least one other input or a reductionin at least one output. Thus a technically inefficient producer could produce the same outputs with less of at least one input, or could use the same inputs to produce more of at least one output.

Debreu in [29] and Farrell in [33] introduced a measure of technical efficienncy. Their measure is defined as one minus the maximum equiproportionate reduction in all inputs that still allows continued production of given outputs. A score of unity indicates technical efficiency because no equiproportionate input reduction is feasible, and a score less than unity indicates the severity of technical inefficiency.

Following work by Dantzig [27] and Farrell [33], Charnes, Cooper, and Rhodes [16] developed mathematical programming technique, Data Envelopment Analysis (DEA).

DEA is a non-parametric linear programming technique that computes a comparative ratio of outputs to inputs for each unit, which is reported as the relative efficiency score. The efficiency score is usually expressed as either a number between 0-1 or 0-100%.

100% efficiency is attained for any Decision Making Unit (DMU) only when:

(a) None of its outputs can be increased without either
- increasing one or more of its inputs or
- decreasing some of its other outputs

(b) None of its inputs can be decreased without either
- Decreasing some of its outputs or
- Increasing some of its other inputs.

A decision-making unit (DMU) with a score less than 100% is deemed inefficient relative to other units.

Thanassoulis, E., in [63] points out that DEA is one of the methods of performance measurement which support type of information such as:
- identification of good operating practices for dissemination;
- most productive operating scale sizes;
- the scope for efficiency savings in resource use and/or for output augmentation;
- most suitable role model operating units an inefficient unit may emulate to improve its performance;
- the marginal rates of substitution between the factors of production and;
- Productivity change over time by each operating unit and by the most efficient of the operating units at each point in time.

3. Data envelopment analysis

History

The term 'Decision Making Unit' (DMU) was used for the first time in the CCR model proposed in Charnes, Cooper and Rhodes [16]. The term DEA (Data Envelopment Analysis) was introduced in their report [18], Rhodes [58] and appeared in Charnes, Cooper and Rhodes' subsequent paper [19].

In their originating study, Charnes, Cooper and Rhodes [16] described DEA as a 'mathematical programming model applied to observational data [that] provides a new way of obtaining empirical estimates of relations – such as the production functions and/or efficient production possibility surfaces – that are cornerstones of modern economics.'

DEA originated from efforts to evaluate results from an early 1970' project called "Program Follow Through" – a huge attempt by the U.S. Office (now Department) of Education to apply principles from the statistical design to experiments to a set of matched schools in a nationwide study. The purpose of the study was to evaluate educational programs designed to aid disadvantaged students in U.S. public schools. The data base was sufficiently large that issues of degrees of freedom, etc., were not a serious problem despite the numerous input and output variables used in the study. Nevertheless, unsatisfactory and even absurd results were secured from all of the statistical-econometric approaches that were tried. While trying to respond to this situation, Rhodes called Cooper's attention to Farrell's seminal article, [33]. Charnes, Cooper and Rhodes extended Farrell's work and succeeded in establishing DEA as a basis for efficiency analysis. Details of the project are described in Charnes, Cooper and Rhodes [20].

A brief history of DEA can be found in [21].

4. DEA methodology

Data Envelopment Analysis estimates a piece-wise linear production function relative to which the efficiency of each firm or decision-making unit (DMU) can be measured. The simplest variant of DEA is a constant returns to scale model in which n decision making units produce s distinct output types using m distinct inputs. The quantities of outputs and inputs which the kth decision-making unit produces and consumes respectively are denoted by Y_{rk}, $r=1,\ldots,s$ and X_{ik}, $i=1,\ldots,m$. The kth decision making unit then chooses its vector of input weights, v_{ik}, $i=1,\ldots,m$, and output weights, u_{rk}, $r=1,\ldots,s$, with the aim of maximizing its weighted sum of outputs subject to a number of constraints. These are that: (i) the chosen weights are such that, when applied to the output and input vectors of any decision-making unit, the ratio of weighted output to weighted input should not exceed unity, (ii), the weighted sum of inputs should be non-negative, and (iv) the weight attached to each input should be non-negative. Now this is a fairly simple linear programming problem. The complete specification of a DEA involves the simultaneous solution of n such programmes – one for each decision – making unit.

The above arguments may be represented by a suite of linear programming problems. Formally, for each k,

$$\max h_k = \sum_{r=1}^{s} u_{rk} Y_{rk} \tag{1}$$

subject to,

$$\sum_{r=1}^{s} u_{rk} Y_{rj} - \sum_{i=1}^{m} v_{ik} X_{ij} \le 0, \; j=1,\ldots,n \tag{2}$$

$$\sum_{i=1}^{m} v_{ik} X_{ik} = 1 \tag{3}$$

$$u_{rk} \ge 0, \; r=1,\ldots,s \tag{4}$$

$$v_{rk} \ge 0, \; i=1,\ldots,m \tag{5}$$

The optimal value of h_k is the efficiency score of the kth decision –making unit. It must lie between zero and one; if h_k=1, then k i tecnically efficient and lies on the efficiency frontier. As specified above, the DEA problem is one of output maximisation. The corresponding input minimisation problem can be constructed by analogous means.

In [44] is given a simple example of five universities (A, B, C, D, E) producing two outputs, y_1 (for example, the number of graduates achieving 'good' degrees) and y_2 (for example, the number of graduates going into employment) using the input x (for example, the number of undergraduates). Fig. 1 plots the ratio of output y_1 to x against the ratio of output y_2 to x, and the piecewise linear boundary which joins up universities A, B, C and D is the production frontier. All DMUs on the frontier are efficient since none can produce more of both outputs (for a given input level) than any other unit on the frontier. In contrast, university E, which lies inside the frontier, is inefficient, and the ratio OE/OE' measures university E's efficiency relative to the other DMUs in the data set.

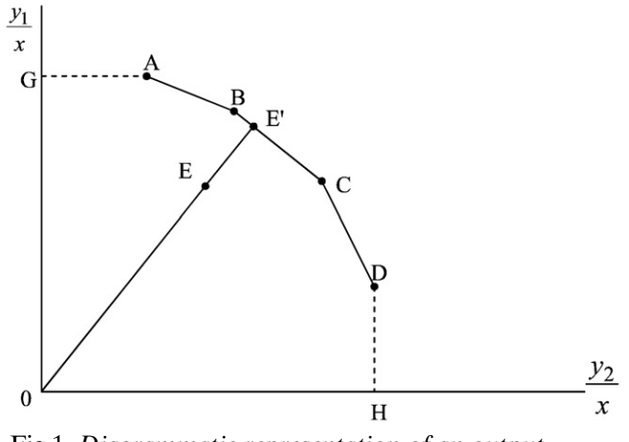

Fig.1. *Diagrammatic representation of an output-oriented DEA*

The CRS assumption can be relaxed and the DEA model can be easily modified to incorporate variable returns to scale (VRS), see Banker, Charnes, & Cooper [7]. While choice of orientation does not affect efficiencies under CRS, it does under the assumption of VRS, see Coelli, Rao, & Battese [24], although it has been shown only to have a slight influence in many cases, see Coelli & Perelman [23].

Basic DEA models and extensions to DEA models can be found in [15], [22], [25], [26].

DEA was initially been used to investigate the relative efficiency of not-for-profit organizations, only to quickly spread to profit-making organizations. DEA has been successfully applied in such diverse settings as schools, hospitals, courts, the US Air Force, rate departments and banks. Charnes et al. [15] have compiled an extensive discussion of efficiency models across a variety of industries.

5. Strenghts and limitations of DEA

A few of the characteristics that make DEA a powerful tool are:

- It is based on a distance function approach and hence can handle multiple outputs and multiple inputs;
- It doesn't require an assumption of a functional form relating inputs to outputs.
- DMUs are directly compared against a peer or combination of peers.
- Inputs and outputs can have very different units. For example X1 could be in units of lives saved and X2 could be in units of dollars without requiring an a priori trade off between the two.

The same characteristics that make DEA a powerful tool can also create problems. An analyst should keep these limitations in mind when choosing whether or not to use DEA.

- Since DEA is an extreme point technique, noise (even symmetrical noise with zero mean) such as measurement error can cause significant problems.
- DEA is a good at estimating "relative" efficiency of a DMU but it converges very slowly to "absolute" efficiency. In other words, it can tell you how well you are doing compared to your peers but not compared to e "theoretical maximum".
- Since DEA is a nonparametric technique, statistical hypothesis tests are difficult and are the focus of ongoing research.
- Since a standard formulation of DEA creates a separate linear program for each DMU, large problems can be computationally intensive.

6. Applications of DEA in education – literature search

Economists typically view educational outcomes as a function of a variety of school inputs, including school expenditures, pupil/teacher ratios, teacher experience, the prior attainment of pupils, peer group pressures and family background, see Hanushek [38, 39]. There has been limited success in finding a causal link between school inputs and educational outcomes. Early work on the education production function concluded that 'teachers and schools differ dramatically in their effectiveness' but that there is 'no strong or systematic relationship between school expenditures and student performance', see Hanushek [39].

For application of DEA in the context of the evaluation of education providers in the primary and secondary sectors see Bessent and Bessent [11], Bessent et al. [10], Bradley et al. [12], Chalos and Cherian [14], Davutyan et al. [28], Fare et al. [32], Ganley and Cubbin [36], Jesson et al. [40], Lovell et al. [50], Kirjavainen and Loikkanen [46], Mancebon and Mar Molinero [52], Mayston and Jesson [53], Norman and Stoker [55], Ray [57], Smith and Mayston [61] and Thanassoulis and Dunstan [62].

Steve Bradley, Geraint Johnes and Jim Millington in [12] calculate the technical efficiencies, based upon multiple outputs – school exam performance and attendance rates – of all secondary schools in England over the period 1993-1998. They estimate models to examine the determinants of efficiency in a particular year, and the determinants of the change in efficiency over the period. Their results suggest that the greater the degree of competition between schools the more efficient they are. The strength of the effect has also increased over time which is consistent with the evolution of the quasi-market in secondary education. Competition is also found to be an important determinant of the change in efficiency over time.

Nurhan Davutyan, Mert Demir and Sezgin Polat in [28] used Data Envelopment Analysis and econometric methods to evaluate the system's efficiency. They identify scale diseconomies and relate them to underlying structural characteristics of the system. Selected suggestions on improving performance are offered. The roles of heterogeneity and centralization are also highlighted. Heterogeneity is modeled as an undesirable measure. The linkage between indicators of centralization and scale diseconomies was found to be statistically significant. The authors believe this to be the first study that investigates the impact of systemic characteristics such as heterogeneity and centralized structure on educational outcomes for Turkey.

The higher education has characteristics which make it difficult to measure efficiency: it is non-profit making; there is an absence of output and input prices; and higher education institutions (HEIs) produce multiple outputs from multiple inputs.

Studies which examine the efficiency of the higher education sectors of various countries such as the UK, the USA, Canada, Finland, Israel, Australia and China have fallen into two main groups:

1. those which have examined the efficiency of a particular department, programme or activity, see (Beasley [8], [9]; Coelli et al., [24]; Haksever & Muragishi [37]; Johnes, [43]; Johnes & Johnes [41], [42]; Korhonen, Tainio & Wallenius [49]; Madden, Savage & Kemp [51]; Tomkins & Green [66], and
2. those which have examined the performance of the entire HEI, see (Ahn et al., [2]; Ahn & Seiford [1]; Athanassopoulos & Shale [5]; Avkiran [6]; Breu & Raab [13]; El Mahgary & Lahdelma [30]; Johnes [44]; Ng & Li [54]).

Ahn and Seiford in [1] used DEA to determine the relative efficiency of 153 doctoral-degree granting institutions of higher learning (IHLs). Of these, 104 were public and 49 were private. The purpose of the study was to determine the effect of different sets of output variables on the relative efficiencies of public and private institutions. Public IHLs are often funded based on an enrollment-related output measure. For this reason, Ahn and Seiford predicted that public IHLs would be more efficient when enrollment-related outputs were considered and private IHLs would be more efficient when less closely monitored outputs were considered. This hypothesis was tested using multiple variable sets. In one trial, faculty salaries, physical investment, and overhead expenses were used as input variables. Undergraduate full-time equivalent students (FTEs) and graduate FTEs were used as output variables. Using these enrollment-related output variables, public IHLs were found to be more efficient than private IHLs. A second trial used faculty salaries, physical investment, overhead expenses, undergraduate FTEs and graduate FTEs as inputs. Undergraduate degrees, graduate degrees, and grants were used as output variables. Using these less closely monitored output variables, private universities were found to be more efficient.

The purpose of the paper [44] is to examine the possibility of measuring efficiency in the context of higher education. The paper begins by exploring the advantages and drawbacks of the various methods for measuring efficiency in the higher education context. The ease with which data envelopment analysis (DEA) can handle multiple inputs and multiple outputs makes it an attractive choice of technique for measuring the efficiency of higher education institutions (HEIs), yet its drawbacks cannot be ignored. Thus, a number of extensions to the methodology, designed to overcome some of the disadvantages, are presented. The paper ends with an application of DEA to a data set of more than 100 HEIs in England using data for the year 2000/01. Technical and scale efficiency in the English higher education sector appear to be high on average. The Pastor, Ruiz, and Sirvent [56] test for comparing nested DEA models is useful in reducing the full model to a smaller 'significant' set of inputs and outputs. Thus, the quantity and quality of undergraduates, the quantity of postgraduates, expenditure on administration, and the value of interest payments and depreciation are significant inputs to, and the quantity and quality of undergraduate degrees, the quantity of postgraduate degrees

and research are significant outputs in the English higher education production process. The possibility of differences in the production frontier (and hence the distribution of efficiencies) of three distinct groups of HEIs is explored using a test proposed by Charnes, Cooper, and Rhodes [17] but no significant differences are found. Bootstrapping procedures, however, suggest that differences between the most and least efficient English HEIs are significant.

Little work has been done on measuring the efficiency in producing any of the outputs of higher education institutions in China. For recent studies see (Ng & Li, [54]; Johnes and Yu in [45]).

Ng and Li in [54] used DEA in an attempt to examine the effectiveness of the education reforms of the mid-1980s in China by focusing on the research performance of 84 key Chinese HEIs from 1993 to 1995. Using research staff and funding as inputs, and publications data as outputs, the authors find mean research efficiency in the Chinese higher education sector to be around 76–80% over the three year period. Variations in efficiency levels between the three geographical regions of China (coastal, central and western) are also found, but these results are mixed: the HEIs in the central zone perform best, on average, in 1993 and 1995, but it is the western zone which has the highest mean efficiency in 1994.

Two alternative approaches have been taken in a small number of empirical studies:

1. to evaluate the performance of all departments within one university, see (Arcelus & Coleman [4]; Friedman & Sinuany-Stern [35], Sinuany-Stern et. al. [60]), and
2. to analyse the performance of higher education sectors across states or countries, see (Breu & Rabb [13]; Kocher, Luptácik & Sutter [47]).

The validity of these approaches seems particularly questionable on the grounds that the DMUs in each case are clearly not a homogenous set of producing units.

Sinuany-Stern et al. in [60] used DEA to determine the relative efficiency of 21 departments at Ben-Gurion University. Operational expenditures and faculty salaries were used as inputs. Grant money, number of publications, number of graduate students and number of credit hours offered were used as outputs. Fourteen of the departments were found to be inefficient. Sinuany-Stern et al. in this paper also tested the effects of variations in inputs and outputs on efficiency scores. In one trial, one output was deleted from the original model. The output was chosen for deletion because no departments were relatively inefficient in that output. In this trial, two additional departments became inefficient. The DEA model was run again with the two inputs combined. Again, two additional departments became inefficient.

Technical efficiency scores in the department level analyses tend to be lower, on average, than those computed in HEI level studies. Mean technical efficiencies computed from department level studies vary as follows: 50 to 60% for UK economics departments, see Johnes & Johnes [41], [42]; around 70% in UK departments of chemistry and physics, see Beasley [8]; 65 to 82% in Australian departments of economics, see Madden et al., [51]; 72% in economics research units in Finland, see Korhonen et al., [49]; and 82 to 87% in the administration sector of Australian universities, see Coelli et al., [24]. Evidence from HEI level studies suggests that mean technical efficiency varies from around 70 to 80%, see Ahn & Seiford [1], Ng & Li [54], to well over 90%, see Ahn et al., [2]; Athanassopoulos & Shale, [5]; Avkiran, [6]; Breu & Raab, [13]; Johnes [43], [44]. The single cross country study suggests, not surprisingly given the disparate nature of the DMUs, that mean technical efficiency is low (23% or 37% depending on whether CRS or VRS are assumed).

University research and its transfer to industry has been a topic of interest in the management of technology literature over decades. Universities provide education as well as innovations resulting from their research. Several researches focused on efficiency of university research transfer, see Anderson, T.R., Daim, T. U., Lavoie, F. F., [3], Siegel and Phan [59], Thursby and Kemp [64], Thursby and Thursby [65].

A data envelopment analysis approach in [3] is used as a productivity evaluation tool applied to university technology transfer. The methodology included weight restrictions providing a more comprehensive metric. The results include an examination of efficiency targets for specific universities as well as peer count of inefficient universities. Evidence of significant efficiency in university technology transfer is found in many leading universities. An examination of differences between public versus private universities and those with medical schools and those without indicated that universities with medical schools are less efficient than those without.

Applications of DEA in the context of education are surveyed in Table 1.

Author (s) (Date)	Country/ Region	Sample	Method	Inputs	Outputs
Anderson et al. (2007)	USA	54 Universities	DEA and regression analysis	Total Regression Spending	• Licensing Income Licensing and Options Executed • Startup Companies • Patents Filed • Patents Issued
Bessent et al. (1982)	Houston	Schools	DEA	• Mean ITBS score at 2nd grade • Mean ITBS score at 5th grade • %Non-minority • %Playing full lunch price • Attendance rate • Number of professionals employed per pupil • Federal expenditure per pupil • Number of special programmes in school • %Teachers with masters degree • Teachers >3 years experience • Teacher attendance rate	• Mean ITBS score at 3rd grade • Mean ITBS score at 6th grade
Bredley et al. (2001)	England	2657 secondary schools	DEA and regression analysis	• The proportion of pupils ineligible for free school meals • The proportion of qualified teachers	• The proportion of 5+GCSEs grades A*-C (EXAM) • Attendance rate
Chalos and Cherian (1995)	Illinois	School districts in Illinois	DEA	• %Pupils not low income • %Pupils non-minority • Pupil attendance rate • Operating expenditure per pupil • %Teachers with masters degree	• Mean mathematics IGAP score level 6 • Mean mathematics IGAP score level 8 • Mean verbal IGAP score level 6 • Mean verbal IGAP score level 8
Davutyan et al. (2010)	Turkey	Turkish secondary education in 81 Turkish provinces	DEA and econometric methods	• TCHR[1] • CLSRM[2] • ENTGRD[3] • SDQNT[4] • SDVRBL[5]	• STDNT[6] • QNT[7] • VRBL[8]

Fare et al. (1989)	Missouri	40 school districts in St. Louis	variable returns to scale specification and jackknifing to provide statistical inference	• Number of 8th graders taking BEST test • Net current expenditure • Net assessed valuation • Number of 8th grade teachers	BEST 8th grade test results in each of : • Reading • Mathematics • Economics and Government
Ganley and Cubbin (1992)	England	All English LEAs	DEA	• Secondary school teaching expenditure per pupil • %Children with non-manual head or household • %Children living in houses with all standard amenities • %Ethnicity	• %≥5graded O-level/CSE results • %≥6 draded results at O-level/CSE • %≥1 graded results at O level/CSE
Jesson et al. (1987)	England	All English LEAs	DEA	• Secondary school teaching expenditure per pupil • %Children with non-manual head of household • %Children not from one-parent families • %Ethnicity	• %≥5 higher grade O-level/CSE passes • %≥3graded O-level/CSE results
Johnes and Yu (2008)	China	109 Chinese regular universities	Output oriented DEA with variable returns to scale, (Four models)	• STAFF[9] • STAFFQ[10] • FUNDS[11] • BOOKS[12] • BLPG[13] • PG[14]	• RES[15] • RESPP[16] • REPUT[17]
Krijavainen and Loikkanene (1998)	Finland	291 of 450 senior secondary schools	Use Tobit to explain DEA efficiencies; adopt a jackknifing approach to test robustness of DEA results	• Teaching hours per week • Non-teaching hours per week • Experience of teachers • Education of teachers • Admission level • Educational level of pupils' parents	• Number of students passing grade • Number of graduates • Score in compulsory subjects (matriculation exam.) • Score in additional subjects (matriculation exam.)
Mancebon and Mar Molinero (1998)	Hampshire, Southampton	All primary schools	Uses OLS to explain the DEA efficiences	• Teacher-pupil ratio • %Non on free school meals	• %Successful in SAT2 English • %Sucessful in SAT2 science

Mayston and Jesson (1998)	England	All English LEAs	DEA	• %Children from high socio-economic group households • %Children not from one-parent families • %Children with head of household unemployed	• %≥5 higher grade O-level/CSE • %≥6 higher grade O-level/CSE • %≥1 higher grade O-level/CSE
Ng and Li, (2000)	China	84 Chinese HEIs	DEA	• Research staff • Funding	• publications
Norman and Stoker (1991)	England	One (unnamed) English LEA	DEA	• Running costs • %Children with English as first language • %Children with no referral to counseling • %Children with above average scores in aptitude tests	• Exam results • %Pupils entering employment of higher education on leaving
Thanassoulis and Dunstan (1994)	England	Schools in one (unnamed) British LEA	DEA	• Mean verbal reasoning score on entry • %Pupils not on free school meals	• Mean GCSE score • %Pupils not unemployed after GDSE

Table 1. *Applications of DEA in the context of education*

[1] Number of teachers in each province
[2] Number of classrooms in each province
[3] Average score of students from each province in the high school entrance examination
[4] Standard deviation of the above-mentioned quantitative examinations scores
[5] Standard deviation of the above-mentioned verbal examinations scores
[6] Number of high school students in each province
[7] Average (quantitative examination) score of students from each province in the university entrance examination
[8] Average verbal examination score of students from each province in the university entrance examination
[9] Staff time is measured using a measure of the full-time staff to student ratio (STAFF)
[10] The quality of the staff input is reflected by the percentage of the faculty with the associate professor position of higher (STAFFQ)
[11] Research funding is measured using research expenditure (FUNDS)
[12] Index of library books
[13] Index of the area of the buildings
[14] Index measuring the proportion of all students who are postgraduates
[15] Index of the total number of research publications
[16] Index of research publications per member of academic staff (RESPP)
[17] Index of the prestige of the HEI

7. Conclusion

This paper introduces Data Envelopment Analysis and presents literature survey of DEA in the context of education. It is hoped that these findings will asiist researches in better understanding the status of this methodology in education, and in continuing to move the field forward in the future.

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Innovation Management

P.K.Amed, C.D. Shepherd, ***Innovation Management****, Prentice Hall, 2010*

In this book, modern management is presented as oriented towards meeting the varied and specific customers' needs. In such circumstances, innovation is considered to be the very centre of the corporate growth and development and is perceived as the basic form of both vitality and competitive advantage. This voluminous, over five hundred page book begins with the elaborate description of the concepts of innovation and creativity, and proceedes with the chapters dealing with strategies, particularly technology development strategies and a broader context of strategic technology management. The portfolio management, the innovation process and product management are analysed in detail. The development of innovative organizational culture and leadership are viewed as a key factor of an organizational innovative strategy, and the issues of innovation in the global context are presented through a large number of examples of modern networks of research and development, their different configurations and structures. The concluding chapters deal with the structural processes of development leaning on the key organizational areas that are the leaders in development, with a special insight into the supply chain as a broader context that has an impact upon innovation. The knowledge and learning management are particularly important since their "essential goal is to develop key competences to support strategic goals". Five basic processes are paid special attention to: finding /identifying the existing knowledge, new knowledge creation, ensuring – acquisition of knowledge, storage and access to knowledge, implementation and usage of knowledge.

Conceptually, innovation is rather broadly interpreted and is related to most varied meanings. The authors quote some interpretations of innovation as creation or invention, innovation as diffusion and learning, discrete event, trajectory, incremental or radical change, the process on the level of the firm or the process in the regional or national contexts. Innovation adds value to the product or to the process. It may be external or internal, and the orga-

nization's capacity to adopt external innovation and knowledge is called the absorption capacity. New products and services are only part of the overall efforts made by the companies to make a difference and achieve competitive advantage.

In addition to the primary focus upon the firm, attention is also paid to the issues of national competitiveness, especially in terms of the firm's activities towards achieving competitive advantage and the competitiveness on the national, macro level. On the firm level, the term competitiveness means the firm's opportunity to improve profitability, market share and size. The traditional economics theory points to the typical competitiveness measures based upon the comparative costs of production. Competitiveness is achieved in that a certain output is produced at lower costs. This is achieved either by reducing the costs of the production factors or by increasing the factor productivity. On the micro level, the competitive advantage is claimed to equal competitiveness. The authors, however, point out that it is not the case on the macro, national level, as the usual competetiveness indicators here are expressed through the conditions of international trade. In this context, competitiveness is understood as the extent to which a nation can, in free and fair market conditions, produce goods and services that passed tha controls of international markets and simultaneously sustain and incraese the real income of its citizens. Thus the competitiveness of the national economy becomes a concept that develops and changes contunually and in recent times it is simply explained as a method to improve the standard of living. (OECD, 1996).

The regional innovative clusters are viewed as areas in which innovation "swarm" and are therefore called innovation bee-hives or innovation sunspots, which is presented on the example of the Silicon Valley, California. The reasons for cluster formation are analysed through specific impacts and conditions characteristic of certain geographical areas, through transaction costs, the knowledge economy, competitiveness and trade.

The opportunities offered in certain regions as the reason for cluster forming represent a traditional explanation related to the arguments proposed by Schumpeter and presented as early as 1943, that innovation offers opportunities for entrepreneurs and that companies and individuals who decide to take the opportunity or innovation are attracted by the location, the site they lie at. The attractiveness of a certain business policy has a multiplying effect as that region begins to be recognized by innovation as well as by new opportunities.

The arguments related to transaction costs generally lean on the works of Coase (1937) and Williamson (1975) who maintained that local networks emerge and grow further in order that transaction costs should be reduced.

Explanations in the knowledge economy domain start from modern, evolution theories as well as from theories of trade. In the regions where knowledge and learning accumulate chances are bigger that innovation will result. Innovation and knowledge accumulation are interrelated and intertwined resulting into innovation chains or trajectories. According to Porter, the reasons for innovations to be created lie primarily in the domain of competitiveness. Porter claims that specific combinations of conditions are found within states, and they have a powerful impact upon the competitive strengths of the firms that are seated here. Explanations from the trade domain are related to Krugman who set a hypothesis (1991) that the comparative advantage of the highest-developed world economies is today lost to the economies of low wages and that today developed countries have to create absolute advantage based on innovative capacities and competences. The product and service innovation is focused upon meeting the needs of international consumers. Krugman claims that innovation is a key lever that ensures absolute advantage in trade, but innovation can be created only in the regions characterised by a high level of knowledge. Contrary to Porter, Krugman highlights the importance of international trade in defining the success or the failure of certain regions. Krugman's contribution is considerable when we talk of the demand-induced innovation.

The core of innovation is creativity and this is interpreted from different points of view. From the organizational point of view, creativity is defined as a capacity to consistently achieve different and valuable results. Related to craetivity are the myths and wrong opinions that should be changed; they are often mirrored in the following sayings encountered in practice: "all we need is good ideas", "a good idea will appear by itself", "I will recognize a good idea when I see it", "we have just implemented an excellent idea and now we can take it easy and rest".

Creativity is perceived as a five-key-step process: preparation, innovation opportunity, divergence, incubation, convergence.

In their analysis of generic innovative strategies the authors list three basic types: product/market-oriented strategies, opportunity/risk-oriented strategies, and time (or activity)-based strategies. They are closely connected with technological development where innovation is introduced on each of the firm's levels and domains: in the product/service domain, in the process domain, in the domain of administration, or in strategic domains.

Special chapters are devoted to the technology management and the technology strategies. The best product, service or process technology is one that survives on the market, and the strategic management of technology determines the technology portfolio predicting and estimating future trends in development.

Dr Maja Levi Jakšić

Manual for Authors

TITLE OF PAPER IN ENGLISH
(two lines at the most)

Marko Markovic[1], Ivan Ivanoviæ[2]
[1]Faculty of Organizational Sciences in Belgrade
[2]Faculty of Economics in Belgrade

Abstract - *These are instructions for preparing papers that will be included in the jou rnal. Your papers should be prepared according to the instructions.*

1. INTRODUCTION

Papers have to be written in English. Original papers should be typed one sided A4 format (210x297mm). Use margin 2,5 upper, 2 cm lower, left and right.

Maximal length of paper is 8 pages including tables, text, pictures, literature and other appendices. Pages are numbered with graphite pencil in upper right corner.

Send two copies of the paper (original + one copy) and diskette in format MS Word 6.0.

If the last page of text is not filled up, the columns on the last page should be even, of the same length.

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2. SUBTITLE (SIMULATION MODEL) (example: SIMULATION MODEL)

In the middle of the first page, after one empty line, insert English title of the paper. Use font Times Roman Bold 14 pt.

The name of authors and the names of their institutions in font Times Roman 10 pt. should be centered as in the model given at the beginning of this instruction..

Other parts type in two columns 0,5 cm in between. Paper is typed normal space and double space between paragraphs. Font Roman 10 pt is recommended. Beginning of the paragraph is typed at the very beginning of the columns.

The title of the paper and names of authors are followed by short abstract in Italic. All subtitles are typed in Bold, capital letters same sized as in the previous text (not smaller than 10 pt).

3. SUBTITLE (example: COMPARATIVE ANALYSES)

$$\sigma^2(r_p) = E(\sum_{i=1}^{n}[r_{p,i} - E(r_p)]^2) \qquad (12)$$

All equations type in one column, numerated at the right side, as illustrated.

4. CONCLUSION

All figures, tables or graphic presentations are adapted to the width of one column. If necessary, when the figures do not fit in one column, use the width of the page , and then continue as previously, in two columns. See the figure below.

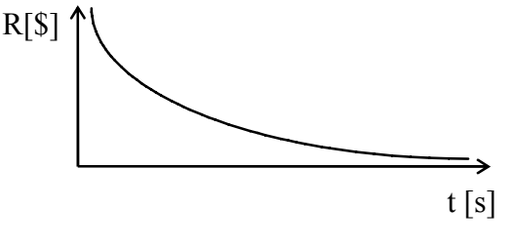

Figure 1. Graphic presentation of results

REFERENCES

Only the literature related to the problems and main ideas presented in paper should be including and ordinal numbers of the references type in angular brackets.

Literature in text has to be quoted in angular brackets to the order of their quotation . For example in [5] it is shown that. The example of literature is shown below.

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